Alexandra Basin Redevelopment 2

Bringing Dublin Port To 2040

Environmental Impact Assessment Report

Chapter 9 Water Quality and Flood Risk Assessment

Volume 2



CALAFORT ÁTHA CLIATH
DUBLIN PORT

TETRA TECH

9 Water Quality and Flood Risk Assessment

Chapter Contents

9 Water Quality and Flood Risk Assessment 9-1
9.1 Introduction 9-2
9.2 Water Quality 9-2
9.2.1 Scope of the Assessment 9-2
9.2.2 Assessment Methodology 9-2
9.2.3 Baseline Environment 9-11
9.2.4 Description of Likely Significant Effects 9-37
9.2.5 Inter-relationships 9-46
9.2.6 Mitigation and Monitoring 9-47
9.2.7 Potential Cumulative Effects 9-56
9.2.8 Residual Impacts 9-67
9.2.9 Summary of Effects and Conclusions 9-67
9.2.10 Limitations of Assessment 9-70
9.3 Flood Risk Assessment 9-70
9.3.1 Scope of the Assessment 9-70
9.3.2 Assessment Methodology 9-70
9.3.3 Baseline Environment 9-73
9.3.4 Description of Likely Significant Effects 9-79
9.3.5 Inter-relationships 9-80
9.3.6 Mitigation and Monitoring 9-81
9.3.7 Potential Cumulative Effects 9-81
9.3.8 Residual Impacts 9-81
9.3.9 Summary of Effects and Conclusions 9-82
9.3.10 Limitations of Assessment 9-84

9.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) comprises an appraisal of the existing Water Quality and Flood Risk conditions within the Project study area and addresses the potential effects of the Project on Water Quality and Flood Risk. The assessment is based on the description of works as noted in **Chapter 5 Project Description**. Where potential adverse impacts are identified, the assessment identifies mitigation measures that will be implemented to prevent, reduce or offset potential adverse effects, or enhance potential beneficial effects where possible.

This chapter has been broken down into the following sub-sections:

Section 9.2: Water Quality

Section 9.3: Flood Risk Assessment

A Water Framework Directive (WFD) Compliance Assessment Report and assimilation capacity calculations have been prepared to support this assessment and are contained within **Appendices 9-1** (WFD Compliance report), **9-2** (Assimilative Capacity) and **9-3** (Assimilative Capacity Calculations) of the EIAR.

9.2 Water Quality

9.2.1 Scope of the Assessment

The primary purpose of this EIAR chapter is to provide an assessment of the likely effects of the Project during the construction and operational phases. Impacts to the receiving water environment and WFD compliance are assessed by establishing existing water quality in the vicinity of the ABR2 Project using available water quality information and WFD monitoring programmes. This chapter then identifies potential significant effects on Water Quality that may arise from the Project and presents mitigation measures that will be implemented to address the potential significant effects.

9.2.2 Assessment Methodology

This section describes the methodology which has been used in the assessment of Water Quality, which may impact or be impacted by the ABR2 Project. The methodology and associated impact assessment had regard to the general guidance for the undertaking of an EIA, as presented in **Chapter 1 Introduction**, as well as Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2008).

Steps taken to produce the chapter include:

- Identify and assess the hazard for all sources of Water Quality impact from the Project;
- Appraisal of the Project with respect to the main sources of Water Quality impacts;
- Consideration of the impact of the Project on Water Quality elsewhere;
- Identification of any mitigation measures required;
- Assessment of any residual impacts; and

- Demonstrate that the Project complies with national planning policy and guidance.

9.2.2.1 Guidance and Legislation

The Water Quality Chapter of the Environmental Impact assessment (EIA) will follow the methodology set out in **Chapter 1 Introduction**. However, specific to the Water Quality EIA Chapter, the following guidance documents and legislation will also be considered:

- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes" (NRA, 2008) – this is further explained in **Section 9.2.2.5**;
- The Marine Strategy Framework Directive (MSFD) 3rd Cycle (2023-2028);
- The European Union Water Framework Directive (WFD) 2000/60/EC;
- The 3rd Cycle River Basin Management Plan (RBMP) 2022-2027;
- The European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009), as amended; this transposes the requirement of the WFD into Irish law and provides Environmental Quality Standards (EQSs) for classifying surface water status;
- European Communities (Quality of Shellfish Waters) (Amendment) Regulations 2009 (S.I. No. 55 of 2009). These regulations classify the standards that are set by the Water Framework Directive for priority substances within the water environment and shellfish waters for Ireland;
- Uisce Éireann Development Management Planning Guidance Notes 2025; and
- Dublin City Development Plan 2022-2028.

Other important pieces of EU and national legislation pertaining to the hydrological environment include:

- European Communities (Water Policy) Regulations, as amended (S.I. 722 of 2003);
- European Union (Water Policy) Regulations 2014 (S.I. 350 of 2014).

9.2.2.1.1 The Marine Strategy Framework Directive (MSFD) 3RD Cycle (2023-2028)

The Marine Strategy Framework Directive (MSFD) (2008/56/EC) was formally adopted by the European Union in June 2008 and is transposed into Irish law by the European Communities (Marine Strategy Framework) Regulations 2011, as amended. The overarching aim of the Directive is to protect Europe's marine waters by applying an ecosystem-based approach to the management of human activities while enabling the sustainable use of the marine environment for present and future generations. The Directive establishes a legal framework for the development of marine strategies designed to achieve Good Environmental Status (GES) in the marine environment by the year 2020. The marine strategy involves defining GES, setting environmental targets and indicators, implementing monitoring programmes for ongoing assessment, and developing and implementing programmes of measures to achieve or maintain GES.

GES is defined as '*the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use*

of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.'

The assessment of GES is undertaken by reference to qualitative descriptors which define overarching objectives in respect of key socio-economic or ecological aspects of the marine environment. These specifically require the consideration of the following:

- Biodiversity;
- Non-indigenous species;
- Commercial fish and shellfish;
- Food webs;
- Human-induced eutrophication;
- Sea-floor integrity;
- Alteration of hydrographical conditions;
- Contaminants in water and biota
- Contaminants in seafood;
- Marine litter; and
- The introduction of energy, including underwater noise.

An Initial Assessment (constituting a comprehensive review of the physical, chemical and biological characteristics of the marine area, as well as the human pressures acting upon it) was undertaken (DHLGH, 2013). A comprehensive set of environmental targets and associated indicators was developed, resulting in 25 revised environmental targets as outlined in Ireland's Article 17 update to Ireland's Marine Strategy Part 1: Assessment (Article 8), Determination of Good Environmental Status (Article 9) and Environmental Targets (Article 10) (DHLGH, 2020). These revised targets align more closely with the requirements of the Birds and Habitats Directives, the Water Framework Directive, and the Common Fisheries Policy. These are being used to demonstrate that GES has been achieved or is being maintained in accordance with the objectives of the MSFD.

An update to part 1 of Ireland's Marine Strategy: Assessment (Article 8), Determination of Good Environmental Status (GES) (Article 9) and Environmental Targets (Article 10) as part of the EU Marine Strategy Framework Directive (MSFD) was published by DHLGH in 2024.

Six of the 11 qualitative descriptors for determining GES, have achieved GES:

- Non-indigenous species;
- Human-induced eutrophication;
- Alteration of hydrographical conditions;

- Contaminants in water and biota;
- Contaminants in seafood; and
- Introduction of energy, including underwater noise.

GES has not been achieved, or only partially achieved, for a number of descriptors:

- Marine Litter;
- Sea floor integrity;
- Biodiversity; and
- Commercial fish and shellfish.

In the case of the elements of marine food webs, the environmental status for this descriptor remains unclear.

An updated monitoring programme has been established by the Department of Housing, Local Government and Heritage (DHLGH) and the Marine Institute to gather and provide scientific data and information for associated assessments, to determine if our marine waters are achieving or maintaining GES (DHLGH, 2021). The information is also used to identify changes in the environmental quality of Ireland's maritime area over time, to track the progress in achieving environmental targets, and to examine the effectiveness of measures designed to improve environmental outcomes. The programme of measures, first developed in 2015, has also been updated (DHLGH, 2022), which established 152 measures, built on existing national, European and International policy frameworks.

The achievement of GES supports the objectives of Marine Spatial Planning (MSP) and, in particular, of the National Marine Planning Framework (NMPF). The environmental policies in the NMPF have been split into nine categories largely aligned to the MSFD GES descriptors, including water quality with a number of water quality policies and environmental targets aligned with the MSFD GES descriptors, eutrophication and contaminants at levels not giving rise to pollution effects (DHLGH, 2021). The assessment of the status of the marine environment and the determination of the characteristics of GES, including threshold values and environmental targets, inform decisions about how to use marine resources sustainably.

To date, the extent of achievement of GES has not been established for individual water bodies; therefore, this water quality assessment relies on the WFD water quality assessment, including protected areas, to ensure that the ABR2 Project will not compromise the achievement of the objectives of the MSFD.

9.2.2.1.2 The European Union Water Framework Directive (WFD) 2000/60/EC

The WFD (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission in December 2000. The WFD requires that all European Union Member States prevent deterioration and protect, enhance and restore all bodies of water. This means that Member States must ensure that new development proposals do not adversely impact upon the environmental objectives of water bodies affected, and that they must address historical modifications that are already impacting a water body.

The WFD was transposed into Irish law through the European Communities (Water Policy) Regulations 2003 (S.I. 733/2003), as amended, in respect of the duties on all public authorities to exercise their functions in a manner consistent with achieving the objectives of the WFD. European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272/2009), as amended, and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9/2010) give further effect to the WFD in Ireland. Article 5 of both these regulations provides that public authorities must not undertake their functions in a manner that knowingly causes or allows deterioration in the status of a water body.

The WFD is given general effect in planning legislation in Section 1A of the Planning and Development Act 2000 (S.I. 30/2000), as amended, and specifically, through amendments made in 2010 which sought to improve how water management and the planning system are integrated.

The EPA consider any development that compromises the achievement of the environmental objectives for a water body, established under the WFD, to represent a significant environmental impact.

The Programme of Measures (POM) outlines the steps that will be taken to meet WFD objectives as applicable to each water body. This POM is contained within an overarching River Basin Management Plan (RBMP). These measures will require implementation at the strategic level, but also at regional and local levels through the establishment of Regional Integrated Catchment Management Programmes.

Areas for Action have been set out in the current third-cycle RBMP, Water Action Plan 2024 – A River Basin Management Plan for Ireland (DHPLG, 2024). The present approach expands on the second-cycle Priority Areas for Action approach and is designed to include a wider selection of Areas for Action, incorporating Areas for Protection, Areas for Restoration and Areas for Catchment Projects. Of four designated areas for action in the Dublin region, two relevant areas occur in the ABR2 Project area: Lower Tolka AFA0693, Dublin City Council Area for Restoration; and Dodder AFA0681, South Dublin County Council and Dublin City Council Area for Restoration. In these areas, local authorities are working to restore water quality as part of their existing work programme, as reported under the RMCEI plan. Activities may include farm inspections, section 4 licences, and domestic wastewater treatment system (DWWTS) inspections under the Water Services Act, other water quality-related projects and programmes, and additional responsibilities under the Water Pollution Act.

9.2.2.2 Water Quality Study Area

The ABR2 Project, including its capital dredging scheme, will take place within the Liffey Estuary. **Figure 9-1** illustrates the Water Quality Study Area. The works are located within one water body: 'Liffey Estuary Lower' transitional water body (water body code: EA_090_0300). The Liffey Estuary Upper water body (water body code: EA_090_0400) is situated upstream of the Port, and the 'Dublin Bay' coastal water body (water body code: EA_090_0000) is located downstream. Other water bodies in the area include the Tolka Estuary (IE_EA_090_0200), as well as several rivers that discharge into the Liffey Estuary and Dublin Bay, principally the Liffey itself and the Dodder, Camac & Poddle and Tolka. The Royal Canal and the Grand Canal also discharge to the Liffey. In addition, several small streams flow from the surrounding areas directly into Dublin Bay. These water bodies are within the Liffey and Dublin Bay catchment (Hydrometric Area No. 09).

The ABR2 Project lies within the 'Dublin Urban' groundwater body (EA-G-008). This water body has achieved and maintained 'good' status in each WFD Monitoring Cycle from 2007-2012 to 2019-2024.

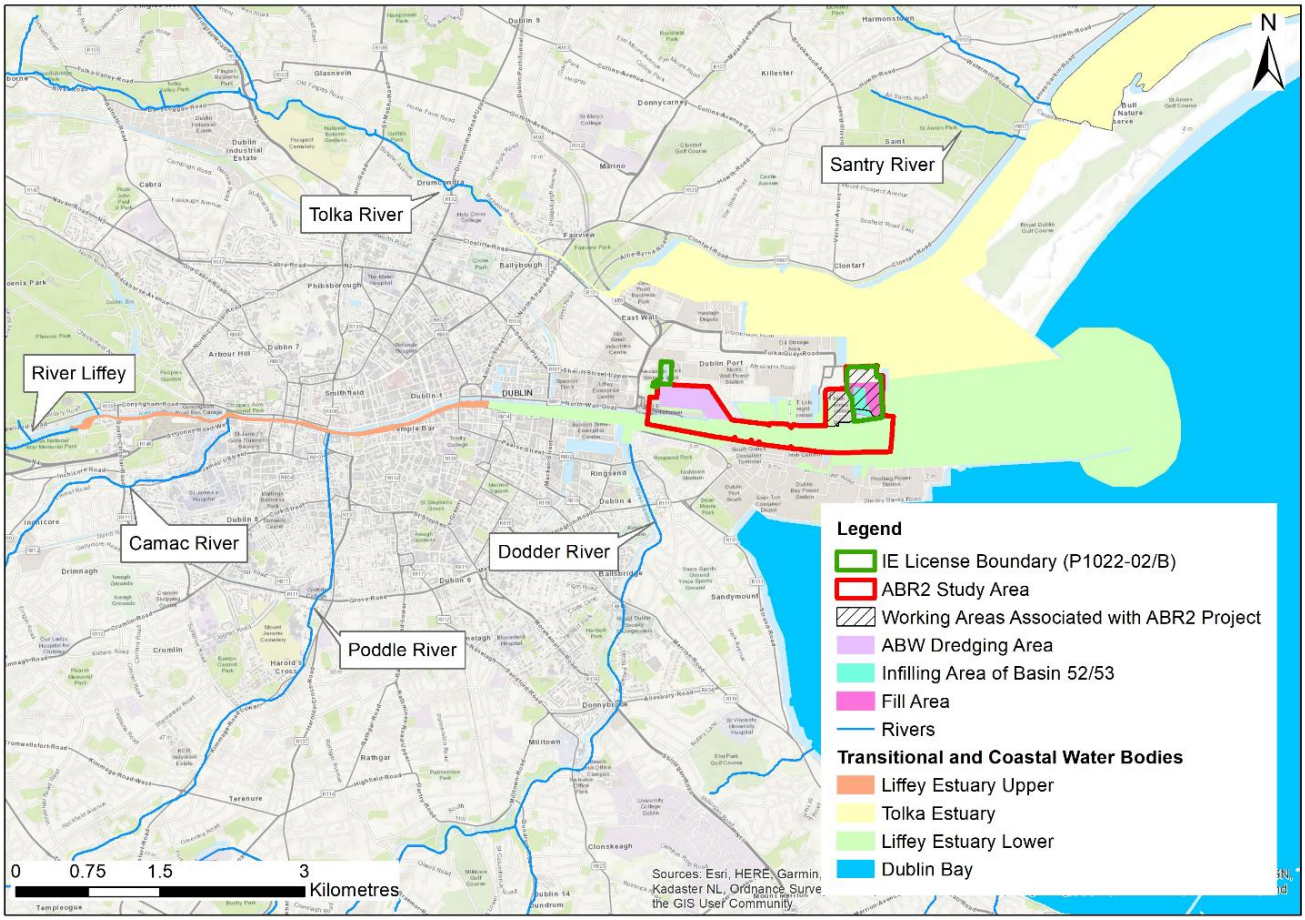


Figure 9-1: Water Quality Study Area

9.2.2.3 Baseline

The baseline environment relevant to this EIAR Chapter was informed by a desktop study of publicly available water quality and protected area information. In addition, DPC's ongoing water quality monitoring programme associated with the redevelopment of the Port provided a comprehensive water quality baseline for review. There were no technical difficulties associated with accessing and reviewing this information.

9.2.2.3.1 Desktop Study

Information on the baseline environment was collected through a desktop review of existing studies and datasets.

The sources used to inform the baseline environment are provided in **Table 9-1**.

Table 9-1: Summary of Key Desktop Data Sources for Water Quality

Data Title	Source/Author	Year
WFD water body status	EPA Water Maps - EPA Maps	2019-2024
Water Quality in 2023: An indicators Report	EPA	2024
Bathing Water Quality 2025	EPA Beaches.ie	2025
Nutrient sensitive areas under the Urban Waste Water Treatment Regulations, 2001	EPA Water Maps - EPA Maps	2025
Water quality monitoring report on nitrogen and phosphorus concentrations in Irish waters 2024	EPA	2025
DPC's water quality monitoring programme	DPC	2025
Marine Institute macroinvertebrate ecological quality status (EQS) assessments in Dublin Bay 2012-2024	Marine Institute	2024
Marine Institute water quality monitoring data for Liffey Estuary Lower and Dublin Bay 2015 –2022	Marine Institute	2022

9.2.2.3.2 Site-specific Surveys

No site-specific surveys have been undertaken to inform the EIA for Water Quality, as the desktop study, including DPC's ongoing water quality monitoring programme, was sufficient to establish baseline water quality conditions.

9.2.2.4 Consultation

Following completion of the EIA Scoping Report, consultation was undertaken to obtain opinions regarding the Project and its potential and scope for significant effects. Specific comments relating to Water Quality are set out in **Table 9-2**, including where additional information in relation to issues can be found in the EIAR.

Table 9-2: ABR2 Project EIA Scoping Report Comments relating to Water Quality

Organisation	Comment Response/Issue Raised	Response
Dublin City Council	DCC advises that the EIAR should take account of the Dublin City Development Plan 2022–2028. DCC also recommends consulting the EPA and EU EIA guidance when preparing the EIAR.	This chapter accounts for the Dublin City Development Plan 2022–2028 by assessing the potential impact of the Project on relevant objectives of sustainable infrastructure policy 9.5.1 Water Supply and Waste Water and 9.5.2 Urban Watercourses and Water Quality. In preparation of this chapter, all relevant EU and EPA guidance were also considered. These are outlined further in **Chapter 1 Introduction**.

Organisation	Comment Response/Issue Raised	Response
		Assimilation capacity calculations, which account for the additional loads from the treatment facility within the existing Industrial Emissions (IE) Directive Licence have been included in **Appendices 9-2** and **9-3**. These are discussed in **Section 9.2.4.1.3**. The impact assessment accounts for potential impacts to receiving waters and protected areas. Mitigation measures are proposed to prevent negative impacts to surface waters as a result of the Project.
Uisce Éireann	UÉ advise that a pre-connection enquiry must be lodged unless it can be demonstrated that the additional water supply required and the additional wastewater loads are both covered by the existing Industrial Emission Licence. The Project must not negatively impact the quality of receiving water, particularly drinking waters. Surface water drainage must be kept separate from foul sewers.	The impact assessment accounts for potential impacts to receiving waters and protected areas. Mitigation measures are proposed to prevent negative impacts to surface waters as a result of the Project. Surface water drainage is discussed in **Sections 9.2.4.2.4** and **9.2.6.1.4.**

9.2.2.5 Assessment Criteria and Assessment of Significance

Determining the significance of effects is a process that involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity for Water Quality are based on those set out in Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2008).

The significance of impact on surface water quality likely to occur during the construction and operational phases of the Project is determined using a predominantly qualitative methodology. The approach to assigning significance of impact relies on reasoned argument, professional judgment and taking on board the advice and views of appropriate organisations.

9.2.2.5.1 Magnitude Criteria

The magnitude of the impact has also been assessed based on the criteria in (**Table 9-3**). Impacts may be considered to have no effect or be negligible to high, and their magnitude has necessarily been assessed on a qualitative basis.

Table 9-3: Criteria for Rating the Magnitude of Impact (NRA, 2008)

Magnitude of Impact	Descriptor
High	Fundamental change to characteristics resulting in permanent consequential beneficial or adverse changes.
Medium	Detectable change to characteristics resulting in non-fundamental temporary or permanent consequential beneficial or adverse changes.
Low	Some measurable change, minor loss or alteration to one (maybe more) key characteristics (Adverse). Minor benefit to one or more key characteristics, features or elements (Beneficial).
Negligible	Very minor loss to characteristics, features or elements (Adverse). Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration to the receptor.

9.2.2.5.2 Sensitivity Criteria

The significance of effects on water quality likely to occur is determined using the predominantly qualitative process described below. The method for determining the significance of effects is a two-stage process. The first step in the process is to determine the sensitivity of the receiving environment and then to define the magnitude of the potential impact. This section describes the criteria applied in this chapter to assign values to the receptor to assist in defining the sensitivity of receptors (**Table 9-4**).

Table 9-4: Criteria for Rating Receptor Sensitivity (NRA, 2008)

Value (Sensitivity)	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

9.2.2.5.3 Significance of Effects

The significance of effects refers to the consequences of an impact. The significance of the effect upon Water Quality receptors is determined by correlating the magnitude of the impact and the sensitivity of the receptor. A range of significance of effect is presented in **Table 9-5**. The final assessment of significance for each effect is based upon expert judgement of the peer-reviewed literature.

For the purposes of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

To conclude the assessment, mitigation measures are proposed to reduce, avoid and prevent these likely significant effects, where appropriate. This enables a “with mitigation” assessment to be made of any residual impact as a result of the construction and operational phases of the Project and/or in combination with other existing or approved projects in the vicinity of the Project.

Table 9-5: Defining Impact Significance (NRA, 2008)

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

9.2.3 Baseline Environment

9.2.3.1 WFD Water Body Status

Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the WFD), and transposing regulations, European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003), as amended by the European Communities (Water Policy) (Amendment) Regulations, 2005, establish a legal framework for the protection, improvement and sustainable management of rivers, lakes, transitional waters (estuaries), coastal waters (to a distance of one nautical mile) and groundwater.

The aim of the WFD is to prevent deterioration of the existing status of waters and to ensure that all waters are classified as at least 'good' status (by 2015 in most cases, with all waters achieving good status by 2027 at the latest). A water body must achieve both good 'ecological status' and good 'chemical status' before it can be considered to be at good overall status.

The European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009) as amended, establish Environmental Quality Standards (EQSs) for classifying surface water status. These regulations set standards for biological quality elements, physico-chemical conditions supporting biological elements (including general conditions and specific pollutants), priority substances and priority hazardous substances.

The 'ecological status' of a water body is established according to compliance with the EQSs for biological quality elements, physico-chemical conditions supporting biological elements and relevant pollutants. The 'chemical status' of a water body is established according to compliance with the EQSs for priority substances and priority hazardous substances (SI No. 272 of 2009).

As illustrated in **Figure 9-1**, the ABR2 Project will take place within the Liffey Estuary Lower transitional water body, upstream of the Dublin Bay coastal water body. The WFD status of the Liffey Estuary Lower water body was reported as moderate ecological potential in 2024 (**Figure 9-2**). The overall status of each waterbody (2007-2024 WFD status) in the vicinity of the ABR2 Project is outlined in **Table 9-6** and a breakdown of the current WFD Status is outlined in **Table 9-7**.

The ABR2 Project lies within the 'Dublin Urban' groundwater body (EA-G-008). This water body has achieved and maintained 'good' status in each WFD Monitoring Cycle from 2007-2012 to 2019-2024. All these

waterbodies are grouped into the 'Liffey and Dublin Bay Catchment' (HA09) of the Irish River Basin District. Due to the nature of the ABR2 Project and the limited scale of geotechnical activities in the application area, there are no likely significant water quality effects expected on groundwater.

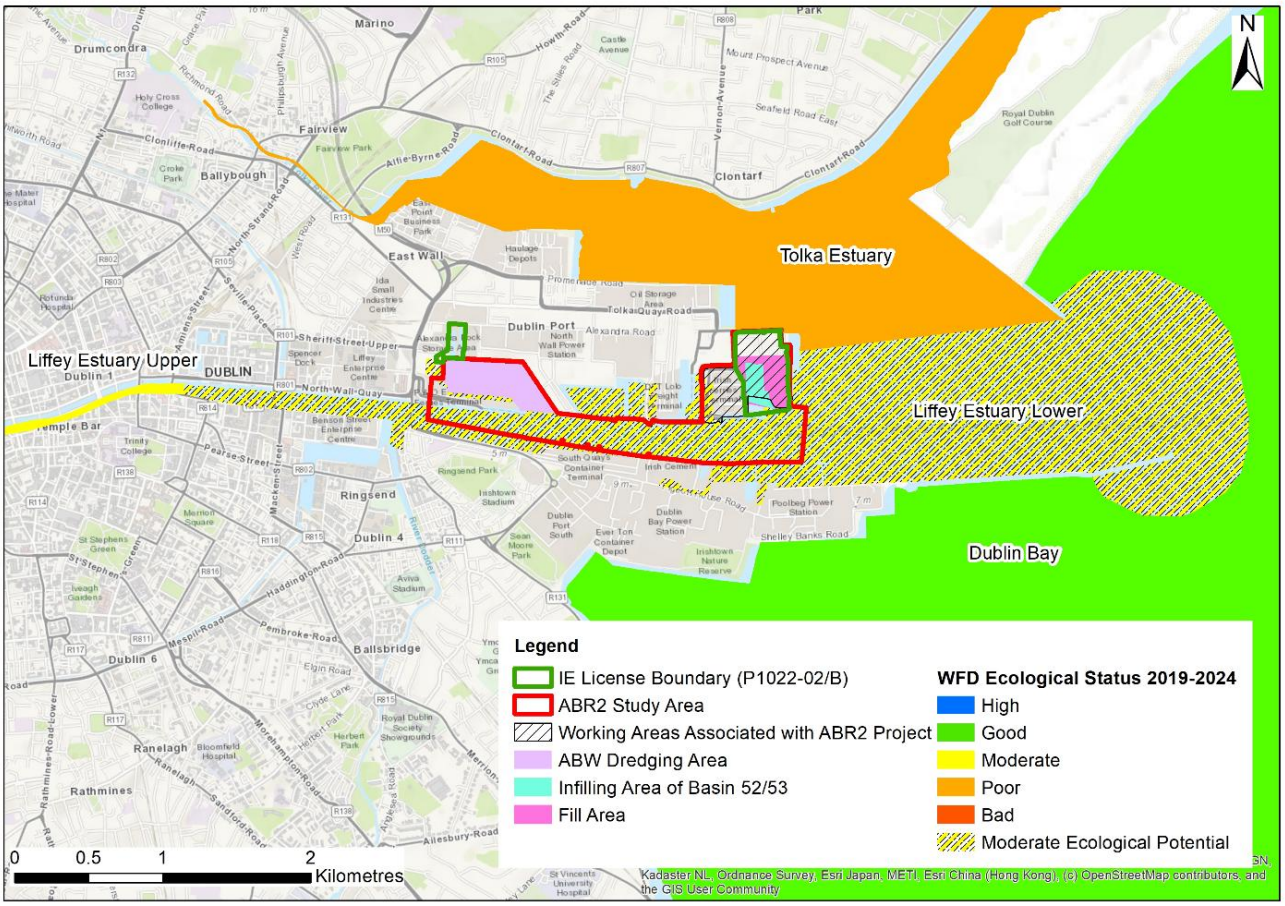


Figure 9-2: 2024 WFD Water Body Status

Table 9-6: WFD Status (2007-2024)

WFD Status 2007-2024	Liffey Estuary Lower EA_090_0300	Liffey Estuary Upper EA_090_0400	Tolka Estuary EA_090_0200	Dublin Bay EA_090_0000
Overall WFD Status (2007-2009)	Moderate Ecological Potential	Poor	Moderate	Moderate
Overall WFD Status (2010-2012–interim)	Good Ecological Potential	Moderate	Moderate	Good
Overall WFD Status (2010-2015)	Moderate Ecological Potential	Moderate	Moderate	Good
Overall WFD Status (2013-2018–interim)	Good Ecological Potential	Good	Moderate	Good
Overall WFD Status (2016-2021)	Moderate Ecological Potential	Good	Poor	Good
Overall WFD Status (2019-2024)	Moderate Ecological Potential	Moderate	Poor	Good

The Liffey Estuary Lower deteriorated in status from ‘good status’ in 2013-2018 to moderate in 2016-2021 and remains at this classification based on the latest monitoring programme, 2019-2024. This Liffey Estuary Lower water body is reported as having ‘moderate’ ecological potential due to fish status, and also has moderate hydromorphological status. This is due to the Heavily Modified Water Body (HMWB) designation for the Liffey Estuary Lower for navigation and shipping activities. The EPA noted that there are significant pressures from the Ringsend Wastewater Treatment Plant and Combined Sewer Overflows that are causing this less-than-good status classification.

Table 9-7: Breakdown of contributing elements to the 2019-2024 WFD water body status

WFD Status 2019-2024 Contributing Elements	Liffey Estuary Lower EA_090_0300	Liffey Estuary Upper EA_090_0400	Tolka Estuary EA_090_0200	Dublin Bay EA_090_0000
Ecological Status or Potential	Moderate	Moderate	Poor	Good
Biological Status or Potential	Moderate	Moderate	Poor	Good
Phytoplankton Status or Potential	Good	Good	Good	High
Other Aquatic Flora Status or Potential	N/A	N/A	Poor	Good
Macroalgae Status or Potential	N/A	N/A	Poor	Good
Angiosperm Status or Potential	N/A	N/A	N/A	Good
Invertebrate Status or Potential	Good	N/A	Moderate	Good
Fish Status or Potential	Moderate	Moderate	Moderate	N/A
Hydromorphological Conditions	Moderate (HMWB)	Poor	Good	Good
Supporting Chemistry Conditions	Good	Moderate	Moderate	High
General Conditions	Good	Moderate	Moderate	High
Oxygenation Conditions	Good	Moderate	Moderate	High
Dissolved Oxygen (% Sat)	High	Moderate	Moderate	High
Other determinant for oxygenation conditions	Good	High	High	High

WFD Status 2019-2024 Contributing Elements	Liffey Estuary Lower EA_090_0300	Liffey Estuary Upper EA_090_0400	Tolka Estuary EA_090_0200	Dublin Bay EA_090_0000
Nutrient Conditions	Good	Moderate	Moderate	High
Other determinant for nutrient conditions	Good	Moderate	Moderate	High
Phosphorous Conditions	Good	High	Good	High
Orthophosphate	Good	High	Good	High
Specific Pollutant Conditions	Good	N/A	N/A	Pass

9.2.3.2 Heavily Modified Water Body Designation (HMWBs)

HMWBs are bodies of surface water which have been substantially changed in their hydromorphological character for the purposes of a specified use. The hydromorphological condition of water bodies has commonly been significantly modified by human intervention for various specified uses, such as for navigation, land drainage, hydroelectric power generation and water supply. The environmental objectives for HMWBs recognise that the extent of the modifications means that the conditions are not consistent with those required for Good Ecological Status (GES), and that the impacts cannot be fully mitigated without impacting on the specified use.

The specified uses and the criteria for designation are set out in Article 4(3) of the Directive. A waterbody can be designated as a HMWB if:

a. the changes to the hydromorphological characteristics of that body which would be necessary for achieving GES would have significant adverse effects on:
    i. the wider environment;
    ii. navigation, including port facilities, or recreation;
    iii. activities for the purposes of which water is stored, such as drinking-water supply, power generation or irrigation;
    iv. water regulation, flood protection, land drainage, or
    v. other equally important sustainable human development activities;
b. the beneficial objectives served by the artificial or modified characteristics of the water body cannot, for reasons of technical feasibility or disproportionate costs, reasonably be achieved by other means, which are a significantly better environmental option. Such designation and the reasons for it shall be specifically mentioned in the RBMPs required under Article 13 and reviewed every six years.

The structures and changes to channel and bed morphology required for a water body to be used for navigation and ports are typical of the type of modifications that result in the designation of a water body as heavily modified.

The DHLG's RBMP 2022-2027 acknowledges that "Initial evidence indicates that there are more waterbodies that have been heavily modified than have previously been designated to date, both within the specified use categories included in the first cycle, and in some of the other specified use categories not previously considered.

The RBMP also states:

"It is important to reiterate, that waterbodies with a heavily modified designation are still expected to meet the required standards for all the other water quality elements, with measures to mitigate to the greatest extent possible the hydromorphological impacts also required."

As highlighted in the Review of Ireland's HMWB Designations for the Third Cycle RBMP (EPA, 2022):

"Waterbodies that are designated as heavily modified have a WFD environmental objective of Good Ecological Potential rather than GES. The designation means that a realistic objective is set that acknowledges that the water body has been physically altered for a specified use that society needs to be continued. The physical modifications caused by the use need to be mitigated against as far as possible, whilst acknowledging that the specified use needs to be retained. For example, a fish pass designed to best practice standards might be required on an instream barrier to ensure fish passage".

In the EPA review, the designation tests required for the designation of Transitional and Coastal Water bodies as heavily modified, as required under Article 4(3), were applied. The Lower Liffey Estuary retains its designation as HMWB for the third cycle of the RBMP, as it remains substantially changed in terms of its hydromorphology and will not achieve GES due to these changes. The EPA concluded that there are no restoration measures available that would not impact the specified use, i.e. navigation and ports, and there are no alternative options which are a significantly better environmental option, technically feasible and not disproportionately costly (EPA 2022).

The Liffey Estuary Lower is therefore one of 13 transitional and coastal water bodies that have been designated as heavily modified under the "navigation and urban uses" specified use category.

Waterbodies that are designated as heavily modified have a WFD environmental objective of Good Ecological Potential (GEP) rather than GES. The designation means that a realistic objective is set that acknowledges that the water body has been physically altered for a specified use that society needs to be continued. The physical modifications caused by the use need to be mitigated against as far as possible, whilst acknowledging that the specified use needs to be retained.

Therefore, the designation of the Liffey Estuary Lower as a HMWB means that mitigation measures will need to be applied to address hydromorphological pressures as far as practicable whilst still retaining the specified use of the water body, i.e. navigation and ports.

What GEP will represent in the HMWB designations will be a decision for the EPA, and whilst hydromorphological supporting conditions will be mitigated to the greatest extent possible through the

application of mitigation measures, HMWBs will still be expected to meet the required standards for other water quality elements.

9.2.3.3 Protected Areas

A significant proportion of the area of Dublin Bay and the adjacent coastline is protected under existing EU legislation requiring special protection due to its sensitivity to pollution or particular environmental importance. All of the areas requiring special protection in the Irish River Basin District have been identified by the EPA, mapped, and listed in a national register of protected areas (required under Article 6 of the WFD). The register of protected areas includes:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- Areas designated for the protection of economically significant aquatic species, i.e. Freshwater Fish and Shellfish;
- Bodies of water designated as recreational waters, including areas designated as bathing waters;
- Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under the Urban Waste Water Treatment Directive; and
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites (Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)).

These protected areas have their own monitoring and assessment requirements to determine their condition. They are often assessed for additional pollutants or requirements relevant to their designation. Protected areas within the Dublin Port and Dublin Bay area include areas of Bathing Waters, Nutrient Sensitive Waters and Natura 2000 sites.

9.2.3.3.1 Bathing Waters

There are three bathing waters in the vicinity of the ABR2 Project (Dollymount Strand, Sandymount Strand and Seapoint Strand) designated under the Bathing Water Directive (2006/7/EC), which came into force in March 2006, and was transposed into Irish law by the Bathing Water Quality Regulations, 2008, as amended. The previous 1976 Directive was repealed with effect from 31st December 2014. Since 2014, the annual water quality classification (rating) of a beach or lake has been based on water quality results covering a four-year period rather than a single previous season's data. Water quality at beaches and lakes is classified as: Excellent; Good; Sufficient; or Poor.

According to Bathing Water Quality in Ireland: A report for the year 2024 (EPA, 2025), Dollymount Strand had Good Water Quality, Sandymount Strand had Poor Water Quality, and Seapoint Strand had Excellent Water Quality for the 2021 - 2024 monitoring period (**Figure 9-3**).

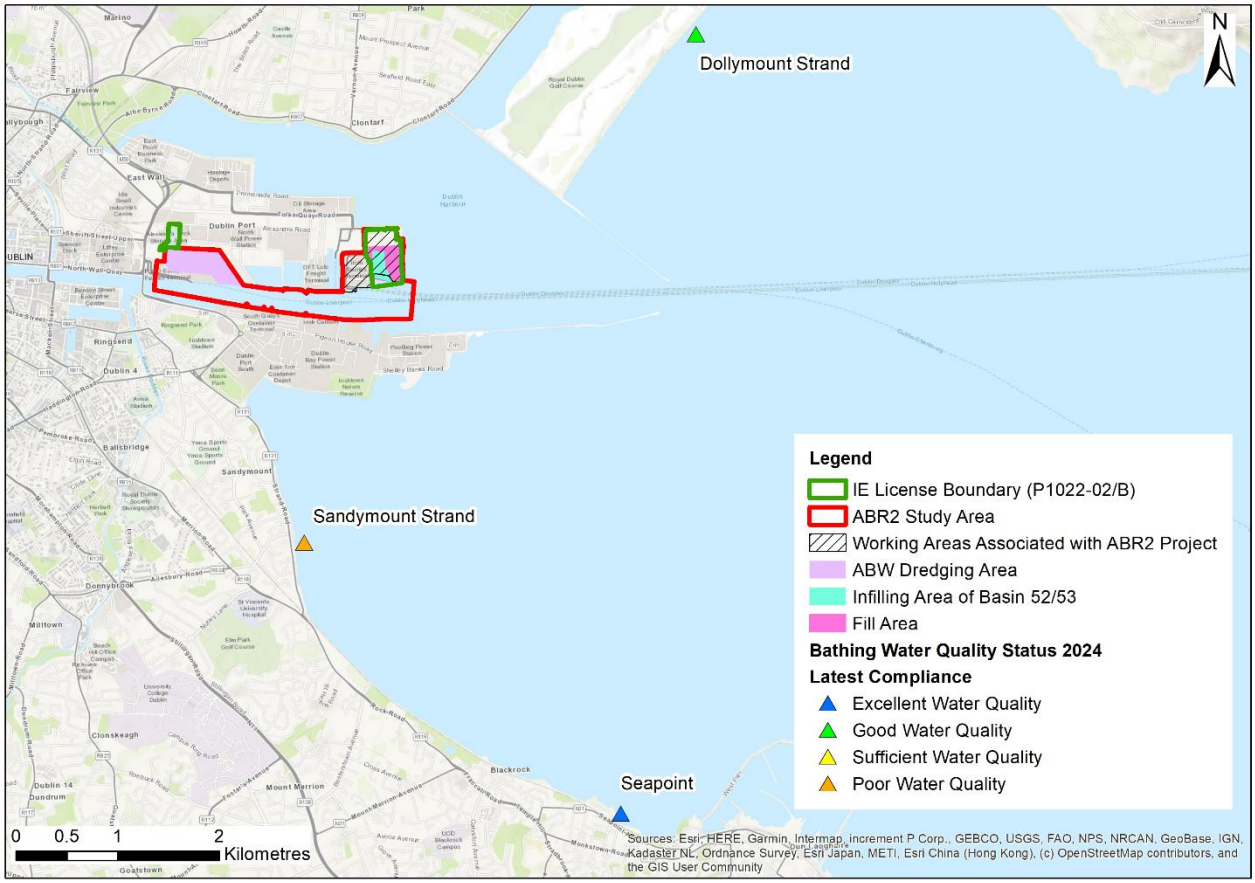


Figure 9-3: Bathing water quality in the Dublin Bay Area 2024

The main sources of pollution resulting in the Poor classification in Sandymount Strand are misconnections and sewage overflows, which contaminate streams flowing to the bathing water, as well as dog fouling left on the beach and birds. The Dublin Bay Bathing Water Taskforce (chaired by DCC) was established in 2019 to help identify and fix pollution sources impacting on bathing water quality. Programs to identify and fix misconnections are ongoing by the local authority. Uisce Éireann has made significant improvements to the wastewater network and work is ongoing to address urban wastewater pressures.

9.2.3.3.2 Nutrient Sensitive Waters

The Urban Waste Water (Nutrient Sensitive Areas) Regulations 2025 (S.I. No. 403/2025) give further effect to EU Directives 91/271/EEC (the Urban Wastewater Treatment Directive) and Directive 2000/60/EC (the Water Framework Directive). Schedule 3 of S.I. No. 403/2025 lists Sensitive areas for the purpose of the Regulations. The Liffey Estuary Lower, Liffey Estuary Upper and the Tolka Estuary waterbodies are identified as sensitive areas in relation to the Ringsend wastewater treatment agglomeration (**Figure 9-4**). Regulation 4(2) requires Uisce Éireann to provide more stringent treatment than secondary treatment in respect of discharges from Ringsend into sensitive areas, or into the relevant catchment areas of sensitive areas where the discharges contribute to the pollution of these areas. Ringsend WWTP currently discharges to the Lower Liffey Estuary and is in the List of Priority Urban Areas (EPA, 2025), where treatment must improve to resolve national environmental priorities. Wastewater treatment at Ringsend has been assessed as inadequate and failing to

meet EU treatment standards. It exerts significant pressure on waters at risk of pollution and has contributed to poor quality bathing water.

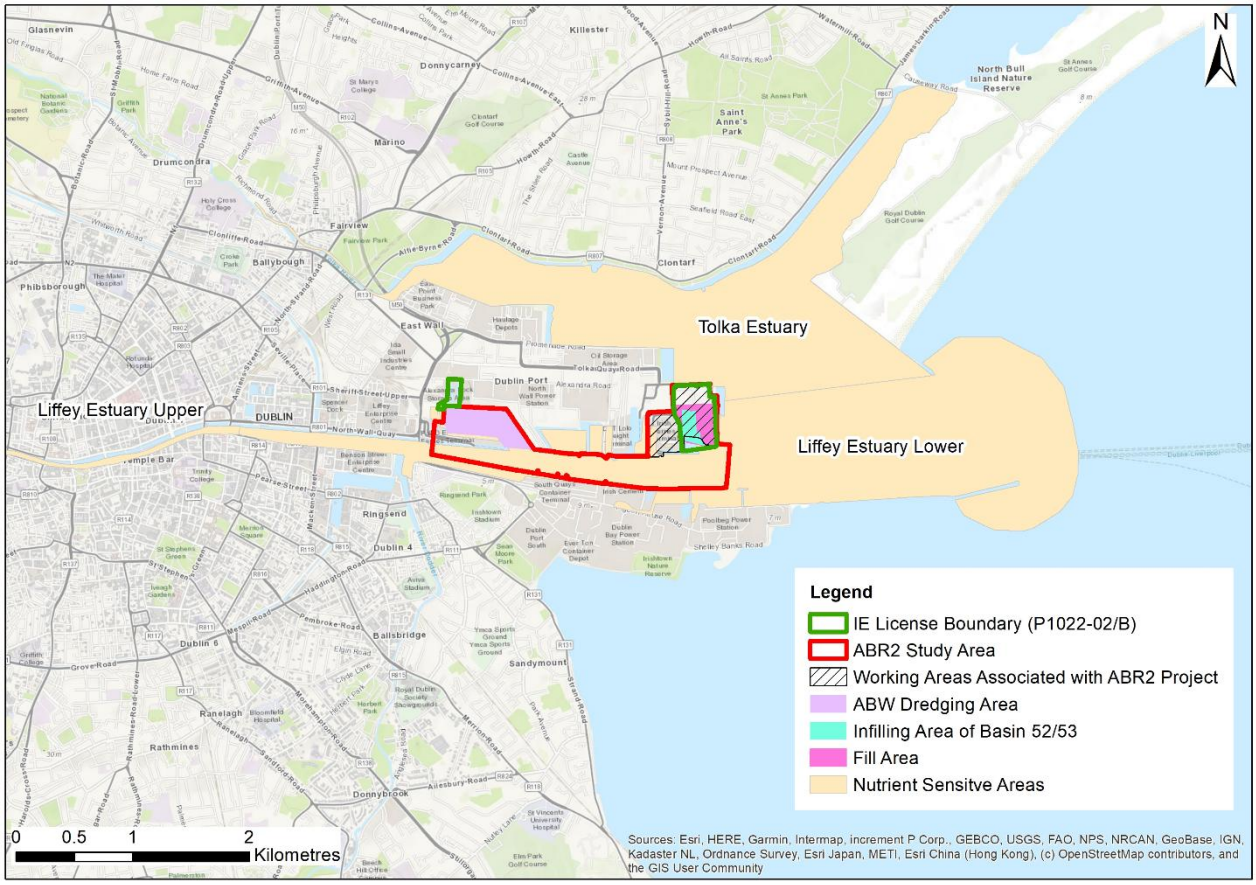


Figure 9-4: Nutrient Sensitive Areas

9.2.3.3.3 Natura 2000 Protected Areas

Natura 2000 is a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) places an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of SPAs, established under the EU Birds Directive (79/409/EEC), and SACs, established under the Habitats Directive itself.

As illustrated in **Figure 9-5**, the ABR2 Project does not fall within any Natura 2000 site (i.e. SPA or SAC), although it is adjacent to the South Dublin Bay and River Tolka Estuary SPA, about 500m from the South Dublin Bay SAC, and about 2.5km from the North-West Irish Sea SPA. North Bull Island SPA and Howth Head SAC are also 2.5km and 7km from the ABR2 Project, respectively. The potential of likely significant effects from the ABR2 Project has been assessed in **Chapter 7 Biodiversity, Flora and Fauna**. It should also be noted that, separately and distinctly, potential effects on Natura 2000 or “European” sites have been considered extensively in the Screening for Appropriate Assessment and Natura Impact Statement submitted with the application for development consent in respect of the ABR2 Project.

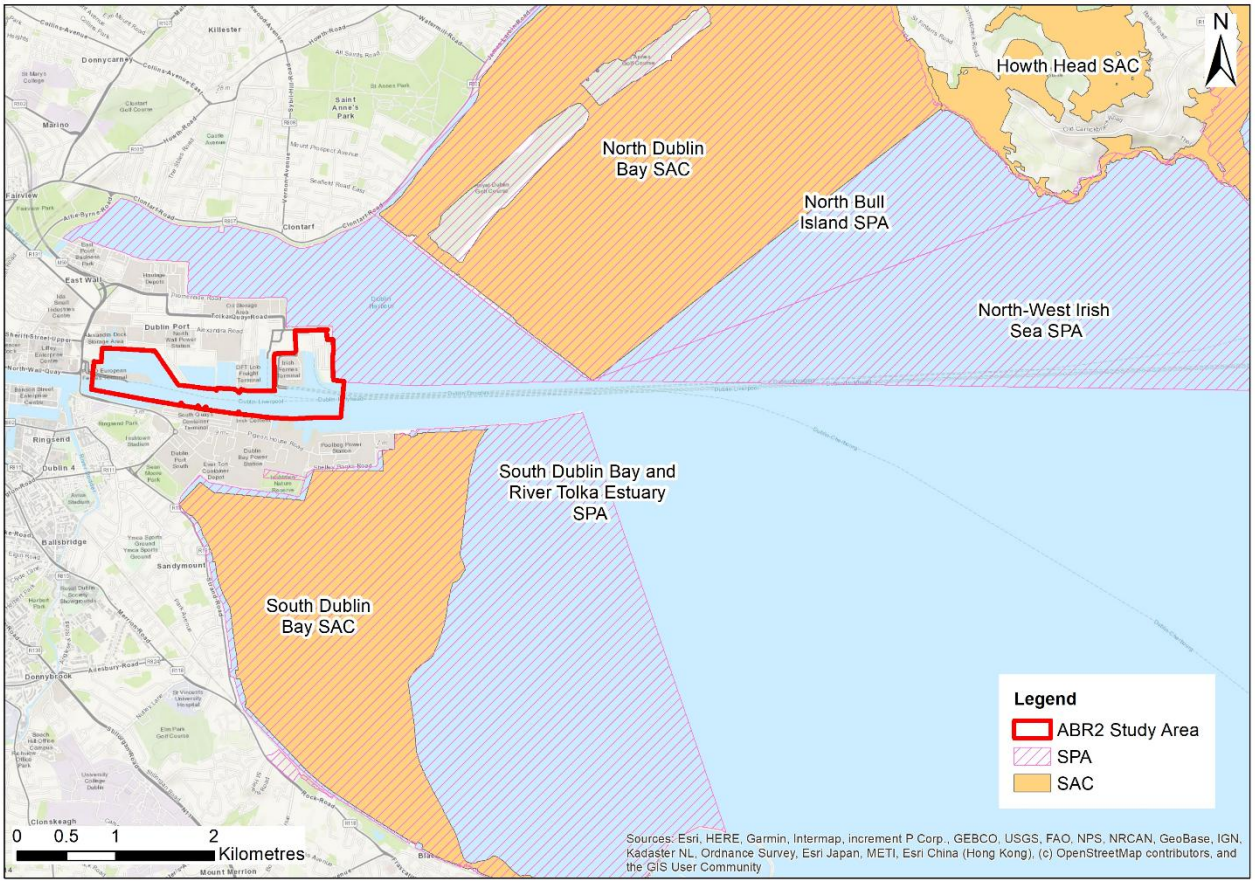


Figure 9-5: Natura 2000 Designated Sites – SACs & SPAs

9.2.3.3.4 Drinking Waters

There are no designated drinking water surface water bodies or groundwater abstraction points in the vicinity of the ABR2 Project which may be impacted by the proposed works.

9.2.3.4 EPA Water Quality Report 2023: An Indicators Report

In 2024, the EPA published the Water Quality in 2023: An Indicators Report. This report covered the 2019-2021 monitoring period. The intention of the report is to keep decision makers and the public informed by providing timely, scientifically sound information on water quality using a series of water quality indicators. Of the ten water quality indicators, three relate to coastal and transitional water bodies in close proximity to the ABR2 Project:

- Nitrogen in Transitional and Coastal Waters;
- Phosphorus in Transitional and Coastal Waters; and
- Nutrient Inputs to the Marine Environment.

9.2.3.4.1 Nitrogen in Transitional and Coastal Waters

Nitrogen is generally considered the primary limiting nutrient in coastal ecosystems, meaning that the concentration of this nutrient can limit the growth of algae and aquatic plants. Increases in nitrogen can lead to elevated growth of phytoplankton and/or macroalgae. Levels of Dissolved Inorganic Nitrogen (DIN) are

monitored in winter, when levels are expected to be at their seasonal maximum due to the absence of any significant plant or algal growth.

The EPA have defined salinity-dependent thresholds for DIN in transitional and coastal waters, and there is an environmental quality standard for coastal waters. These assessment thresholds range from ≤2.6mg N/l at a salinity of 0 to ≤0.25mg N/l at a salinity of 34.5 and are used to assess the water quality of transitional and coastal waters around Ireland. DIN concentrations above the assessment threshold indicate the presence of elevated nitrogen levels from anthropogenic sources. The indicator uses the median winter DIN concentration for the period 2021–2023 to assess the number of exceedances against the assessment threshold.

The EPA 2023 Indicators Report has reviewed trends in some coastal and transitional water bodies. The Liffey Estuary Lower, the Tolka Estuary and Dublin Bay have been included in this analysis. The report indicates that the median DIN concentration trend between 2012 and 2023 has changed in the Liffey Estuary Lower with an upward trend in winter DIN concentrations; however, the median concentrations recorded in the 2021 to 2023 monitoring period were still 49% to 15% below the threshold.

9.2.3.4.2 Phosphorus in Transitional and Coastal Waters

Phosphorus is important in transitional systems because it is limiting in lower salinity waters. Salinity-dependent thresholds have been defined for phosphorus in transitional and coastal waters, and there is an EQS for transitional waters (S.I. 272, 2009). The assessment threshold is 0.06mg P/l for fresh to intermediate salinity waters and ranges from 0.059–0.040mg P/l for intermediate to full salinity waters. Phosphorus concentrations above these thresholds can indicate excess phosphorus being transported to surface waters due to anthropogenic activity. Levels of Molybdate Reactive Phosphorus (MRP) are monitored in winter when levels are expected to be at their seasonal maximum due to the absence of any significant plant or algal growth. Winter (January–March) phosphorus exceedances give an indication of available nutrients without the influence of biological activity, which mainly occurs during the summer growth period.

The report indicates that the median MRP concentration trend between 2012 and 2023 has remained stable for the Liffey Lower Estuary, the Tolka Estuary and Dublin Bay. It also reports that the Liffey Estuary Lower, the Tolka Estuary and Dublin Bay have experienced no exceedances in the Winter MRP threshold with concentrations between 15% and 49% lower than the MRP Standard.

In this water quality assessment, consideration has been given to potential effects of the development on these nutrient-related environmental indicators.

9.2.3.4.3 Nitrogen Inputs to the Marine Environment

Nutrient inputs to the marine environment, expressed as loadings, from 19 major rivers are monitored to provide an indicator of the loss of nutrients from land-based sources. High loadings of nutrients, both nitrogen and phosphorus, can have significant impacts on our marine ecosystems. The nutrient loads are calculated based on nutrient concentrations, measured 12 times a year, and river flow, which is monitored continuously.

The loadings are reported on a national basis, and nitrogen loads to the marine environment were slightly lower in 2023 compared to 2022 but were similar to 2021 and 2020, indicating no improvement over the last four years. Phosphorus loads to the marine environment were slightly higher in 2023 compared to 2022 but again indicate little change over recent years. The largest contributions of both nutrients come from catchments in the

south east of the country. The Liffey catchment contributes less, which is consistent with the nitrogen and phosphorus concentrations in transitional and coastal waters in the vicinity of the ABR2 Project, as outlined in the previous sections on nitrogen and phosphorus in transitional and coastal waters.

9.2.3.5 Water Quality Monitoring Report on Nitrogen and Phosphorus Concentrations in Irish Waters 2024

In 2025, the EPA published the Water Quality Monitoring Report on Nitrogen and Phosphorus Concentrations in Irish Waters 2024. This report used phosphorus and nitrate data from the national water quality monitoring programme 2022- 2024 for groundwater, rivers, lakes, estuarine and coastal waters. Data was collected from monitoring stations that are representative of the impact of agriculture on water quality, i.e., monitoring stations that also reflect the impacts of predominantly urban or industrial pressures were not included. The results are expressed as winter medians of DIN and MRP for estuarine and coastal waters.

9.2.3.5.1 Phosphorus in Estuarine and Coastal Waters

Nationally, 97.5% of estuaries and coastal waters assessed were in satisfactory condition, and these were predominantly located in the west. The Liffey Estuary Lower is reported as 15% to 49% lower than the threshold value for good quality status, which is established for each individual water body based on salinity. The Liffey Estuary Upper transitional water body and Dublin Bay coastal water body are more than 50% below their respective threshold values for good quality status.

9.2.3.5.2 Nitrate in Estuarine and Coastal Waters

Of the 119 estuarine and coastal water bodies assessed, 23 were in unsatisfactory condition for winter DIN concentrations. The Liffey Estuary Upper transitional water body is 1% to 50% above its threshold value, while the Liffey Estuary Lower is reported as 15% to 49% lower than the threshold value. The Dublin Bay coastal water body is more than 50% below its threshold value and is also demonstrating a consistent downward trend from 2014 to 2024.

9.2.3.1 Marine Institute Monitoring

The Marine Institute has carried out monitoring since 2012 to determine macroinvertebrate ecological quality status (EQS) in coastal and transitional waters around the Irish Coast in order to fulfil requirements of the WFD. As part of this programme, sampling is carried out once every three years at seven sites in the Lower Liffey Estuary, and at fifteen sites in the Dublin Bay coastal waterbody (**Figure 9-6**), and the status of the benthos is calculated using the Invertebrate Quality Index (IQI).

Monitoring of Dublin Bay in 2024 determined that sediments tend to be comprised of muds and fine sands with some gravel component in places. Furthermore, the communities surveyed in Dublin Bay continue to be characteristic of the shallow muddy fine sand sediments sampled. It should be noted that, in the 11 sampling events since 2012, the benthic macro-invertebrate EQS has been classed as Good or better each year (**Table 9-8**).

The IQI is a versatile metric capable of determining impact on benthic macro-invertebrates resulting from organic enrichment, chemical contamination, and physical disturbance (i.e., smothering). It is clear from the benthic monitoring carried out in Dublin Bay that the condition of the benthos is broadly consistent from year-to-year

and represented by Good Ecological Quality Status. The Marine Institute therefore further concluded that the effects of dredging (both loading and spoil disposal) do not appear to be impacting the wider seabed invertebrate communities in Dublin Bay.



Figure 9-6: Dublin Bay Water Framework Directive benthos Sampling points in the Liffey Lower (n=7) and Dublin Bay (n=15). General location of spoil site is also provided.

Table 9-8: WFD (IQI) benthos scores Dublin Bay (2012-2024)

	2012	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024
IQI - Score	0.765	0.664	0.717	0.747	0.753	0.708	0.733	0.729	0.722	0.727	0.712
EQS	High	Good	Good	Good	High	Good	Good	Good	Good	Good	Good

The Marine Institute (MI) also monitors water quality at two locations in Dublin Bay and one location in the Liffey Estuary Lower (**Figure 9-7**). Available physico-chemical monitoring data from January 2015 to March 2018 have been collated and are summarised in **Figure 9-8**.

The mean turbidity measured by MI at Dublin Bay stations 1 and 2 is 8NTU. This is in agreement with measurements made at the coastal monitoring buoys in the ABR Project, where mean turbidity at four sites and at three depths ranged from 7.5 to 14.8NTU. The mean turbidity measured in the Liffey Estuary Lower (based on data from September and November 2018 only) is 21NTU. This compares with mean turbidity of 1.3 to 7.0NTU measured at four sites in the Liffey Estuary from March 2024 to April 2025 during Dublin Port's ABR and MP2 Projects. The slightly higher turbidity measured by MI may relate to the time of year when measurements were made at this site (September and November). It also reflects the greater variance in turbidity in the dynamic port area.

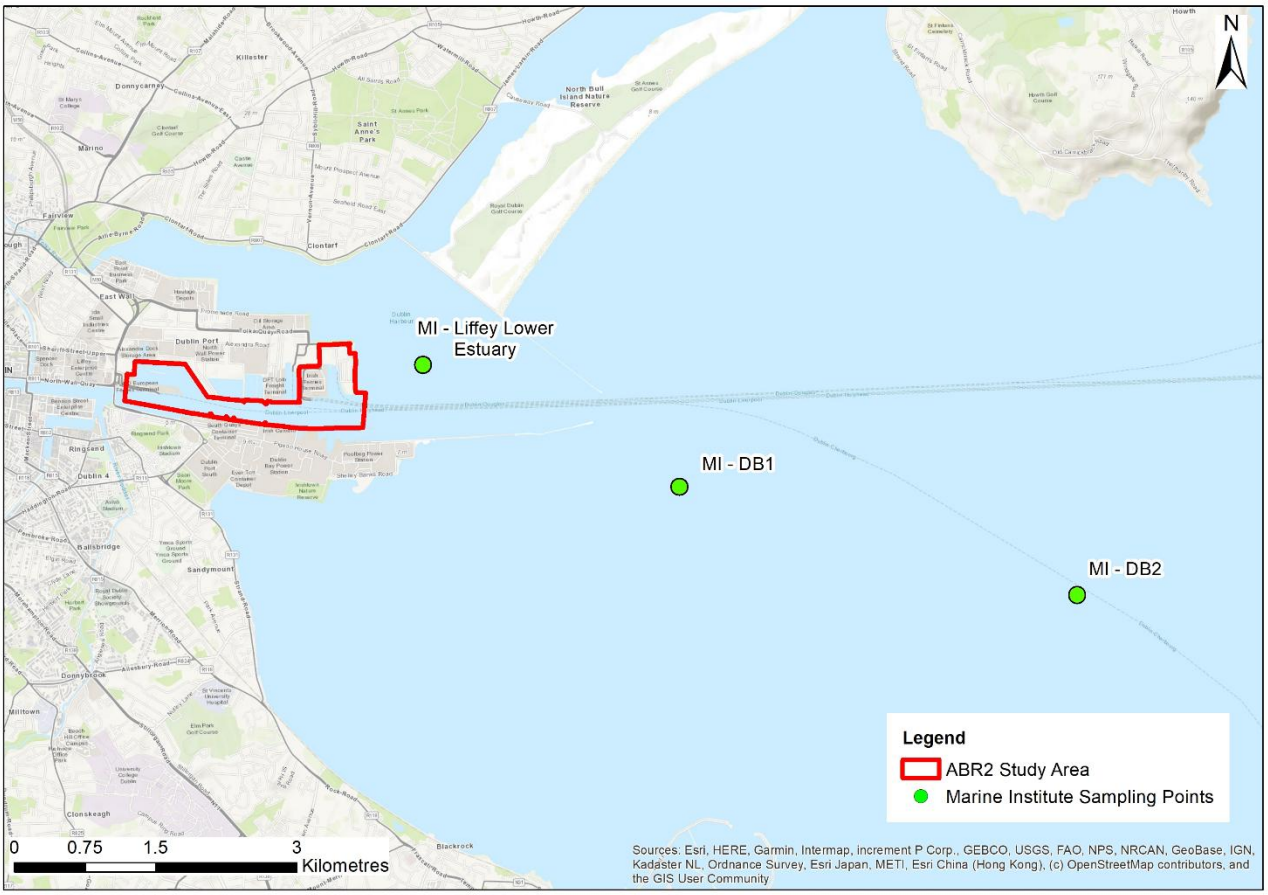


Figure 9-7: Marine Institute Monitoring Locations

Dissolved oxygen levels are 8.9mg/l at both Dublin Bay sites and slightly lower in the Liffey Estuary at 8.3mg/l. This compares with average dissolved oxygen levels of 7.3 to 8.9mg/l measured in the Liffey Estuary during the ABR and MP2 Projects for 2024 to 2025 and confirms that dissolved oxygen is typically around saturation levels.

This Marine Institute monitoring data provides a baseline of existing turbidity levels and variations, giving context for the assessment of potential construction and operational activities.

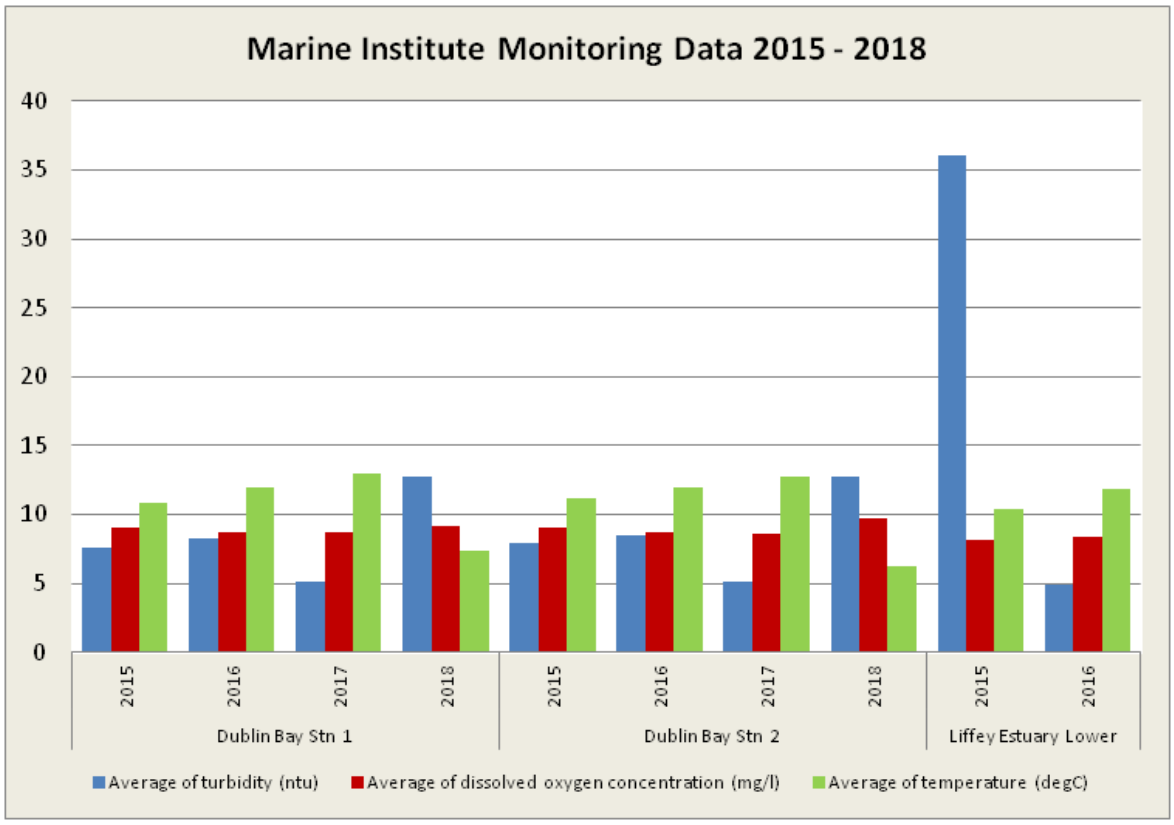


Figure 9-8: Marine Institute Summary Water Quality Data 2015 – 2018

9.2.3.2 Dublin Port Company Monitoring Programme (ABR/MP2 Projects)

Dublin Port Company is carrying out extensive monitoring of water quality in Dublin Port and Dublin Bay as part of its ABR Project and MP2 Project.

Monitoring stations have been established in the Port since 2016 to provide detailed information on relevant water quality parameters. The locations of these stations have been agreed with the Planning Authority. They measure real-time water quality and continuously relay the data to a shore-based location. Trigger levels that initiate investigations have been set for key water quality indicators to allow a quick response and remedial actions, including the temporary cessation of the works where appropriate.

Monitoring stations were also established in Dublin Bay at the licensed dredge dumping site as required by Dumping at Sea Permit S00024-01 to provide for the protection of the marine environment by way of monitoring the impacts associated with the loading and dumping at sea activity during dredging operations. Continuous real-time turbidity monitoring was carried out from 2017 to 2021 at four stations and at various depths, along with tidal current and wave climate.

9.2.3.2.1 Within Dublin Port

Monitoring Stations

Four water quality monitoring stations have been established at locations within the Liffey Estuary (**Figure 9-9**). The sites represent ambient surface water quality in the Liffey Estuary Lower and in the Tolka Estuary water bodies. The monitoring station at the Tolka Estuary is mounted on an OSIL Inshore 0.6m Monitoring Buoy. At

the East Link, Poolbeg Sludge Jetty and North Bank Light stations, the monitoring apparatus has been secured to permanent in-river structures. Monitoring data is available for the period 2017 to 2026.

Four parameters are measured at each of the water quality stations (turbidity, temperature, dissolved oxygen and salinity). In addition, the water level is measured at the Poolbeg Sludge Jetty station. More recently, pH measurement has been added to the suite of parameters recorded. Measurements are made every 15 minutes using a Hydrolab Multiparameter HL4 Sonde with integrated sensors. A secure stilling tube maintains the sonde at a fixed point below the surface, and a watertight compartment on the structure houses a data logger and communications hardware. Data are relayed from the monitoring stations via a 4G connection, and a secure web-based data hosting service (Hydromet Cloud) is used to visualise, process and distribute the information.



Figure 9-9: Water Quality Monitoring Stations in the Dublin Port Area

Turbidity and Total Suspended Solids

Turbidity is monitored as a proxy for total suspended solids (TSS) in water due to the ease and frequency with which it can be measured. Turbidity is a measure of the cloudiness or haziness of water caused by material suspended in the water, such as soil particles, sediment, or small floating algae. Particles are often small and can remain in suspension in the water for lengthy periods. Turbidity can be caused by natural events such as flooding, algal growth, water currents, wind and wave action, as well as human activities.

Turbidity is measured in NTU (Nephelometric Turbidity Units), which is basically a measure of the amount of light scattered by particles in suspension. It is readily measured on site and can be used to give a rapid estimate of the total amount of suspended solids in the water. Measuring the total suspended solids concentration requires taking water samples for filtration, weighing and drying in the laboratory.

The relationship between turbidity and suspended solids in water is site-specific. It is influenced by the type of sediment in suspension, its colour, shape and reflectivity. Therefore, a sediment sample from the Liffey at East Link Bridge was taken and used to establish a relationship between turbidity and suspended solids for the Port area. The sediment consisted of sandy silt, and suspensions were prepared from this sample to provide turbidity in the range 0 to 150NTU. Turbidity (NTU) and TSS (mg/l) were measured for 75 suspensions to allow construction of a calibration curve (**Figure 9-10**).

This relationship can be used to estimate total suspended solids from turbidity readings at the monitoring stations in the Port area. Based on this relationship, a factor of 2.5 is used to convert turbidity (units of NTU) to Total Suspended Solids (units of mg/l).

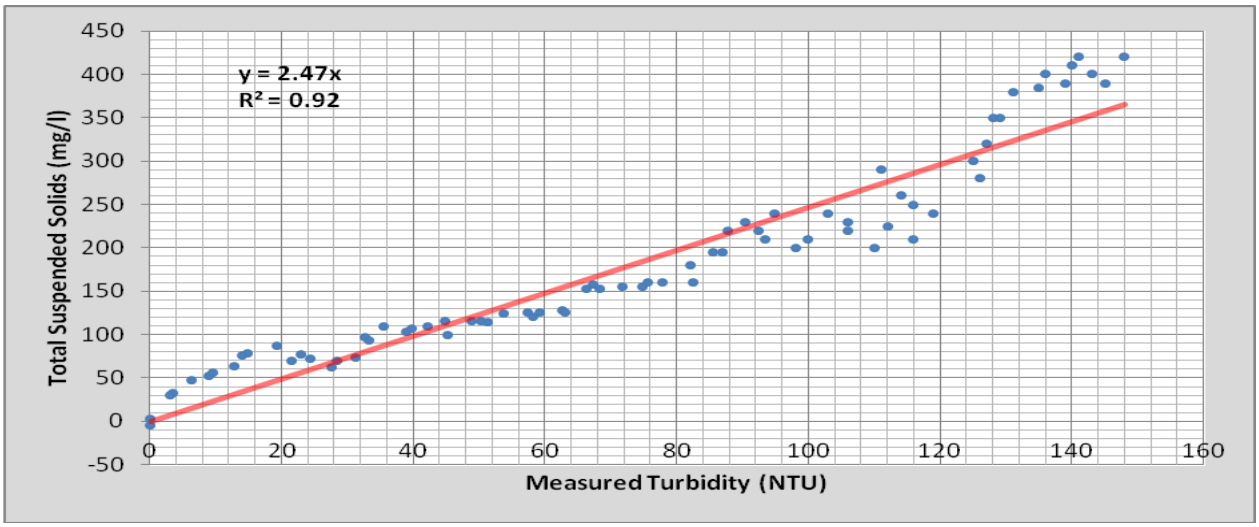


Figure 9-10: Relationship Established between Turbidity and Total Suspended Solids (Inner Liffey Channel)

Dissolved Oxygen, Temperature and Salinity

The amount of oxygen dissolved in the water is reported as milligrams per litre (mg/l). Aquatic animals breathe using the oxygen dissolved in the water. The level is therefore critically important, particularly for fish. Salmon and trout begin to be affected by low oxygen levels at about 6 mg/l (around 50% saturation), and at dissolved oxygen levels below 1.7mg/l, death of some adult fish is likely.

Temperature is one of a number of factors that can affect oxygen levels in water. When freshwater is saturated with oxygen, it can hold about 12.7mg/l of oxygen at a temperature of 5°C; this reduces to 9.1mg/l at 20°C. High

temperatures also promote more rapid microbiological breakdown of organic wastes, and this can also use up oxygen in the water.

Other factors, including salinity and atmospheric pressure, can also affect dissolved oxygen levels. For example, seawater holds about 20% less oxygen than freshwater when saturated, and algae produce oxygen during the daylight hours when they are photosynthesising, but use it up during darkness when respiring. These factors produce seasonal, daily and tidal rhythms of higher and lower dissolved oxygen levels.

Salinity is measured in PSU (practical salinity units). Full seawater has a salinity of about 35PSU, while freshwater has a value close to zero. As well as influencing the type of animals and plants that occur in the water, salinity affects many aspects of the water's chemistry and physical properties (including the amount of oxygen dissolved in the water, as demonstrated above).

Summary statistics for the period 2017 – 2025 are set out in **Table 9-9** to **Table 9-12** based on individual 15-minute interval measurements at each station. Although maximum and minimum values are given for each parameter, these reflect extreme outlier values that are highly unlikely to be representative of general ambient water quality. The percentile values listed give a more robust indication of the true dispersal of the measurements, and clearly, most of the measurements (90% of them) lie between the 5th percentile (5%ile) and 95th percentile (95%ile) values listed.

The graphs in **Figure 9-11** to **Figure 9-14** show the 24-hour average values for turbidity, dissolved oxygen, temperature, and salinity at each of the monitoring stations. The timing of dredging campaigns undertaken between 2017 and 2025 (capital and maintenance dredging) is also shown. Some data gaps occur due to several causes, e.g. fouling of instruments, apparatus failure or damage.

Table 9-9: Summary Statistics for Dissolved Oxygen, Salinity, Temperature and Turbidity at Eastlink Monitoring Station (2017 – 2025) based on measurements taken at 15-minute intervals

	Turbidity (NTU)	DO (mg/l)	Salinity (ppt)	Temperature (°C)
Mean	2.3	7.7	32.2	11.7
Max	638.0	16.3	39.7	22.2
Min	0.0	1.9	0.0	2.0
5%-ile	0.0	5.5	28.4	6.9
95 %-ile	9.0	9.6	34.5	17.1
n	279813	273840	272814	280064

Table 9-10: Summary Statistics for Dissolved Oxygen, Salinity, Temperature and Turbidity at Poolbeg Monitoring Station (2017 – 2025) based on measurements taken at 15-minute intervals

	Turbidity (NTU)	DO (mg/l)	Salinity (ppt)	Temperature (°C)
Mean	5.6	8.3	31.7	12.6
Max	2394.0	16.5	39.7	24.9
Min	0.0	1.6	0.0	3.2
5%-ile	0.0	6.5	25.1	7.6
95 %ile	21.0	9.9	34.8	17.9
n	246415	251523	241905	249784

Table 9-11: Summary Statistics for Dissolved Oxygen, Salinity, Temperature and Turbidity at Northbank Monitoring Station (2017 – 2025) based on measurements taken at 15-minute intervals

	Turbidity (NTU)	DO (mg/l)	Salinity (ppt)	Temperature (°C)
Mean	3.8	8.3	32.2	12.0
Max	913.0	16.6	40.7	21.7
Min	0.0	0.9	0.0	1.5
5%-ile	0.0	6.3	25.9	7.0
95 %ile	13.0	9.9	35.3	17.3
n	246972	246283	247242	248940

Table 9-12: Summary Statistics for Dissolved Oxygen, Salinity, Temperature and Turbidity, at Tolka Monitoring Station (2017 – 2025) based on measurements taken at 15-minute intervals

	Turbidity (NTU)	DO (mg/l)	Salinity (ppt)	Temperature (°C)
Mean	5.9	8.9	31.3	12.0
Max	719.3	17.2	38.1	25.2
Min	0.0	2.1	5.6	4.0
5%-ile	0.0	7.6	25.9	6.9
95 %ile	20.8	10.4	34.8	17.2
n	174743	181487	175454	182383

Summary statistics show that in general, salinity remains high at all sites. Mean salinities are approximately 32PSU, and 90% of values lie between 25.1PSU (5%ile) and 35.3PSU (95%ile). Occasionally, freshwater influences result in lower values, resulting from events such as major rainstorms when riverine freshwater inputs increase, or sondes transitioning to surface freshwater layers at particularly low tides.

Water temperature shows the expected seasonal trend. Average daily temperature peaks during July and August (95%ile 17.1 to 17.3°C) at East Link, North Bank Light and Tolka Estuary. The temperature at the Poolbeg site is slightly higher (95%ile 17.9°C) compared to the other three sites. The higher temperatures here probably reflect the influence of the nearby cooling water streams.

The two water quality parameters of greatest significance are turbidity and dissolved oxygen. **Table 9-9** to **Table 9-12** show that turbidity can be very variable. However, turbidity levels are generally low in the Port area. The sites recording the highest turbidity in general were Poolbeg (95% of values recorded at this site are less than 21.0NTU) and Tolka Estuary (95% of values recorded at this site are less than 20.8NTU). East Link recorded the lowest turbidity in general, and 95% of all values were less than 9NTU. Tidal scour, particularly during low spring tides, also influences turbidity, particularly at the shallower monitoring locations (Poolbeg and Tolka Estuary).

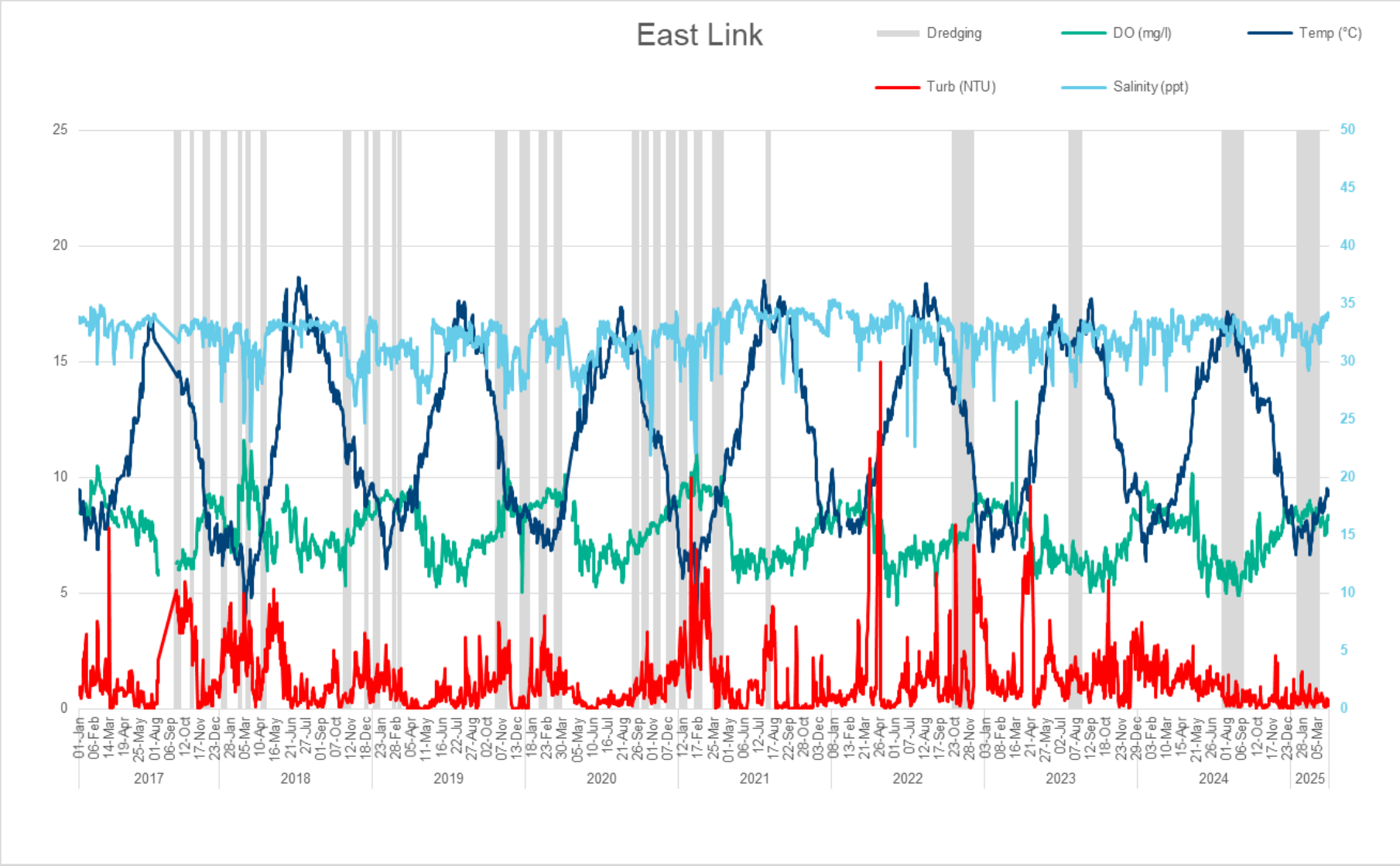


Figure 9-11: Plots of 24-Hour Averages for Water Quality measurements made at Eastlink Monitoring Station (2017-2025). Dredging Periods shown by Grey Bars. Salinity on right axis, all other parameters on left axis.

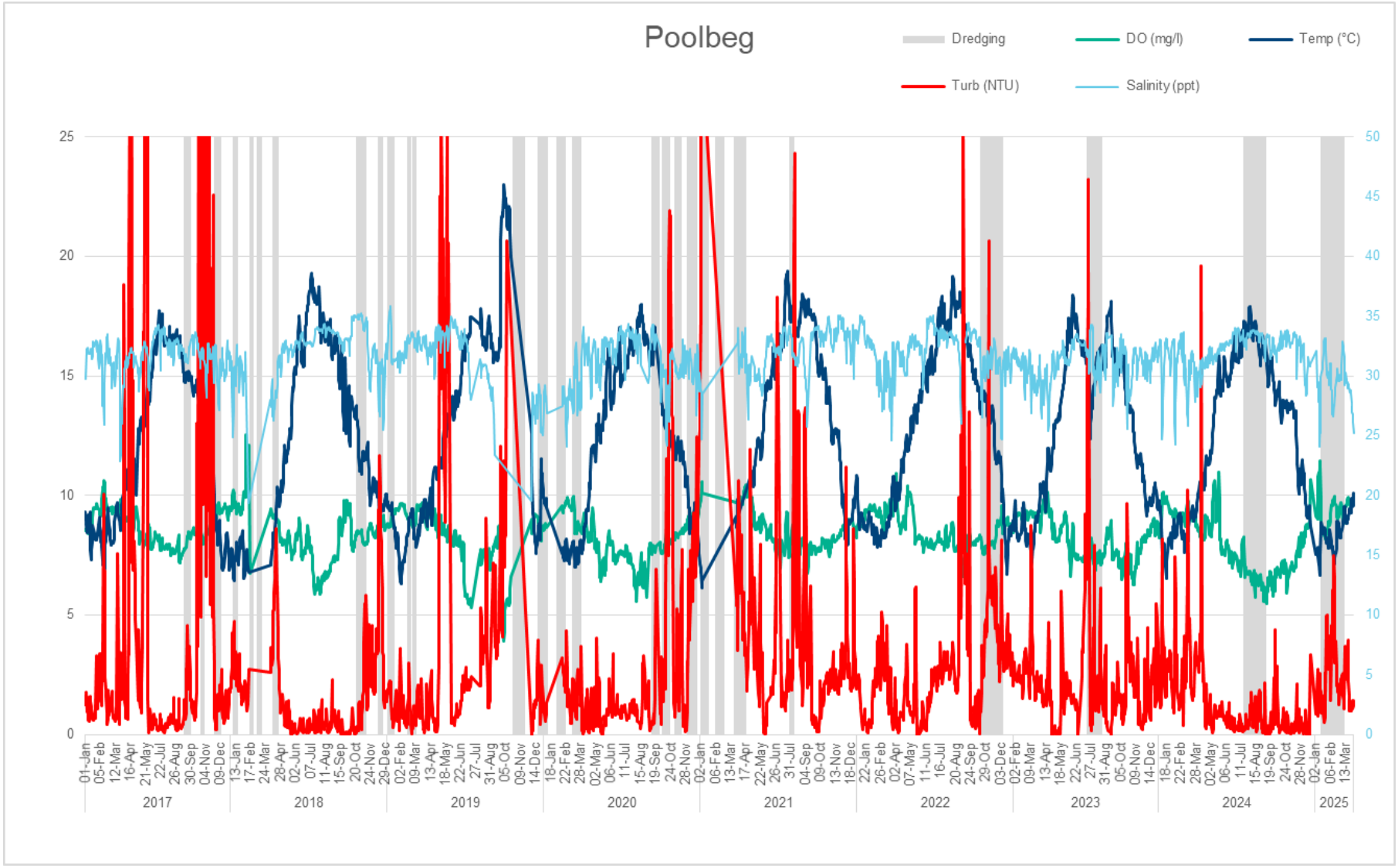


Figure 9-12: Plots of 24-Hour Averages for Water Quality measurements made at Poolbeg Monitoring Station (2017-2025). Dredging Periods shown by Grey Bars. Salinity on right axis, all other parameters on left axis.

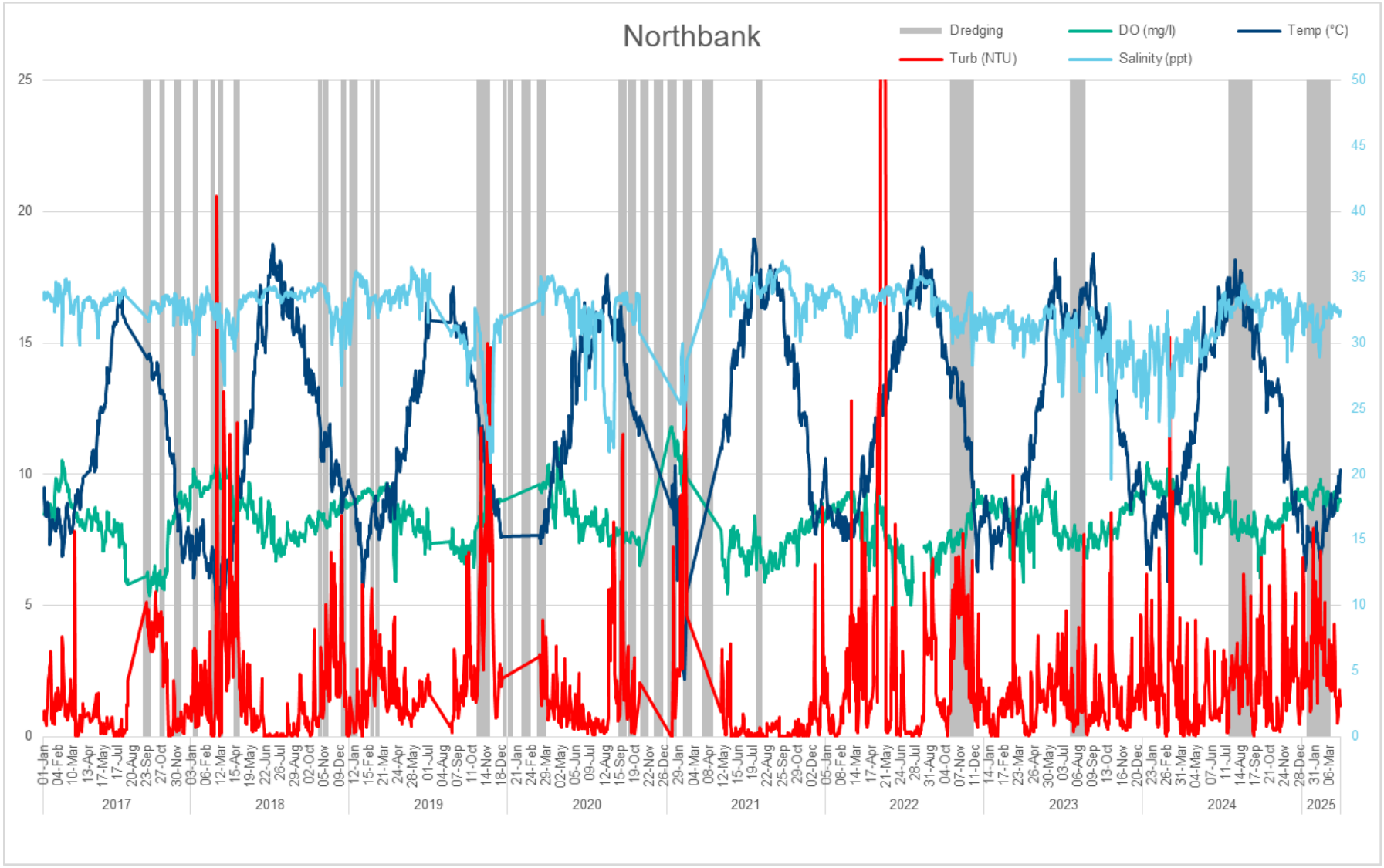


Figure 9-13: Plots of 24-Hour Averages for Water Quality measurements made at Northbank Monitoring Station (2017-2025). Dredging Periods shown by Grey Bars. Salinity on right axis, all other parameters on left axis.

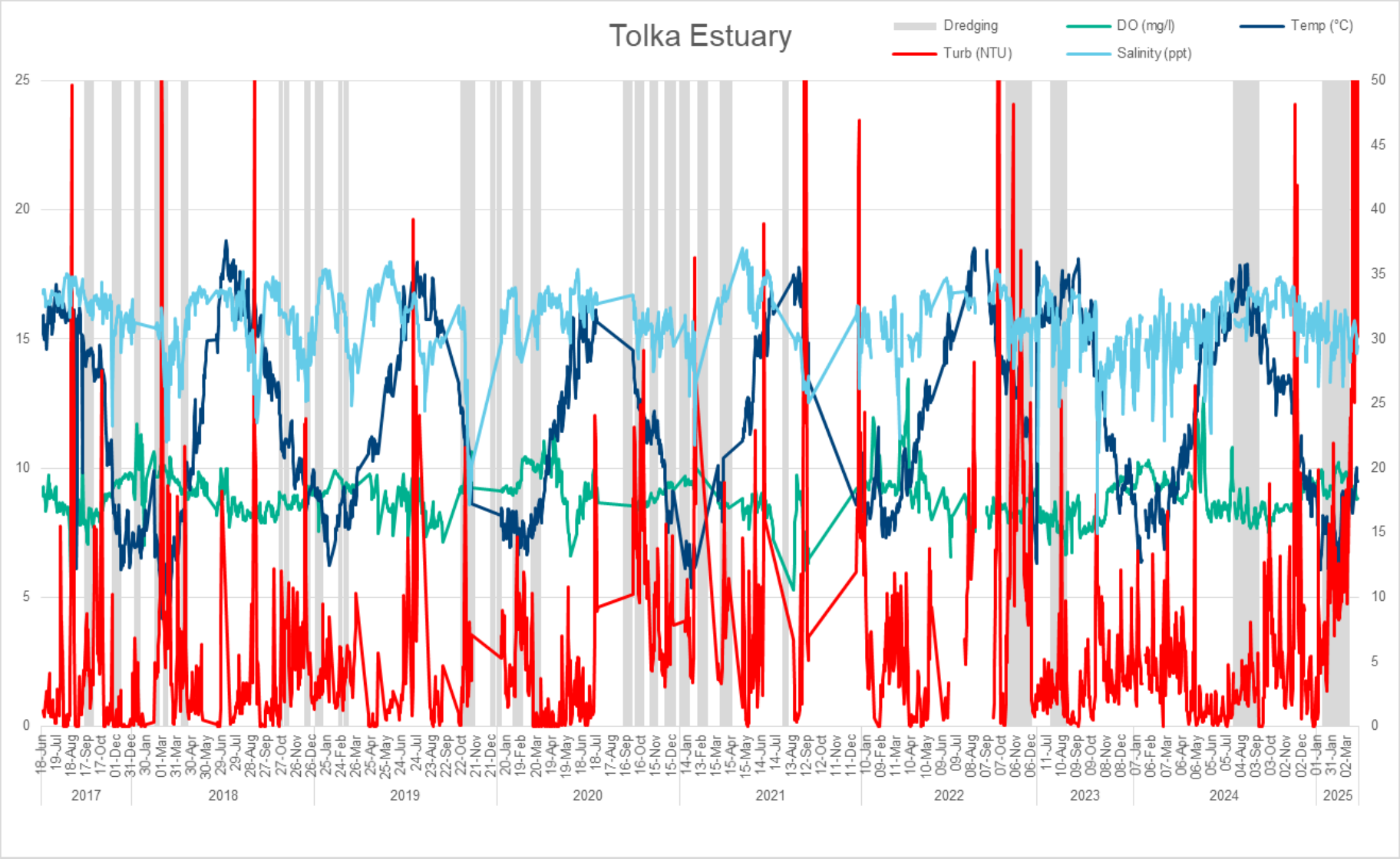


Figure 9-14: Plots of 24-Hour Averages for Water Quality measurements made at Tolka Monitoring Station (2017-2025). Dredging Periods shown by Grey Bars. Salinity on right axis, all other parameters on left axis.

Periods of higher turbidity often occur during the winter period, and storms are a major factor in generating elevated turbidity. High turbidity in October 2017 resulted from the impact of Storm Ophelia, followed quickly by Storm Brian. Maximum wave heights of 4.8m and 3.8m, respectively, were recorded in Dublin Bay during these storms. The impact of Storm Ophelia on turbidity is illustrated in **Figure 9-15**. A further high turbidity event occurred in February/March 2018 and was caused by Storm Emma, which struck Ireland on 28th February 2018 (**Figure 9-16**). A maximum wave height of 7.8m was recorded in Dublin Bay during this storm, which was extremely destructive and resulted in extensive damage to coastal and monitoring infrastructure.

In April 2021, Maynooth University, as part of the Science Foundation Ireland Predict project, analysed the effect of dumping/dredging on water turbidity in Dublin Port and Dublin Bay using the ABR Project monitoring data provided by Dublin Port Company. The Predict Project developed a model to calculate the effects of wind speed, dredging and dumping on turbidity. The greatest dredging effect was estimated at 4NTU at the Northbank monitoring station. At the three other stations in Dublin Port (East Link, Poolbeg and Tolka Estuary), it was estimated to be less than 1NTU.

Investigations during elevated turbidity events have confirmed that the ABR and MP2 Project activities were not implicated in these events. Comparisons of mean turbidity during periods of 'dredging' and 'no dredging' activity showed that there is little difference between absolute values and no apparent pattern, i.e. no consistent increase in mean turbidity during dredging episodes as reflected in the plots above. In fact, mean turbidity is higher just as frequently during periods when no dredging was occurring. Measured turbidity results demonstrate that dredging campaigns from 2017 to 2025 did not cause any discernible increase in turbidity within the inner Liffey channel.

Finally, mean dissolved oxygen levels range from 7.7 to 8.9mg/l at the monitoring locations, and 95% of DO values recorded are above 5.5mg/l to 7.6mg/l at individual sites. The dissolved oxygen values clearly indicate that oxygen levels are consistently close to saturation levels, and no extended periods of oxygen sag occur.

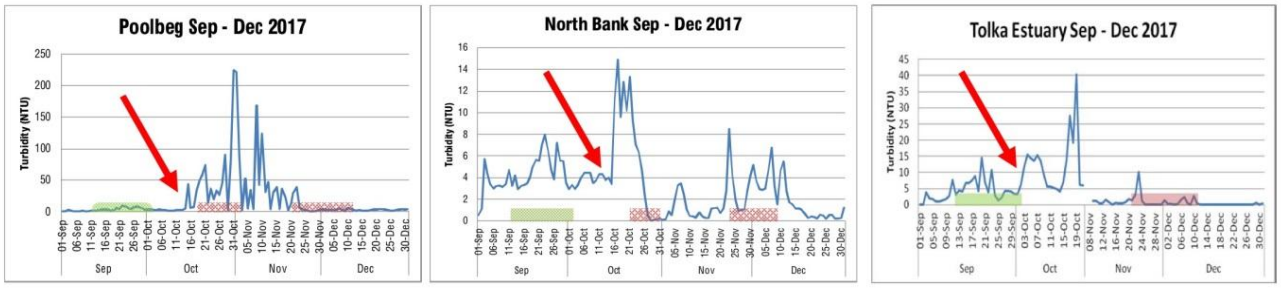


Figure 9-15: Mean daily turbidity September to December 2017 (periods of dredging are indicated by horizontal bars – green for maintenance dredging and red for capital dredging). The onset of Storm Ophelia is shown by the red arrows

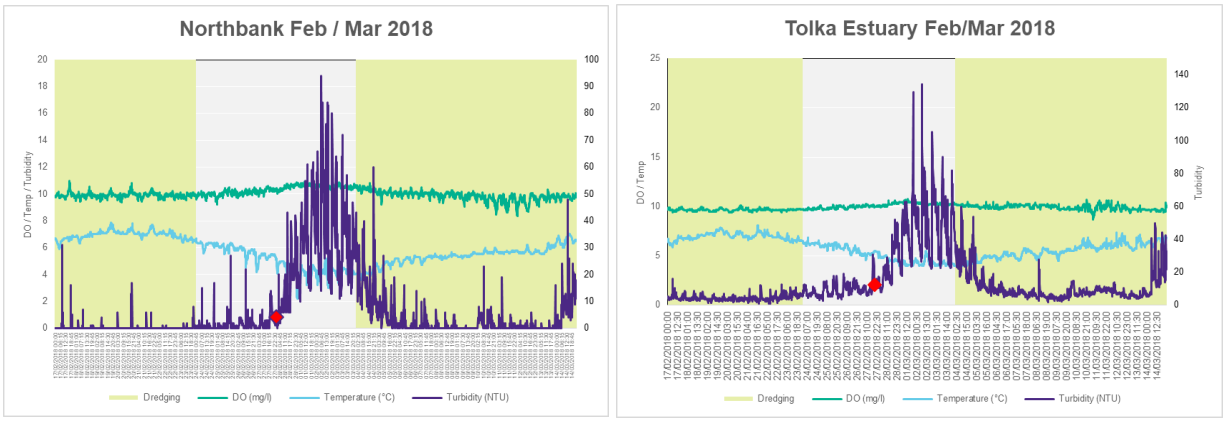


Figure 9-16: Turbidity during Storm Emma. The onset of the storm on 28th February 2018 is indicated by the red marker in both plots. Dredging periods are indicated by the green bars.

In conclusion, the measured turbidity results demonstrate that the various dredging campaigns did not cause any discernible increase in turbidity above background levels. These site-specific detailed monitoring data have provided further understanding of existing turbidity levels and variations to provide added context for the assessment of potential significant effects of the construction and operational activities of the ABR2 Project.

9.2.3.3 Water Quality Model Simulations

Chapter 14 Coastal Processes details the extensive numerical modelling programme that has been used to assess the ABR2 Project and determine the likelihood of significant impacts on the coastal processes within Dublin Port and Dublin Bay. The assessment includes the dispersion and fate of suspended solids arising from the dredging and loading of dredge spoil in the port area. The Coastal Processes chapter also includes an assessment of the operational impacts of the ABR2 Project on the dispersion of thermal plumes, tidal regime, wave climate and sediment transport regime, which are all important elements of the physico-chemical and hydromorphological supporting conditions of the Liffey Estuary Lower in particular. The results of the computational modelling have informed the water quality assessment presented in this Chapter and the assessment of the impacts on the physico-chemical, hydromorphological conditions supporting ecological status and the chemical status in the WFD assessment **Appendix 9-1**.

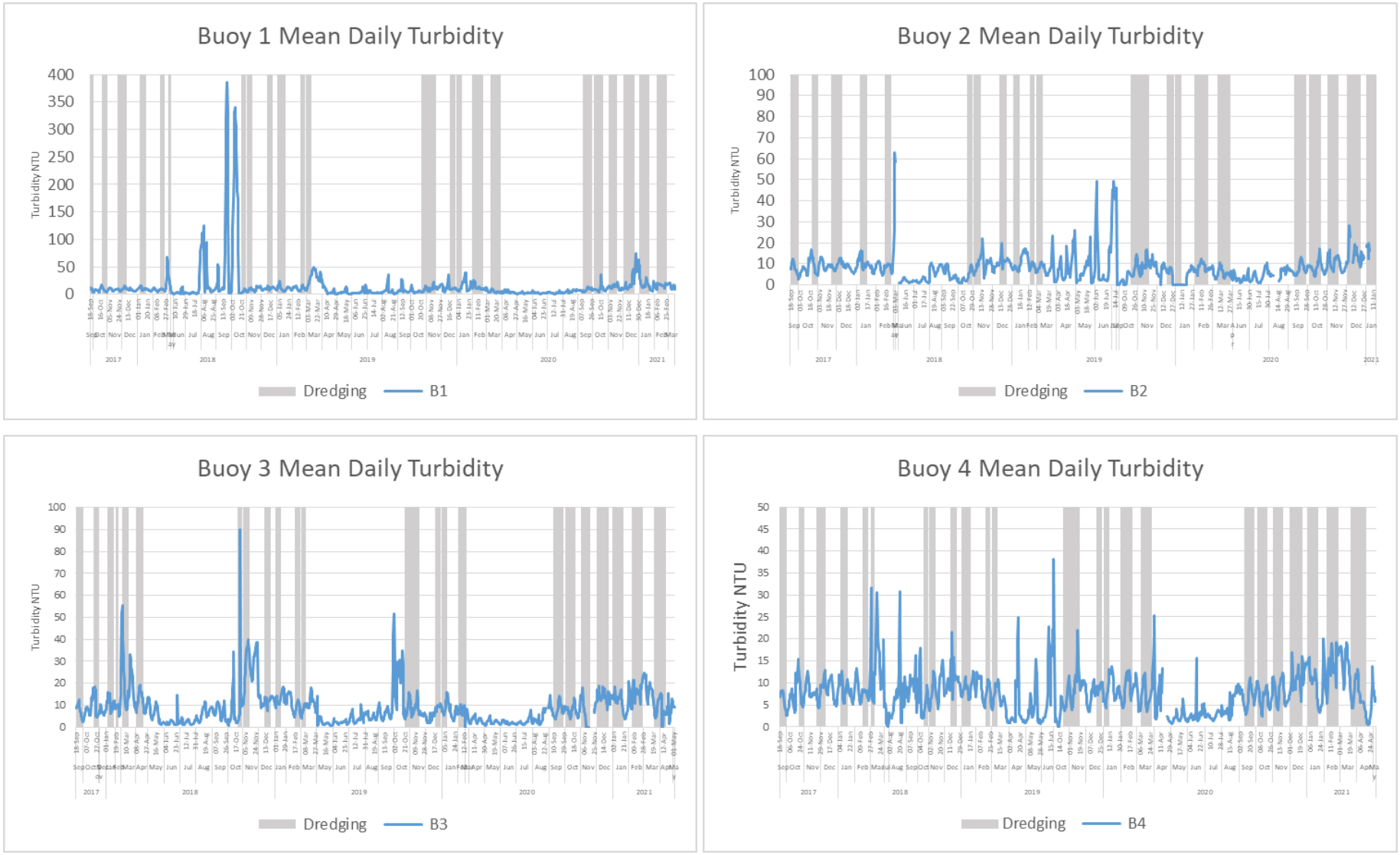


Figure 9-17: Mean daily turbidity measured at 4 Coasteye Buoys (2017-2021). Dredging Periods shown by grey bars.

9.2.4 Description of Likely Significant Effects

A range of potential impacts on Water Quality have been identified, which may occur during the construction and/or operational phase of the ABR2 Project. Following the assessment of the receiving environment in **Section 9.2.3** and based on the sensitivity criteria set out in **Table 9-4**, the sensitivity of the receiving environment is deemed to be **Very High**.

9.2.4.1 Assessment of Construction Effects

9.2.4.1.1 Mobilisation of contaminated sediment containing heavy metals

Alexandra Basin West contains sandy and silty clays that are contaminated with several heavy metals, such as Arsenic, Copper, Chromium, Cadmium, Nickel, Lead, Mercury, and Zinc. In addition, elevated levels of TBT are known to be present in Alexandra Basin West.

These heavy metals may be released into the water column through the completion of dredging within Alexandra Basin West, which will comprise dredging of the remaining 334,000m^3 of contaminated material to a depth of -10m CD over an area of 194,000m^2. Environmental assessments have demonstrated that dredging may be undertaken at a rate of up to 4,000m^3/day as described in **Chapter 5 Project Description**. It is anticipated, however, that maximum potential dredging rates will be achieved infrequently due to operational constraints associated with vessel movements within Alexandra Basin West and will be restricted by treatment capacity and stockpile capacity at the proposed treatment areas.

Dredging operations will cause temporary suspension and release of sediments at the loading sites. Dredging loading operations have been designed to minimise the disturbance and escape of material at the seabed and during removal through the water column. Individual loading operations are of relatively short duration and intermittent in nature, and the works area is limited and within a substantially enclosed basin. All dredged sediment will be recovered and treated, and no sediment will be disposed of in the marine environment.

Sediment dispersion modelling (discussed further in **Chapter 14 Coastal Processes**) provided a worst-case scenario in terms of suspended sediment concentration. It was assumed that a significant portion of the material was comprised of the most easily mobilised material encountered in the area during spring tides, with the highest expected dredge rate. In reality, sediment survey information has shown sediment characteristics to vary within the basin, with areas of sand and gravel present throughout. During the course of the dredging operations in Alexandra Basin West, temporary increases in significant suspended sediment concentrations do not extend to the designated areas of Dublin Bay. Sediment plumes instead remain within Dublin Port (Liffey Estuary Lower waterbody). This may have localised, short-term adverse impacts upon water quality and aquatic ecology. The confinement of the sediment plumes is due to the location of dredging, defined dredge rates, and embedded mitigation measures within the ABR2 Project Design. However, heavy metals may become detached from sediments during the dredging process and enter the water column.

Considering the *Very High* sensitivity of the receiving environment, the magnitude of the potential impact arising from the general construction works is considered to be *High*. The significance of effect is therefore **Major** in the absence of mitigation measures due to the high sensitivity of the receiving environment. The impact duration is temporary and for a short term.

9.2.4.1.2 Accidental spillages of dredge spoil

The dredged material will be loaded onto barges to be transported to alternative treatment facilities proposed to be located at North Wall Quay Extension and/or at Berth 49, and/or Berth 52 West. However, due to operational constraints within the Port, neither Berth 49 nor Berth 52 West may be used concurrently. This may result in several handling and treatment scenarios occurring during the construction phase, as follows: treatment may occur at either one of the three possible locations individually or a combination of two alternative scenarios (excluding Berth 49 and Berth 52 West occurring concurrently). These alternative scenarios are outlined in **Chapter 5 Project Description**.

The contaminated dredged material may be off-loaded on arrival or alternatively may be left on the barge overnight to allow for settlement. This method is proposed to remove as much free water from the dredged material as possible. Liquid arising from the solid material settling will be pumped out to an appropriately licensed mobile water treatment plant on-site (under the terms of the existing IE licence). The dredged material will be off-loaded by excavators to the respective treatment facility.

The transport of contaminated dredge spoil for treatment can increase the risk of accidental release of potentially hazardous material into the water environment. As above, this may have adverse impacts upon water quality and aquatic ecology. Direct impacts may occur upon the Lower Liffey Estuary as works are taking place within this waterbody. Coastal processes can transport these contaminated sediments to adjacent water bodies within and beyond Dublin Bay. Mobilised contaminated sediment can have detrimental impacts on hydromorphological contributing elements and chemical status of water bodies, which places increasing pressures on a water body that is currently designated as a HMWB.

Considering the *Very High* sensitivity of the receiving environment, the magnitude of the potential impact arising from the dredging of contaminated material in Alexandra Basin West is considered to be *High*. The significance of effect is therefore **Major** in the absence of mitigation measures due to the high sensitivity of the receiving environment. The impact duration is temporary and for a short term.

9.2.4.1.3 Discharge from treatment of dredged material

Best practice industry techniques (Stabilisation/solidification (S/S) or soil washing (dependent upon the levels of contamination within the dredged sediment)) will be used to treat the contaminated material yielded from the dredging of the Alexandra Basin West, depending on contamination levels. Stabilisation/solidification (S/S) is a remediation technology that reduces the mobility of contaminants. Immobilisation is achieved by reaction of contaminants with reagents to promote sorption, precipitation, or incorporation into crystal lattices, and/or by physically encapsulating the contaminants. The process produces a high-strength monolith-like product that physically reduces the mobility of the material and chemically binds contaminants to the produced matrix. This treated material would be suitable for infill, and it is expected that this form of treatment will be applied to c. 120,000m^3 of dredge sediment arising from Alexandra Basin West.

Treatment and recovery operations may take place at either North Wall Quay Extension, Berth 49 or Berth 52 West, subject to operational activities being undertaken at the time of the proposed works. It is feasible that this may result in various elements of treatment works being undertaken at one or two of the three locations concurrently. The following operations will occur within the treatment area(s):

Separation - If required, the contaminated dredged material will be screened to remove extraneous material unsuitable for treatment (e.g. debris). Dredged material will be screened potentially either within the barge or in a storage lagoon, if required, following unloading as part of the pre-treatment process. Separation (soil washing) techniques may be applied, should the material be suitable for this technique, to separate dredge material into fines, sand and gravel in order to separate contaminated fine particles from uncontaminated sediments.

Dewatering - Reducing the moisture content reduces the volume to be treated and the volume of additives that may be required for the S/S process. If deemed necessary to facilitate management and recovery for re-use onsite, further dewatering methods may be applied to the fines to return the dredged sediments' moisture content to a minimum to that of the in-situ material.

Waste Water Treatment - The proposed process for the treatment of wastewater will be designed by the appointed contractor of the works to achieve the emission limit values in the IE licence.

During the construction phase of works, the contractor will be required to manage any contaminated water arising from the sediment handling process. A water treatment plant will comprise a single lane treatment process to remove suspended solids, product and contaminants (if present) from the wastewater produced from the dredging, dewatering, stockpiling and treatment processes. The volume of water to be treated will be determined by the amount of water to be removed prior to the treatment process.

Flocculants may be required as part of the dewatering and wastewater treatment processes. Water arising from the dewatering process will be removed by pumping and treated in a water treatment plant before being discharged via the designated discharge point in accordance with appropriate consents. Sampling points will be included within the pipe work system to allow for the collection of water samples from the emission point as per the IE licence. The sampling and testing schedule will be in accordance with Schedule C of the IE licence.

Sediment Handling - The sediment handling process will be undertaken in a batching plant in one of the proposed treatment areas. The soil washing and S/S treatment plants will be brought to the treatment area by road on low-loaders or by sea aboard barges and set up. Plant and equipment will be installed on concrete hardstanding areas. If necessary, temporary buildings will be erected to cover the material while it is being stored and treated.

This treatment is subject to an IE licence granted by the EPA. The conditions of the IE licence (P1022-02) allow for 6.9 litres/second to be discharged from one or more discharges cumulatively to Liffey Estuary Lower in any one day at the below emission limit values (ELVs) (**Table 9-13**).

Table 9-13: Emission Limit Values for Emissions to Water in IE licence P1022-02

Parameter	Emission Limit Values (mg/l)
Suspended Solids	35
Total Organic Carbon (TOC)**	60
Hydrocarbon Oil Index (HOI)**	10

Metals	
TBT	0.000014
Nickel	0.318
Mercury	0.00065
Arsenic	0.05***
Cadmium	0.004
Chromium*	0.15
Hexavalent Chromium VI	0.299
Copper	0.047
Lead	0.1***
Zinc	0.374

*Note 3: The monitoring only applies when the substance concerned is identified as relevant in the waste gas stream based on the inventory mentioned in BAT 3.

**Note 4: The monitoring only applies when the water washing of excavated contaminated soil is occurring on site.

*** Reduced ELVs amended by BAT in Technical Amendment B

The existing IE licence (P1022-02) accounts for the provision of two wastewater treatment works within the licensed boundary. Previous environmental assessments have assumed that dredging would be undertaken at a rate of up to 1,000m^3/day. For this assessment, pending review of the potential environmental impact and feasibility of a higher rate of dredge, treatment capacity of up to 2,500m^3/day has been assumed. Where daily dredging rates exceed this treatment capacity on a given day, surplus sediments generated over and above the installed treatment capacity will be stockpiled locally to the relevant treatment plant for treatment on subsequent days where dredging rates do not exceed treatment capacity. Therefore, for the purposes of this assessment, it is assumed that the combined discharge from these works does not exceed either:

- the prescribed limits outlined in Schedule B2 of the IE licence (6.9l/s at ELVs outlined in the licence (Table 9-13)) or
- combined discharge at a rate of up to 69l/s with a corresponding reduction in contaminant concentrations to retain the equivalent loading, subject to amendment of the IE licence.

The mass balance calculations, completed for the ABR Project application, have been updated to account for the proposed increase in flows from the treatment facilities and corresponding reduction in the contaminant concentration. The assessment has determined that an increase in flows to the levels proposed can occur without increasing the contaminant load to the Liffey Estuary Lower, provided the equivalent reduction in the concentration of the contaminant of concern in the discharge is achieved. This will ensure that the impact of the

discharge from the wastewater treatment works on the Liffey Estuary Lower does not change and remains insignificant (See **Appendices 9-2** and **9-3**). A review of the existing IE licence and a revision to the ELVs and maximum flow from the wastewater treatment works will be sought from the EPA.

A proposal for Specified Engineering Works will be submitted to the EPA for agreement in accordance with Condition 3.16 of the IE licence and will contain the following:

- Installation of waste handling and processing infrastructure;
- Installation of wastewater treatment plant;
- Relocation of plant and equipment as the phases of the licensable activity progress;
- Capping of infill areas; and
- Any other works notified in writing by the EPA.

Wastewater from this process will be pumped from the treatment area into a settlement holding tank/lagoon. From the tank/lagoon, water will be directed through a separator (Class 1 Full Retention) to prevent suspended solids and oil from entering the treatment process. From the separator, the remaining water will be directed through a sand filter to remove further suspended solids, and an activated carbon vessel to remove any organic contaminants before discharge via a designated discharge point to Alexandra Basin West or Berths 52/53 basin, as applicable. Sampling points will be included within the pipe work system to allow for the collection of water samples.

No works will be undertaken without the prior agreement of the EPA.

Despite the *Very High* sensitivity of the receiving water environment, the magnitude of the potential impact is deemed to be *Negligible* on the condition that discharges from the treatment facilities do not exceed the ELVs permitted by the revision to the IE licence (P1022-02). Therefore, the significance of environmental effect is reduced to **Minor**. No further mitigation measures are required.

9.2.4.1.4 Release of contaminated surface water drainage

Given the proposed reuse of recovered materials from Alexandra Basin West above the basin at Berths 52/53 there is an expectation that up to 25,000m^3 of recovered sediments may be stored in designated stockpiles at North Wall Quay Extension, Berth 49 and Berth 52 West from the time of dredging until filling of the existing basin at Terminal 5 is completed (up to 2 years). These stockpiles will be located as indicated in **Figures 5-5** to **5-7** in **Chapter 5 Project Description** and will not exceed 2.5m in height at North Wall Quay Extension and 4m in height at Berth 49 or Berth 52 West. To minimise the stockpiling of dredged material, the rate of dredging is determined by the rate of treatment of the dredged material and available stockpile capacity.

Through appropriate site layout and design of surface water collection systems, uncontaminated water will be kept separate from contaminated water, and good housekeeping measures will be put into place to minimise the potential for cross-contamination. All contaminated water will be managed and directed through the wastewater treatment system prior to discharge under the requirements of the IE licence. Precipitation falling on the stockpiled dredge material within the three treatment areas will be collected within a bund surrounding

the contaminated material and then subsequently pumped to the wastewater treatment works for treatment. Therefore, the surface water generated in the stockpiled contaminated dredge areas will be contained within the bund and then treated in the wastewater treatment plant. Clean surface water generated in the treatment areas will drain to the existing drainage network.

In circumstances where the above mitigation measures are employed during the spoil treatment operations, the potential impact on the receiving water environment will be negligible, thus reducing the significance of environmental effect to **Imperceptible** on the very high sensitivity of the receiving environment.

9.2.4.1.5 Infilling of Basin B52/53

The treated dredged material will be recovered for use as infill for the basin at Berths 52/53. Prior to the filling of Berths 52/53 basin, the replacement Riverside Berth 52 West quay wall will be constructed (under a separate planning consent) to close off Berths 52/53 from the main navigation channel. This will eliminate direct surface water exchange between the basin and the Liffey estuary channel. Water quality will be measured in Berths 52/53 during the infilling operation to ensure that measured parameters are within agreed limits. A controlled outlet from the Berths 52/53 basin will be constructed to control water level/flow.

Infilling with treated sediments will continue to a level of c. 1.6m OD. Previously treated dredge material (currently stored in a bunded and capped stockpile adjacent to Berths 52/53) will then be excavated and infilled to continue to raise levels to the rim of the basin, with further minor filling to provide final levels (post settlement) of the infill. The resulting temporary surface will be capped with High-Density Polythene (HDPE) liner and geotextile protection layer to facilitate drainage and shedding of incident rainfall and surface water from the infilled material without coming into contact with the treated infilled material.

To promote consolidation and settlement of the infill material and underlying soft basin sediments, surcharge materials will be imported (crushed rock and stone) and placed to a depth of c. 2m. The consolidation process will be accelerated through the provision of vertical band drains into the underlying sediments to relieve pore water pressures generated from the loading imposed by the infill of recovered sediments. Porewater will be collected from the vertical band drains installed, and surface water shed from the impermeable barrier/capping layer will be collected from the perimeter of the capped area for discharge via the Wastewater Treatment Works if required, subject to water quality.

In circumstances where the above mitigation measures are employed, the potential impact on the receiving water environment will be Negligible, thus reducing the significance of environmental effect to **Imperceptible** on the *Very High* sensitivity of the receiving environment.

9.2.4.1.6 Alternative management options for disposal of dredge material in the event that the volume of dredge spoil exceeds the void space at the Berths 52/53 basin

Chemical analysis of sediments within Alexandra Basin West has found that these will not be suitable for disposal at sea. Therefore, there will be no disposal of dredge material at the designated dump site in Dublin Bay. Once the basin of Berths 52/53 has been filled, there are three options available for disposal of excess spoil. These include:

- Recovered at a soil recovery or soil treatment facility in Ireland, subject to testing of the sediments in line with the selected facility licence at the time of the works;
- Recovered at a soil treatment facility in Great Britain or northern Europe; or
- Disposed of at a licenced landfill facility in Ireland.

It is estimated that there will be an excess of c. 60,085m^3 of spoil which cannot be accommodated as infill for the basin of Berths 52/53 and will be required to be disposed of off-site. The material to be exported will consist of sands, silts and clays:

- Given the probable condition of sands extracted from dredged sediments from Alexandra Basin West following soil washing activities, this volume of material will be considered for export to a recovery facility in Ireland (26,235m^3); and
- Further materials required to be removed from the site will consist of the remaining fractions of the source dredge (i.e. in the region of 33,850m^3 of silts and clays), to be removed to a suitable soil recovery or soil treatment facility in Ireland, subject to testing of the sediments in line with the selected facility's licence at the time of the works.

In the event that a soil recovery or soil treatment facility is not available in Ireland, the material will be recovered at a soil recovery or soil treatment facility in Great Britain or northern Europe, subject to the testing of the sediments in line with the selected facility's licence at the time of the works.

In circumstances where the selected facilities have the capacity to accept the excess spoil without breaching the terms of their respective licences, the potential impact to receiving water environment will be *negligible,* thus reducing the significance of environmental effect to **Minor** on the *Very High* sensitivity of the receiving environment. No further mitigation is required.

9.2.4.1.7 General Construction Works

General construction activities associated with works machinery, infrastructure and on-land operations, including the temporary storage of construction materials, oils, fuels and chemicals, also have the potential to impact on water quality in the Liffey Estuary Lower and downstream Dublin Bay water bodies. The construction works of the Project will involve the use of plant machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals. During the construction/decommissioning phase, there is the potential for accidental spillage or release of construction materials (e.g. diesel, oil, chemicals) which could have a significant adverse impact on water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the RBMP.

Considering the *Very High* sensitivity of the receiving environment, the magnitude of the potential impact arising from the general construction works is considered to be *High*. The significance of effect is therefore **Major** in the absence of mitigation measures based on a high sensitivity of the receiving environment. The impact duration is temporary and for a short term.

9.2.4.1.8 Demolition Waste

Demolition works will be required, and this may include some localised breaking out of concrete using a rock breaker mounted on an excavator, particularly the removal of bunds on decommissioned stockpiling areas. Therefore, removal of existing marine infrastructure at Berths 52/53 could potentially lead to the release of highly alkaline cement and concrete pollution, which may impact the biological, physico-chemical and supporting chemical conditions of receiving water bodies. The demolition of marine infrastructure is to be carried out prior to the infilling of the Berths 52/53 basin at Terminal 5. However, as amended by the MP2 Project, the basin will be closed off once the new river Berth has been constructed, prior to infilling. Therefore, there will be no hydrological connection between the Berths 52/53 basin and the River Liffey. In addition, detailed asbestos surveys within the marine structures will be carried out prior to demolition to ensure there are no sources of asbestos in the structure.

Therefore, despite the *Very High* sensitivity of the receiving water environment, as there will be no hydrological connection at the time of the works, the magnitude of the potential impact is deemed to be *Negligible,* and the significance of the environmental effect is reduced to **Minor**. No further mitigation measures are required.

9.2.4.1.9 Abstraction of water for use in the treatment of dredged sediments

It is proposed that water will be abstracted from Berths 52/53 at a rate of 200m^3/day for use in the treatment of contaminated dredge material from Alexandra Basin West. As Berths 52/53 is infilled to the point where there is not enough water to abstract, material that does not require treatment will be used as infill. Therefore, this abstraction is temporary for a time period in the construction phase. The Principles of Water Abstractions and Associated Impoundments Authorisation guidance document (EPA, 2025) outlines the requirements of the Water Environment (Abstractions and Associated Impoundments) Act 2022 and its associated Regulations (2024). All abstractions of greater than 25m^3/day must be registered, and those greater than 2000m^3/day require a licence. However, temporary abstractions to facilitate carrying out of works and abstractions from coastal waters are exempt from these requirements. Therefore, no significant effects are anticipated, and no further mitigation is required.

9.2.4.2 Assessment of Operational Effects

9.2.4.2.1 Mobilisation of contaminated sediment containing heavy metals

The aim of dredging Alexandra Basin West to -10m CD is to remove the legacy contamination issue in the basin, which will allow DPC to undertake routine maintenance dredging within this area. Therefore, following completion of the ABR2 Project, there will be no contaminated sediments remaining within the basin to disturb. This will result in long-term, positive impacts for the biological, physico-chemical and chemical quality elements of the Liffey Estuary Lower and downstream Dublin Bay water bodies. No mitigation is required.

9.2.4.2.2 Routine maintenance dredging

Maintenance dredging is an ongoing requirement in the port, and a new licence will be required to cover maintenance of Alexandra Basin West following the removal of contaminated sediments during the capital dredging works under the ABR2 Project. These works will be subject to further sediment chemical testing.

During dredging operations, there is the potential for suspended sediments to be released into the water column in the absence of mitigation measures.

Considering the *Very High* sensitivity of the receiving environment, the magnitude of the potential impact arising from the routine maintenance dredging of the newly deepened Alexandra Basin West is considered to be *High*. The significance of effect is therefore **Major** in the absence of mitigation measures based on a high sensitivity of the receiving environment. The impact duration is temporary and for a short term.

9.2.4.2.3 Changes in hydromorphological supporting conditions within the Lower Liffey Estuary

As outlined in **Section 9.2.3.2**, waterbodies that are designated as heavily modified have a WFD environmental objective of Good Ecological Potential rather than GES. The designation means that a realistic objective is set that acknowledges that the water body has been physically altered for a specified use that society needs to be continued. The physical modifications caused by the use need to be mitigated against as far as possible, whilst acknowledging that the specified use needs to be retained.

The Mitigation Measures Library detailed in CIS Guidance Document No. 37 (Steps for defining and assessing ecological potential for improving comparability of Heavily Modified Water Bodies) lists 12 mitigation measure categories that are relevant across EU member states, including Ireland, and for which a toolbox of measures has been developed to address hydromorphological pressures as far as practical, whilst still retaining the specified use of the water body. The design of the ABR2 Project has considered these mitigation measures and has adopted measures where relevant. Key groups of measures listed in the EU toolbox of mitigation measures that are applicable to the ABR2 Project are summarised in Table 5.3 in Section 5.3 of the WFD Compliance Report (**Appendix 9-1**). The WFD Compliance Report has also assessed the potential impacts of changes in hydromorphology on the WFD status of other contributing elements of the Liffey Estuary Lower and has found that there will be no deterioration in status due to changes in hydromorphology from the ABR2 Project works.

This is supported by the analysis undertaken in **Chapter 14 Coastal Processes**, which has concluded that the changes to the tidal currents are insignificant in terms of the hydrodynamic regime and will not significantly impact on the supporting hydromorphological conditions in the coastal water bodies

Therefore, despite the *Very High* sensitivity of the receiving water environment, the magnitude of the potential impact is deemed to be *Negligible* and the significance of the environmental effect is reduced to **Minor**. No further mitigation measures are required.

9.2.4.2.4 Surface Water Drainage

The ABR2 Project will result in an additional 45,650m^2 of drained area due to the infilling of the Berths 52/53 basin. The previously consented stormwater drainage proposals in the ABR Project outlined the extensions of existing outfalls within the existing basin to relocated outfalls at the new Berth 52.

Despite the *Very High* sensitivity of the receiving environment, the magnitude of the potential impact is considered to be *Negligible* and the significance of the effect is therefore considered to be **Minor**.

9.2.5 Inter-relationships

Effects on Water Quality also have the potential to have secondary effects with other receptors, which are considered in relevant topic-specific chapters. These receptors and effects are:

- Flora and Fauna (Considered in **Chapter 7 Biodiversity, Flora and Fauna**)
  - Effect of temporary habitat losses and disturbances to aquatic animals; and
  - Effect of temporary food chain disturbances to avian species.
- Coastal Processes (Considered in **Chapter 14 Coastal Processes**)
  - Effect of permanent disturbances to the hydromorphological regime.
- Waste (Considered in **Chapter 20 Resource and Waste**)
  - Effect of temporary water quality impacts from construction waste.

9.2.5.1 Flora and Fauna

There is potential that water quality parameters which do not meet environmental standards may subsequently impact on aquatic animals, e.g. Atlantic Salmon and plants which contribute to the ecological status of a water body. Water quality impacts can also have a significant effect on avian species, particularly through the food chain, which can also impact on terrestrial species, e.g. otter. In addition, marine mammals, such as Harbour Porpoise and Seals, which may be present within the Lower Liffey Estuary, may be at risk from contaminated sediments released from dredging activities. However, this is subject to mitigation measures and should not pose a significant effect on flora and fauna.

9.2.5.2 Coastal Processes

There is potential for the final ABR2 phase to impact upon supporting hydromorphological and physico-chemical conditions of ecological status in terms of water quality status. However, simulations have determined that alterations to tidal processes and sediment transport are not significant outside the immediate vicinity of Alexandra Basin West. Therefore, interactions between water quality and coastal processes will not result in significant effects.

9.2.5.3 Waste

There is potential for interaction between infilling works at Berths 52/53 and the surrounding water quality. This interaction is specific to the construction phase; however, any interaction will be prevented by removing the hydrological pathway to the River Liffey. Therefore, interactions between water quality and waste will not be significant.

9.2.6 Mitigation and Monitoring

9.2.6.1 Construction Phase Mitigation

9.2.6.1.1 Construction phase best practice measures

Mitigation measures will include the requirements for best practice and adherence to the following relevant Irish guidelines and recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- NetRegs Guidance for Pollution Prevention series (GPP) series in relation to a variety of activities developed by the Scottish Environmental Protection Agency (SEPA), Natural Resources Wales (NRW) and the Northern Ireland Environment Agency (NIEA);
  - GPP2: Above-ground oil storage tanks
  - GPP3: Use and design of oil separators in surface water drainage
  - GPP5: Works and maintenance in or near water
  - GPP6: Working at construction and demolition sites
  - GPP8: Safe Storage and disposal of used oils
  - GPP13: Vehicle washing and cleaning
  - GPP20: Dewatering underground ducts and chambers
  - GPP21: Pollution incident response planning
  - GPP22: Dealing with spills
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);
- International Convention for the Prevention of Pollution From Ships, 1973, as modified by the Protocol of 1978 (MARPOL) for domestic waste discharges to the environment;
- International Marine Organisation guidelines; and
- Control of Substances Hazardous to Health (COSHH) Handling of Hazardous Materials.

9.2.6.1.2 Mobilisation of contaminated sediment containing heavy metals

The Dublin Port Company completed a winter capital dredging season from January to March 2025 as part of the MP2 Project. This was the third campaign for the MP2 Project, capital dredging having been undertaken in October 2022 and in March 2024. These dredging campaigns were fully compliant with the requirements of all the development consents, as confirmed by high-resolution environmental monitoring results reported in relevant Annual Environmental Reports, the most recent submitted to the Office of Environmental Enforcement (OEE) in March 2025. The monitoring included year-round real-time measurement of water quality parameters in the Liffey Estuary at four monitoring stations chosen to represent ambient surface water quality in the Liffey Estuary Lower and in the Tolka Estuary water bodies. This was supplemented by sediment plume and

hydrographic monitoring that validated Plume Dispersal Modelling, as reported in the AER, and in the Year 9 Environmental Monitoring Report for the ABR and MP2 Projects (DPC, 2025).

A Dredging Management Plan was developed for the MP2 Project and is set out in the *MP2 Project Construction Environmental Management Plan (CEMP) Rev B, April 2025*. The mitigation for dredging operations in the ABR2 Project has been informed by the MP2 Project and the ABR Project monitoring and experience working in the same locations. The following key relevant mitigation measures will apply to each dredging campaign in the ABR2 Project:

- Loading will be carried out by a backhoe dredger.
- The backhoe will have a clamshell bucket adapted for environmental dredging when working in Alexandra Basin West.
- A silt curtain is to be utilised around the dredger whilst the dredging of contaminated material is ongoing.
- Material dredged in Alexandra Basin West is to be treated and reused for reclamation within the Port as far as practicable, specifically as infill for Berths 52/53.
- A contingency bubble curtain installed across the entrance to Alexandra Basin West will be utilised in the event of a breach of the silt curtain around the dredger.
- Dredged material will be transported to the proposed treatment facility by barge and treated under the terms of the existing IE licence P1002-02, or as may otherwise be agreed with the EPA during a licence review to account for amendments to the licence which may be required to accommodate the works as outlined in the ABR2 Project.
- No overtopping of barges is permitted, and spill plates are to be utilised to prevent spillage during offloading operations.
- Full-time monitoring of Marine Mammals within 500m of loading operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS, 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement.
- A documented Emergency Response Procedure will be put in place prior to commencement.
- A full record of loading locations and a record of the material being treated will be maintained for each trip.
- When any dredging is scheduled to take place within a 500m radius of power station intakes, the relevant stakeholders will be notified so that precautionary measures can be taken if deemed necessary.

In circumstances where the above mitigation measures are employed during capital dredging and treatment operations, the potential impact on the receiving water environment will be Negligible, thus reducing the significance of environmental effect to **Minor**.

9.2.6.1.3 Accidental spillages of dredge spoil

The mitigations outlined above in **Section 9.2.6.1.2** are also applicable to this impact when transporting dredge material by barge to the treatment area.

Therefore, assuming adherence to the above mitigation measures during the transport of dredge spoil, the significance of the environmental effect is considered **Minor** on the *Very High* sensitivity of the receiving environment.

9.2.6.1.4 Release of contaminated surface water drainage

Sediments arising from Alexandra Basin West will be subjected to storage in stockpiles and potentially soil washing techniques appropriate to the concentrations of contaminants.

All contaminated water will be managed and directed through the wastewater treatment system prior to discharge under the requirements of the IE licence. Dredged sediments will be stored in bunded areas, stockpiles will not exceed the heights applicable to the material being stored at North Wall Quay Extension to ensure that the loading of materials onto the structure do not exceed service loading, or at Berth 49 and Riverside Berth 52 West will not exceed the height of a stockpile placed at the natural angle of repose of the sediments within the footprints of the storage areas. Precipitation falling on the stockpiled dredge material within the three treatment areas will be collected within a bund surrounding the contaminated material and then subsequently pumped to the wastewater treatment works for treatment. Therefore, the surface water generated in the stockpiled contaminated dredge areas will be contained within the bund and then treated in the wastewater treatment plant. Clean surface water generated in the treatment areas will drain to the existing drainage network.

The treatment of soil and sediment washing allows the recovery of the inert fraction with coarser particle size (sands and gravels) for reuse on site. It is expected that this form of treatment will be applied to c. 120,000m^3 of dredge sediment arising from Alexandra Basin West.

The mitigation and control measures to address the impact from suspended sediments associated with these activities will follow sound design principles and good working practices as listed in the NetRegs Guidance for Pollution Prevention series. In addition to the requirements of best practice and relevant guidelines, the following mitigation measures will be implemented by the contractor during the construction phase:

- Sampling points will be included within the pipe work system of the wastewater treatment system for contaminated water to allow for the collection of water samples from the emission point as per the IE licence. The sampling and testing schedule will be in accordance with Schedule C of the IE licence;
- A controlled outlet from Berths 52/53 will be constructed to control water level/flow. A written record of the types and quantities of material recovered at the infill sites will be maintained. Ongoing

monitoring of the soil washing and S/S process will also take place during construction and will consist of the following:

- Geotechnical tests, e.g. the permeability (hydraulic conductivity) and the compression strength of the stabilised materials after different strength development periods;
- Environmental testing, e.g. batch leaching tests and diffusion testing to measure the leaching of contaminants from the treated dredge material as per the IE licence requirements;
- An ongoing monitoring programme will be undertaken prior to, during, and post the recovery operation (surface water quality in harbour, monitoring of pore water in the construction, sediment samples from the harbour, water levels and groundwater quality) as per the IE licence requirements; and
- A Quality Assurance/Quality Control (QA/QC) programme will be established.

- Where preferential surface flow paths occur, silt fencing or other suitable barriers will be used to ensure silt-laden or contaminated surface runoff from the site does not discharge directly to a water body or surface water drain.
- In the event that dewatering of foundations or drainage trenches is required during construction and/or discharge of surface water from sumps, a treatment system prior to the discharge will be used; silt traps, settlement skips, etc. This measure will allow additional settlement of any suspended solids within stormwater arising from the construction areas.

Assuming the above mitigation measures are employed, the potential impact on the receiving water environment will be reduced to *Negligible,* thus reducing the significance of environmental effect to **Minor**.

9.2.6.1.5 General Construction Works

The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example, leakages/spillages of fuels, oils, other chemicals and wastewater) will be controlled through good site management and the adherence to codes and practices which limit the risk to within acceptable levels. The following measures will be implemented during construction:

- A detailed works-specific Construction Environmental Management Plan (CEMP) will be prepared which will meet the minimum requirements of the draft CEMP (under separate cover) and will include details in respect of every aspect of the works in order to minimise potential impacts and maximise potential benefits associated with the works;
- Management and auditing procedures, including toolbox talks to personnel, will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions;
- Existing and proposed surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure

water bodies are not impacted by sediment and other pollutants using measures to intercept the pathway for such pollutants;

- The use of oils and chemicals on-site requires significant care and attention. The following procedures will be followed to reduce the potential risk from oils and chemicals;
- Fuel, oil and chemical storage will be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. The control measures in GPP2: Above Ground Oil Storage Tanks and GPP 26 “Safe storage – drums and intermediate bulk containers” will be implemented to ensure safe storage of oils and chemicals;
- The safe operation of refuelling activities shall be in accordance with GPP 7 “Safe Storage – The safe operation of refuelling facilities”;
- Breaking of concrete (associated with structure demolition) has the potential to emit alkaline dust into the receiving environment. A barrier between the dust source and the sensitive receptor (the water body in this case) will be erected to limit the possibility of dust and falling debris from contacting the receptor;
- Concrete use and production shall adhere to control measures outlined in Guidance for Pollution Prevention (GPP5): Works and maintenance in or near water. Any on-site concrete production will have the following mitigation measures: a bunded designated concrete washout area; closed-circuit wheel wash and initial siting of any concrete mixing facilities such that there is no production within a minimum of 10m from the aquatic zone;
- The use of concrete in close proximity to water bodies requires a great deal of care. Fresh concrete and cement are very alkaline and corrosive, and can cause serious pollution in water bodies. It is essential to ensure that the use of wet concrete and cement in or close to any water body is carefully controlled so as to minimise the risk of any material entering the water, from the shuttered structures and cofferdams that will be used to contain the concrete;
- Where concrete is to be placed under water or in tidal conditions, a specific fast-setting mix is required to limit segregation and washout of fine material/cement. This will normally be achieved by having either a higher than normal fines content, a higher cement content or the use of chemical admixtures; and
- Contingency Planning: A project-specific Pollution Incident Response Plan will be prepared by the contractor consistent with DPC's Environmental Emergency Plan and will be in accordance with GPP 21 Pollution Incident Response Planning. Whilst a major incident is highly unlikely to occur in circumstances where the mitigation measures are implemented, the finalisation of the draft CEMP is considered to be best practice. The contractor's Environmental Manager and DPC will be notified in a timely manner of all incidents where there has been a breach in agreed environmental management procedures. Suitable training will be provided by the contractor to relevant personnel detailed within the Pollution Incident Response Plan to ensure that appropriate and timely actions are taken.

In circumstances where the above mitigation measures are employed during construction, the significance of environmental effect to the receiving water environment will be reduced to **Imperceptible**.

9.2.6.2 Operational Phase Mitigation

9.2.6.2.1 Routine maintenance dredging

Any maintenance dredging which may be required in the longer term will likely be carried out as part of DPC's regular maintenance dredging programme. The material generated would likely be disposed of at sea at a licensed disposal site (subject to further chemical testing), as agreed in accordance with DPC's maintenance dredging licence. This has been standard practice in the Port for decades. Maintenance dredging will implement comprehensive mitigation measures as set out below:

- Loading will be carried out by a backhoe dredger or trailing suction hopper dredger (TSHD).
- No over-spilling from the vessel will be permitted while the dredging activity is being carried out within the inner Liffey Channel.
- The TSHD pumps will be switched off while the drag head is being lifted and returned to the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment.
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control suspended solids released at the dumping site. This is equivalent to a maximum quantity per trip of 2,030 tonnes (wet weight).
- Full-time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS, 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement.
- A documented Emergency Response Procedure will be put in place prior to commencement.
- A full record of loading and dumping tracks and a record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.
- When any dredging is scheduled to take place within a 500m radius of power station intakes, the relevant stakeholders will be notified so that precautionary measures can be taken if deemed necessary.

Therefore, the magnitude of the potential impact from maintenance dredging, with the continued implementation of DPC's maintenance dredging programme and the environmental controls that are currently in place, is considered to have a *Negligible* impact on water quality. The significance of the environmental effect is therefore **Minor** on the *Very High* sensitivity of the receiving environment.

9.2.6.2.2 Environmental Management System

The ABR2 Project, when complete, will be subject to the Port's existing Environmental Management System (EMS), which is accredited to the Port Environmental Review System (PERS), which has gained Dublin Port designation as an 'Ecoport' at the European level.

The EMS comprehensively identifies environmental aspects and impacts relating to Dublin Port, including Tenant operations. Regular review of environmental aspects is required and will facilitate incorporation of any ABR2 Project-specific issues that may arise with implementation of mitigation, as necessary. The EMS is supported by a comprehensive suite of Standard Operating Procedures (SOPs) providing mitigation of all environmental aspects identified and mechanisms to ensure effective implementation. SOPs have been prepared for oil and chemical spill responses, mineral oil handling, waste handling, monitoring and maintenance of surface water interceptors and handling of drain cleaning waste. Controls are in place for transport, handling and storage of hazardous materials, ship cargo, dry bulk material, surface water runoff, fuelling and bunkering of vessels and ship discharges. Site audits promote best practice and ensure compliance with the EMS requirements.

In circumstances where the mitigation measures listed above are employed, the potential impact on the receiving water environment will be reduced to *Negligible*, thus reducing the significance of environmental effect to **Minor**.

9.2.6.3 Monitoring

9.2.6.3.1 Water Quality Monitoring within the inner Liffey channel

The construction works associated with the ABR2 Project are located primarily on the northern shores of the Dublin Port Estate.

A water quality monitoring system has been designed to ensure robust protection of the marine environment and for users of the inner Liffey channel during the construction phase of the ABR2 Project. Water quality monitoring stations previously established and operated during the ABR Project and MP2 Project will continue to monitor a range of water quality parameters in real time. The locations of the monitoring stations are shown in **Figure 9-18**.

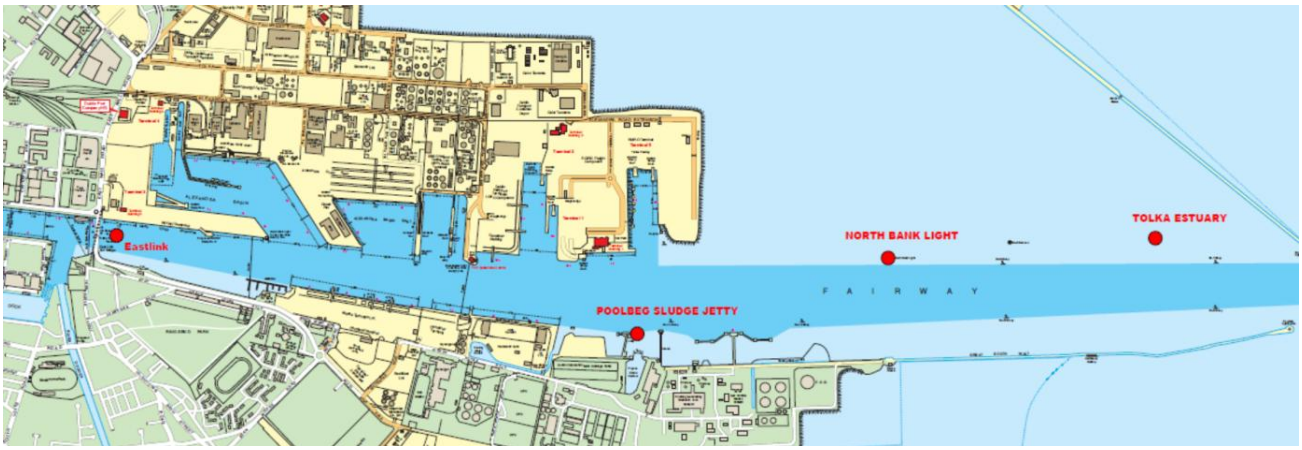


Figure 9-18: Location of Monitoring Stations (supplied by DPC)

- **Monitoring Station 1 (Eastlink):** This monitoring station is sited in the River Liffey Channel downstream of East Link Bridge.
- **Monitoring Station 2 (Poolbeg Sludge Jetty):** This monitoring station is sited along the southern edge of the River Liffey Channel at the Poolbeg Sludge Jetty in close proximity to a power station intake.
- **Monitoring Station 3 (North Bank Light):** This monitoring station is sited along the northern edge of the River Liffey Channel at the North Bank Light outside, but in close proximity to the South Dublin Bay and River Tolka SPA.
- **Monitoring Station 4 (Tolka Estuary):** This monitoring station is sited in the Tolka Estuary near the northern edge of the River Liffey Channel inside the South Dublin Bay and River Tolka SPA.

9.2.6.3.2 Monitoring System Specification

The specification is based on state-of-the-art 24/7 real-time monitoring. Water quality monitoring sensors, giving high-resolution data with respect to the following parameters, are being used at each of the four monitoring locations:

- Turbidity;
- Dissolved Oxygen (DO);
- Temperature;
- Salinity; and
- pH.

Water level is also measured at one monitoring station to provide information on the tidal state. Turbidity is measured as a surrogate for suspended solids. Site-specific tests have previously been undertaken by the ABR Project to define site-specific relationships between turbidity and suspended solids.

Apparatus housing and moorings used are robust and designed for the marine conditions at the monitoring locations. An ongoing calibration and maintenance programme is in place, comprising:

- Regular field calibration of sensors at weekly to three-week intervals, depending on operations;
- Regular maintenance of sensors (including cleaning and factory calibration as required);
- Documented procedures for Data Quality Control; and
- Availability of standby and operational instrumentation as required.

A data acquisition and transfer system is being used to enable the transmission of high-resolution data to an onshore station at approximately 15-minute intervals.

A data storage and interrogation system is in place, comprising:

- Provision of Data Server for data storage and secure archival;
- Secure web portal access to data; and
- Suitable Software to interrogate and display data.

The following threshold values (TVs) for turbidity and DO for compliance assessment are proposed based on existing multi-annual data sets. The TVs have been set considering established baseline conditions at these sites, data accuracy, coastal processes and sediment plume model outputs, and potential for significant environmental impact.

- **Inner Liffey channel Turbidity TV:** Peak Daily ≤ 59NTU (90%ile compliance);
- **Dublin Bay Turbidity TV:** Peak Daily ≤ 80NTU (90%ile compliance); and
- **Inner Liffey channel DO TV:** Mean Daily ≥ 6mg/l (90%ile compliance).

9.2.6.3.3 Duration of Monitoring Programme

The monitoring network infrastructure has been in place since 2016 and will continue for the duration of the construction phase of the ABR2 Project.

This monitoring system has already generated a robust water quality baseline within the inner Liffey channel with the ability to identify water quality trends. The continuation of the monitoring system will serve to further strengthen the knowledge of water quality trends, a key indicator of the health of the marine environment.

The water quality data currently being collected is summarised in monthly environmental reports and circulated to Dublin City Council. This transfer of information will continue for the duration of the construction phase of the ABR2 Project.

The data collected is also being shared with research organisations (Dublin City University, Maynooth University and University College Cork).

9.2.6.3.4 Incident Response / General Observations

In the event of possible environmental incidents, the on-site Environmental Facilities Manager will initiate additional investigative sampling as required to seek to identify the possible source and nature of any pollutants present. A record will be made of any general observations relevant to the event, which may inform the investigation, including: weather conditions; any unusual water attributes (e.g. unusual colour or smell of sample, foam, scum); any other observations, including works within or surrounding the site; any other general observations, including written and photographic records, will be made as appropriate.

9.2.6.3.5 Reporting

Data from ongoing monitoring programmes will be collated at regular intervals (usually calendar months) and summarised in synoptic reports by the Environmental Facilities Manager. Any breaches of emission, threshold values or compliance values will be indicated in the report along with the findings of any relevant investigation. In addition to interim synoptic reports, an annual environmental report will be prepared.

9.2.6.3.6 IE Water Quality Monitoring

The ABR Project works for sediment treatment were subject to an IE licence issued by the EPA (Licence Register No: P1022-02) to regulate the treatment of contaminated dredge material within a licenced boundary at the port. IE licence P1022-02 is for the ex-situ treatment by stabilisation/solidification of contaminated dredge material

sourced from the ABR Project (now to be completed under the ABR2 Project). IE licence P1022-02 specifies a specific programme of monitoring related to the treatment of dredged sediments. These monitoring requirements will continue to be implemented in relation to the ABR2 Project, or as may otherwise be agreed with the EPA during a licence review to account for amendments to the licence which may be required to accommodate ABR2 works.

9.2.7 Potential Cumulative Effects

Chapter 21 Cumulative Effects and Environmental Interactions outlines the methodology used to complete the assessment of cumulative effects, which may arise from adjacent or nearby development, together with those predicted for the Project. The projects which have been considered within the assessment of cumulative effects are outlined in **Chapter 21 Cumulative Effects and Environmental Interactions**. For the purposes of this Water Quality Chapter, projects with a hydrological link to the water bodies potentially impacted by the ABR2 Project were considered and this assessment included projects with a maximum distance of 722m from the ABR2 Project. This approach is considered appropriate as it is based on the source pathway receptor approach, i.e. the pathways (hydrological links) from other projects (sources) are considered in the cumulative assessment for the Liffey Estuary Lower and Dublin Bay receiving water bodies (receptors).

9.2.7.1 Poolbeg West SDZ

Poolbeg West is designated as a Strategic Development Zone (SDZ). Planning permission for this development was approved by An Bord Pleanála in April 2019. In addition to 3,500 residential units, its uses will include leisure, community, educational and commercial facilities. In relation to potential water quality issues and cumulative impact, the primary consideration is wastewater discharges from the SDZ. Wastewater discharges will be treated at Ringsend WwTP. There will be no discharges of untreated wastewater arising from the ABR2 Project. No cumulative effects on water quality will arise.

9.2.7.2 Poolbeg 220kV Electrical Substation

The development will consist of the construction of a new 220kV gas-insulated switchgear (GIS) Switchboard building and all associated ancillary works, located adjacent to the Port Estate. Site drainage is proposed to permeate at a permissible rate through an oil interceptor and an attenuation pond. An NIS was submitted with this application, detailing all construction and operational mitigation measures and concluded that there will be no adverse impacts to European Sites. No cumulative effects on water quality will arise is expected with this development.

9.2.7.3 MP2, 3FM and Dredging Projects

This section of the cumulative impact assessment considers several consented or proposed projects by Dublin Port Company. Consented projects include the first two elements of Strategic Infrastructure Development to be brought forward for planning consent from the Dublin Port Masterplan 2040, reviewed 2018; the ABR Project and the MP2 Project. The 3FM Project is in the late stages of planning, and a decision by An Coimisiún Pleanála

is awaited. The cumulative impact of the consented Dublin Port 2022-2029 Maintenance Dredging Programme, and the Dublin Harbour Capital Dredging Project are also assessed.

In circumstances where the appropriate mitigation measures are fully implemented during the construction and operational phases, the impact of the ABR2 Project on the water quality has been assessed as negligible to minor, and therefore, the likelihood of cumulative impact with other projects being considered here is low. Additionally, MP2 Project and 3FM Project are part of Dublin Port Company's Masterplan and have been planned and designed as part of a structured and integrated development programme that considers environmental impact and cumulative effects.

The most significant elements of the MP2 and 3FM Projects in considering potential cumulative impacts with ABR2 on water quality are the capital dredging elements. Annual maintenance dredging and Dublin Harbour capital dredging programmes are also included here to provide a comprehensive and robust assessment of potential cumulative impacts, since projects may overlap temporally, and all will load material within Dublin Port. The ABR2 Project will not dispose of any dredged material at the licensed spoil grounds in Dublin Bay, and therefore, no cumulative impacts will occur in relation to the dump site and Dublin Bay.

a) MP2 Project

The MP2 Project is the second Strategic Infrastructure Development project from the Dublin Port Company's (DPC) Masterplan 2012 to 2040. An Bord Pleanála granted permission for the MP2 Project on 1st July 2020 (29N.304888; Dumping at Sea Permit S0024-02) for a period of 15 years, ending July 2035.

The MP2 Project comprises a number of engineering works set out in DPC's Masterplan document, mainly:

- Construction of a new Ro-Ro jetty (Berth 53) for ferries up to 240m in length.
- A reorientation of the already consented Berth 52 (ACP Ref. 29N.PA0034) and modification to Berth 49.
- A lengthening of an existing river berth (50A).
- The redevelopment of Oil Berth 3, and the infill of Oil Berth 4, as a future deep-water container berth for the Container Freight Terminal.
- The dredging of berthing pockets and channel widening.
- Consolidation of passenger terminal buildings, demolition of redundant structures and buildings, and removal of connecting roads to increase the area of land for the transit storage of Ro-Ro freight units as a Unified Ferry Terminal (UFT); a heritage zone adjacent to Berth 53 and the Unified Ferry Terminal set down area.

MP2 Project capital dredging at Berths 52/53, and the localised widening of the navigation channel will be completed prior to commencement of the ABR2 Project. The outstanding dredging works are considered below in relation to potential cumulative impacts with ABR2 and other dredging works.

Piling at Berth 53 commenced in 2024. Piling at Berths 52 and 53 will be completed prior to the commencement of the ABR2 Project. The next phase of the MP2 Project (Berth 50A extension / Oil Berth 3 / Infilling of Basin at

Oil Berth 4) is due to commence in 2028. Works have the potential to overlap with the ABR2 Project, but dredging operations will be managed by DPC to ensure no overlap. These works are situated on the north side of the Liffey channel and separated from the ABR2 Project dredging locations.

The MP2 Project's Environmental Impact Assessment Report (RPS, 2019) has determined that, in circumstances where the appropriate mitigation measures are fully implemented during the construction and operational phases, the impact of the MP2 Project on water quality will be imperceptible, and therefore, the likelihood of cumulative impact with other projects being considered here is low.

Given the mitigation measures above and the temporal and spatial separation of works, it is therefore considered that there will be no cumulative impacts of MP2 construction phase works (excluding dredging, which is considered below) with the ABR2 Project.

b) 3FM Project

The 3FM Project is the third and final Strategic Infrastructure Development Project to be brought forward for development consent from the Dublin Port Masterplan 2040, as revised in 2018. The proposed project focuses on the DPC-owned lands of the south port area on the Poolbeg Peninsula. The 3FM Project has six key elements:

1. A new public road and bridge called the **Southern Port Access Route (SPAR)** to link the north and south port areas.
2. A **new Lift-on Lift-off (Lo-Lo) container terminal** with an annual throughput capacity of 550,000 Twenty-foot Equivalent Units (TEU) or 5.34m tonnes.
3. Replacement of the existing Lo-Lo container terminal, currently operated by MTL, with a **new Roll-On Roll-Off (Ro-Ro) freight terminal** with an annual throughput capacity of 360,000 Ro-Ro units or 8.69m tonnes.
4. Provision of a **325m diameter ship turning circle** in the river channel north of Pigeon House Harbour, dredged to a depth of -10.0m CD.
5. Development of a new **Maritime Village** at Pigeon House Road and Berth 41.
6. Development of proposed new public amenities on the Poolbeg Peninsula as part of the 3FM Project will provide **community gain** and contribute towards integrating the port with the city.

DPC is seeking a 15-year permission to facilitate the construction of the 3FM Project and the phasing of construction works.

The 3FM Project requires capital dredging to create a number of infrastructure elements, including creating berthing pockets, reconfiguration of the Marina and new Finger Berths, placement of scour protection, and creation of a turning circle for vessels. Dredging will not take place between 1st April and 30th September to avoid overlap with any maintenance dredging activities. Nor will dredging take place between 15th March and 31st March in loading areas in the inner Liffey channel upstream of Berth 49 to avoid the commencement of the salmon smolt run. Capital Dredging requirements for the proposed 3FM Project lie outside the area of potential cumulative impact with the ABR2 Project.

Cumulative impacts with the ABR2 Project and other dredging works are considered below.

c) Maintenance Dredging

Maintenance Dredging at Dublin Port between August 2022 and September 2029 has been consented (Dumping at Sea Permit S0004-03; Foreshore Licence FS007132) within the period April to September inclusive each year. Dredging at Alexandra Basin West within Area 3 (closest sector to the entrance of the basin) will be avoided during periods when maintenance dredging is taking place along the northern portion of the Liffey, upstream of the western Oil Jetty (Oil Berth 1). This minor restriction will avoid any potential cumulative impact of elevated suspended solids within the Liffey. Cumulative impacts with ABR2 and other dredging works are considered below.

d) Capital Dredging

The Dublin Harbour Capital Dredging Project has been consented (DAS Permit Ref S0033- 01; Foreshore Licence FS007164) within the period October to March inclusive annually, valid until 2030, to allow for the safe passage and berthage of vessels of deeper draught expected to visit Dublin Port. The first dredging campaign for the Dublin Harbour Project commenced in February 2026, and dredging will be completed over three winter campaigns.

DPC has also submitted a Dumping at Sea Permit Application to the EPA for the 3FM Project on 11th October 2024 (S0038-01). The 3FM Project requires capital dredging to create the following infrastructure elements:

- Reconfiguration of Marina and new Finger Berths
- Placement of scour protection for the replacement Quay at Berth 45
- New Turning Circle, 325m diameter
- Berthing pocket for container vessels at Wharf N (Dredged depth -13.0m CD)

Dredging will not take place between 1st April and 30th September to avoid overlap with any maintenance dredging activities. Nor will dredging take place between 15th March and 31st March in loading areas in the inner Liffey channel upstream of Berth 49 to avoid the commencement of the salmon smolt run. No restrictions are required with respect to the Dublin Harbour Capital Dredging Project and the ABR2 Project because capital dredging of the navigation channel between the entrance to Alexandra Basin West and the Western Oil Jetty has already been completed.

Cumulative impacts with the ABR2 Project and other dredging works are considered below.

Potential Cumulative Impacts of Dredging

Capital dredging for the ABR2 Project is confined to Alexandra Basin West and is anticipated to occur between Q1 2029 and Q4 2030. Dredged material will be brought ashore for treatment and re-use as a fill material at the Berths 52/53 basin. This is to be subject to extension of the existing IE licence (P1022-01).

DPC's submission to the EPA (January 2024) in response to S0033-01 Section 5(2) Notice to provide details on the predicted sediment deposition and sediment dispersion from loading and dumping activities, cumulatively from the proposed activities and those permitted under (S0004-03 and S0024-02) and any subsequent impacts on the wider environment.

Water quality environmental control measures for vessels (including shipboard oil emergency plans, discharge of ballast water, etc.) under MARPOL Convention and the Sea Pollution Act requirements are mandatory and will be observed during all works. All dredging programmes take on board the following common mitigation constraints to both minimise the source of sediment entering the receiving waters and to control the formation of sediment plumes:

- No overspill is permitted within the inner Liffey channel.
- The hopper volume is limited to 4,100m3 per trip.
- No dredging will take place between the 1st April and 14th May (inclusively) in the inner Liffey channel upstream of Berth 49, including the main channel and channel-side berths, but not including basins.

Dredging in any year has been scheduled to minimise periods of overlap.

Dredged sediments will be taken ashore for treatment and recovery. There will be no spoil disposal at the dump site in Dublin Bay, and therefore, no cumulative impacts with other projects. Potential for cumulative effects relates only to loading operations in Dublin Port.

Modelling (Coastal Processes Risk Assessment, RPS 2021; MP2 Project Additional Sediment Plume Modelling, RPS, 2021) and monitoring data (DPC ABR/MP2 Project Environmental Monitoring Report, RPS 2023) have shown that during dredging operations, suspended sediment plumes are spatially confined at loading sites, and suspended sediment concentrations are generally low (less than 25mg/l) beyond the immediate dredge area. In almost all instances, the lateral extent of the 10mg/l sediment plume envelope is generally less than 750m under most tidal conditions. Such increases in suspended solids due to the channel dredging works are well within the background range experienced in Dublin Port during normal Port operations.

Adherence with the key mitigation measures set out above will ensure that cumulatively the projects considered here will comply with, or will not result in the contravention of the following Directives:

- The Habitats Directive 82/43/EEC and Birds Directive 2009/147/EEC;
- The Water Framework Directive 2000/60/EC; and
- The Marine Strategy Framework Directive 2008/56/EC.

Work undertaken by the Marine Institute, which included extensive sampling and monitoring of benthic communities throughout Dublin Bay since 2012, also concluded that the effects of dredging (loading) and spoil disposal appear to be contained within the loading and dumping areas, and do not appear to be impacting the wider seabed invertebrate communities in Dublin Bay.

Therefore, evidence from computational modelling, water quality monitoring, and benthic surveys suggests that the dredging activities over many years have had no measurable long-term effect on water quality or environmental conditions in the Liffey Estuary Lower or in Dublin Bay.

Dredging at Alexandra Basin West within Area 3 (closest sector to the entrance of the basin) will be avoided during periods when maintenance dredging is taking place along the northern portion of the Liffey, upstream of

the western Oil Jetty (Oil Berth 1). This minor restriction will avoid any potential cumulative impact of elevated suspended solids within the Liffey.

No restrictions are required with respect to the Dublin Harbour Capital Dredging Project because capital dredging of the navigation channel between the entrance to Alexandra Basin West and the Western Oil Jetty has already been completed. Capital Dredging requirements for the MP2 Project and the proposed 3FM Project lie outside the area of potential cumulative impact.

Adherence to mitigation measures outlined above for capital and maintenance dredging, loading and dumping activities will ensure that cumulatively they will comply with, and will not result in the contravention of The Water Framework Directive 2000/60/EC. On the basis of scheduling of works and comprehensive mitigation measures applied it can be concluded that there will be no cumulative effects of the MP2, proposed 3FM Project, Dublin Port 2022-2029 Maintenance Dredging Programme, or the Dublin Harbour Capital Dredging Project with the proposed ABR2 Project.

e) Other Permissions within Dublin Port

Planning permission was granted for the demolition of 10 buildings and removal of temporary structures, for use of the site as a multi-functional storage yard within Dublin Port in 2020 ACP reference (PL29N.306648). The AA Screening and Inspector's Report supporting this application states that there is no potential for significant water quality effects as a result of the works. These works have since been completed, and so cumulative effects with ABR2 are not envisaged.

An application for the Liffey Tolka Project (Planning Ref: 3220/21) was approved in 2023 for the construction of a new 1.4km pedestrian walkway and a 2-way cycle lane along East Wall Road and Bond Road, which will include a bridge over Promenade Road. The project will include various construction and demolition activities. The project is below the EIA threshold, and an NIS has been completed for this application and concluded that, subject to mitigation measures, the project will not impact the South Dublin Bay and River Tolka Estuary SPA. Therefore, cumulative effects with ABR2 are not envisaged.

An application for a unified state service facility at the Former Cal Oil site within Dublin Port was approved in 2019 (Planning Ref: 3638/18). An appropriate assessment screening completed by RPS concluded that there were no risks to European Sites as a result of the project, including water quality impacts to sites in Dublin Bay. Therefore, cumulative effects with ABR2 are not envisaged.

An application to demolish a redundant warehouse building along with various other construction and ancillary works at Ocean Pier beside Alexandra Basin West was approved in 2019 (Planning Ref: 3859/19). An appropriate assessment screening completed by RPS concluded that there were no risks to European Sites as a result of the project, including water quality impacts to sites in Dublin Bay. Therefore, cumulative effects with ABR2 are not envisaged.

An application to develop a new silo bin storage facility north of Alexandra Basin West, including demolition and relocation of existing infrastructure and buildings, was approved in 2024. An NIS has been completed by RPS for this application and concluded that, subject to mitigation measures, the project will not impact the North

Dublin Bay cSAC, South Dublin Bay cSAC and South Dublin Bay and River Tolka Estuary SPA. Therefore, cumulative effects with ABR2 are not envisaged.

In 2022, Dublin Port submitted a planning application for the Terminal 10 Link Road, which was approved in 2023 (Planning Ref: 4894/22). An EIA screening was completed, and determined that this project was a sub-threshold development and there would be no significant negative impacts on the Liffey Estuary or Dublin Bay. Therefore, cumulative effects with ABR2 are not envisaged.

In 2024, approval was granted for the demolition of a two-storey office building, the construction of 2 no. high mast lights and amendments to planning permission granted under Reg. Ref. 3859/19 between Alexandra Basin West and Alexandrea Basin East (Planning Ref: 4919/23). The AA completed by RPS for the project concluded that there would be no significant impacts to European Sites within Dublin Bay and therefore, cumulative effects with ABR2 are not envisaged.

In 2026, planning was approved for a Shore-to-Ship crane and all associated site works at Alexandra Basin West. The AA was completed for the project and concluded that there would be no significant impacts to European Sites within Dublin Bay and therefore, cumulative effects with ABR2 are not envisaged.

9.2.7.4 Aviation Fuel Pipeline

In 2016, planning was granted for a 14.4km fuel pipeline from Dublin Port to Dublin Airport. Work began on this project but stalled in November 2025. An EIA and NIS were submitted in support of this planning application and did not identify any potential water quality impacts to the Liffey Estuary or Dublin Bay, and so cumulative effects with ABR2 are not envisaged.

9.2.7.5 Uisce Éireann – Ringsend Wastewater Treatment Plant (WwTP) Upgrade Project

The need for additional wastewater treatment capacity has previously been identified to meet increased commercial, domestic and industrial demand, together with a requirement to meet higher environmental standards in the Lower Liffey Estuary, which is designated as a “sensitive” water body requiring higher treatment standards. As a result, Uisce Éireann proposed to expand the existing wastewater treatment plant to 2.4 million population equivalent (PE) capacity and to upgrade the Ringsend WwTP using enhanced Nereda© treatment technology to allow for improved environmental outcomes.

Estimates of the potential reduction of pollutants due to the upgrade are provided in the *Ringsend Wastewater Treatment Plant Upgrade Project EIAR* (June 2018). These are reproduced in **Table 9-14**.

Construction began in 2018 and was delivered across multiple phases to maintain full treatment operations throughout, despite the plant operating over capacity. The completed upgrade now provides treatment capacity for 2.4 million PE, enabling Dublin’s wastewater to be treated to the required environmental standards. It includes advanced nutrient removal for nitrogen and phosphorus, protecting the Liffey Estuary Lower.

Therefore, given that the Ringsend upgrade is now complete with a positive impact on receiving water quality, there can be no cumulative adverse effects when considered in combination with the ABR2 Project.

Table 9-14: Ringsend Wastewater Treatment Plant, Final Effluent Discharge – Load Reduction Summary

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

9.2.7.6 Dublin Bay Power Plant

Synergen Power Limited operates the Dublin Bay Power Plant at Pigeon House Road in Poolbeg peninsula. The plant is a primarily natural gas-powered electricity generation plant in tandem with a heat recovery steam generator (IE licence PO486-02).

The most significant discharge from the plant is the condenser cooling water discharge. The cooling water is abstracted from the Liffey Estuary Lower and returned via a channel downstream. The maximum volume of cooling water discharge permitted in any one day is 726,000m^3, and the maximum permitted rate per hour is 30,250m^3. The cooling water stream also receives emissions from the boiler blowdown emission point (maximum 100m^3/day) and the plant's water treatment neutralisation tank emission point (maximum 200m^3/day).

The IE licence sets emission limit values (ELVs) for a range of parameters, including suspended solids, and thermal limits for the cooling water discharge. The most relevant parameters in terms of potential cumulative effects with the ABR2 Project are suspended solids and temperature. For suspended solids, an ELV of 30mg/l applies to the Synergen water neutralisation treatment tank emission point. The 2017 AER reports a value of 5.25mg/l. This compares with an average turbidity measured at Poolbeg of 6.3NTU, which is equivalent to a total suspended solids of 15.75mg/l. Compliance with the ELV for suspended solids means it is highly unlikely that any significant cumulative effect would occur from the Synergen discharge and the ABR2 Project.

With respect to the power station intakes, any increase in the suspended sediment concentrations was generally very small by comparison with background levels in the Liffey Estuary. The ABR2 dredging operations are therefore unlikely to have any effect on the quality of intake waters in terms of suspended solids content. The ABR2 Project will have no impact on the dispersion of thermal plume envelopes within Dublin Port. However, as customary, DPC will continue to notify the power station operators in advance of each dredging campaign. This will allow operators to temporarily stop abstracting water from the Liffey for a short duration, should this be necessary.

In 2020, the ESB applied for planning permission to develop two sites of 3.5ha (Planning Ref. 3646/20) and 6.1ha (Planning Ref. 3647/20) immediately south of the existing power plant. These developments were subject to EIA, have been completed and are licenced under the existing IE licence (PO486-02) discussed above. In 2023, the ESB applied for planning permission to develop 6.85ha within the grounds of Dublin Bay Power Plant.

Part of this area is within the Poolbeg West SDZ and so has been assessed for cumulative impacts. This development will be subject to Dublin Bay Power Plant's IE licence following an application to include this development within the licenced area. In 2024, the ESB applied for planning permission to develop a 2.4ha site (Planning Ref. PWSDZ3791/24) south of the Ringsend 110kV Substation. This area is partly within the Poolbeg West SDZ, and an NIS has been completed, which states the project will not adversely affect European Sites within Dublin Bay.

Therefore, given the nature and composition of the Dublin Bay Power Plant discharge, there will be no additive contribution to pollutant loads, and no cumulative effects are likely.

9.2.7.7 Poolbeg Generating Station

The ESB operates the Poolbeg Generating Station, Pigeon House Road in accordance with IE licence P0577-03. Poolbeg Generating Station has a total electricity generating capacity of 470MWe from a combined cycle gas turbine (CCGT) generating unit firing on natural gas from the national gas network.

Emissions to water include the discharge of condenser cooling waters to the Liffey Estuary Lower. The maximum permitted volume to be discharged in any one day is 1,036,800m^3 and the maximum permitted rate per hour is 43,200m^3. The cooling water stream also receives emissions from the water treatment neutralisation tank emission point (maximum 200m^3/day), and boiler blowdown emission points (combined maximum 200m^3/day). Screen wash water at the upstream abstraction point is returned locally to the Liffey Estuary Lower (combined maximum 480m^3/day).

The IE licence sets emission limit values (ELVs) for a range of parameters, including temperature, thermal load and chlorine in the cooling water discharge. These and the other parameters specified are of little relevance to ABR2 Project activities. No limits have been specified in relation to suspended solids at the point of discharge.

In 2020, the ESB applied for planning permission to develop two sites of 5.6ha (Planning Ref. 3624/20) and 5.3 ha (Planning Ref. 3625/20) within the grounds of Poolbeg Generating Station. In 2023, the ESB applied for further planning permissions to complete various construction and demolition works within the grounds of Poolbeg Generating Station (Planning Refs. 3137/23 and 4057/23). These developments have been granted planning permission and were subject to their own EIA and Planning and Environmental Consideration Report (PECR), respectively. Planning Ref. 4057/23 was below the threshold for EIA, and the PECR found that water quality to the Liffey Estuary and Dublin Bay will not be impacted during the construction or operational phases, as there will be no outfalls to nearby waterbodies. Applications will be made to incorporate these developments into the existing IE licence.

Therefore, given the nature and composition of the Poolbeg Generating Station discharge, there will be no additive contribution to pollutant loads, and no cumulative effects are likely.

9.2.7.8 Waste Incinerator / Waste-to-Energy Facility

Covanta operates a waste incinerator/waste-to-energy facility at Pigeon House Road in Poolbeg peninsula in accordance with Waste Licence W0232-01. Up to 600,000 tonnes of waste per annum may be processed at the facility.

Cooling water is discharged to the Liffey Estuary Lower via the same channel as the Dublin Bay Power Plant above. The maximum volume of cooling water discharge permitted in any one day is 570,000m^3 and the maximum permitted rate per hour is 14,040m^3.

The IE licence requires monitoring of flow, temperature and residual chlorine in the cooling water emissions and sets ELVs for temperature and total residual chlorine. It also requires toxicity testing, and upstream and downstream biological surveys (including fish diversity).

As above for the Dublin Bay Power Plant and Poolbeg Generating Station, the nature and composition of the discharge is such that there will be no additive contribution to pollutant loads, and no cumulative effects are likely.

9.2.7.9 Point Bridge and Tom Clarke Bridge Widening Project

This project is part of the Dublin City Council's Active Travel Network initiative. It is currently at the preliminary design stage, and the proposed development consists of the construction of a circa 150m long pedestrian and cyclist bridge known as Point Bridge, and improvement and widening works to the Tom Clarke Bridge. The construction programme for the proposed development is anticipated to be approximately 15 months. The current project programme shows construction commencing on site in Q1 2027.

The Point Bridge will have a five-span arrangement (four fixed spans and a central movable span across the river navigation channel). The span lengths and associated bridge substructure arrangement (piers and abutments) will align with those of the Tom Clarke Bridge. The deck on the two northern fixed spans and the bascule span will have a width of c. 8.9m. The southern fixed spans will have a width which varies from 8.4m at the southern abutment to 17.4m in the vicinity of the bascule pier.

The northern abutment will be of in-situ concrete construction, set back from the face of the quay wall. The intermediate piers within the river channel will be a combination of precast and in-situ concrete construction and will be supported on piled foundations. The south abutment will be of in-situ concrete construction and will be about the western face of the Tom Clarke bridge southern abutment, but will be structurally separate.

The piled foundations supporting the Point Bridge substructure are proposed to be large-diameter bored concrete piles (approximately 900mm diameter), which will be socketed into the underlying bedrock and provided with permanent steel casings. The existing vessel protection structures will be removed, and a new structure will be provided on the western approach of Point Bridge, formed using groups of large-diameter bored concrete piles.

The Point Bridge is within the Liffey Estuary Lower transitional water body. The changes to the hydromorphology of the Liffey Estuary Lower, which is a HMWB, through the operation of the Point Pedestrian and Cycling Bridge will not be significant given the modified nature of this water body for Port and Navigation use. The design and alignment with the Tom Clake bridge will ensure that flows are not negatively impacted and the longitudinal connectivity of the Liffey Estuary Lower is not compromised, and therefore the movement of fish upstream or downstream will not be negatively affected.

The EIAR for the Point Bridge Project is required to consider cumulative effects with other projects, including the ABR2 Project, with which it may overlap temporally. The impacts of the ABR2 Project are imperceptible and

given the implementation of standard best practice and mitigation during the construction phase of both projects, there is no risk of significant cumulative effects.

9.2.7.10 Offshore Wind Energy Projects

Since the ABR2 Project will not be using the offshore licenced dump site to dispose of dredge spoil, there is no risk of cumulative effects with proposed wind energy projects, including site investigation applications or other proposed dredging projects.

The Codling Wind Park, Seastacks windfarm, the Dublin Array, Kish and Bray Wind Farm have proposed possible export cable landfall on the south of Poolbeg Peninsula in Dublin Bay, each with cable corridors that traverse south Dublin Bay from the southeast. The North Irish Sea array is located in the North Irish Sea. The ABR2 Project will not impact Dublin Bay, the North Irish Sea or the area south of the Poolbeg Peninsula, and therefore no cumulative effects will occur.

9.2.7.11 Microsoft Ireland Operations Ltd Geophysical Survey and Site Investigations

Microsoft applied to MARA for a Marine Usage Licence, which was approved in 2024 for geophysical surveys and site investigations for a proposed subsea fibre optic cable having a landfall in Dublin Port and to evaluate options for the route traversing Dublin Bay, across the Irish Sea to Anglesey, Wales. The surveys include non-invasive geophysical surveys and invasive tests, including cone penetration tests and vibrocores.

Since the ABR2 Project will not be using the offshore licenced dump site to dispose of dredge spoil and has been determined not to have any significant impacts on Dublin Bay, there is no risk of significant cumulative effects, particularly given the nature of the surveys proposed under the MUL, which will have a limited extent in terms of seabed disturbance.

9.2.7.12 Other Projects

A comprehensive list of adjacent or nearby developments is provided in **Chapter 21**. These have each been reviewed and have been assessed for environmental impact within their respective applications. Those consented all must adhere to their respective CEMPs and water quality management plans. This, along with differences in construction timings, reduces the likelihood of cumulative effects. Therefore, at this stage, it is considered that there are no potential cumulative effects arising from adjacent or nearby development, together with those predicted for the Project.

9.2.7.13 Conclusion

In conclusion, there will be no cumulative impacts between the ABR2 Project and any other projects in the surrounding area, which could negatively impact the quality and WFD status or objectives of surrounding water bodies.

9.2.8 Residual Impacts

In circumstances where the project design and proposed mitigation measures are fully implemented during the construction and operational phases, as outlined in **Section 9.2.6**, the Residual Effects of the Project on Water Quality would consist of changes to the hydromorphology of the Liffey Estuary Lower; however, this impact is Minor and non-significant in EIA terms. Provided the mitigation measures defined within the CEMP are fully implemented during the construction and operational phases, and the conditions of the IE licence are fully adhered to, the impact of the ABR2 Project on water quality will be Minor and therefore non-significant in EIA terms.

The completion of works as part of the ABR2 Project is therefore not expected to have a significant detrimental impact on the water quality of the receiving waters or make a significant change to the existing morphology. In addition, the ABR2 Project will not compromise the achievement of the environmental objectives for the Liffey Estuary Lower, which is to achieve good ecological potential by 2027, nor will the activity result in a deterioration in the status of Dublin Bay, which is currently achieving its environmental objective of good status, which must be maintained. It can therefore be concluded that the proposed works are compliant with the requirements of the WFD.

9.2.9 Summary of Effects and Conclusions

Baseline water quality within the receiving environment was established through review of national monitoring data used to establish water quality status in the context of the EU WFD and supporting environmental standards. Recent extensive high-frequency monitoring data collected over a period of ten years during Dublin Port Company's ABR Project and MP2 Project were also reviewed.

Using baseline water quality data and site specific water quality model simulation outputs, an assessment of the ABR2 Project was conducted to determine the likelihood of significant impacts on water quality using the criteria for rating significance and magnitude as set out in the National Roads Authority (NRA) publication "*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*" (NRA, 2008), and appropriate mitigation measures to reduce impacts were proposed where the design of the project could not avoid or minimis impacts.

A summary of the impact assessment is provided in **Table 9-15**. In circumstances where project design and the appropriate mitigation measures are fully implemented during the construction and operational phases, the impact of the ABR2 Project on water quality to the receiving water bodies will be **Minor** and non-significant in EIA terms. The ABR2 Project is therefore not expected to significantly impact water quality, either alone or in combination with other projects, in the receiving waters.

It can therefore be concluded that the ABR2 Project works are compliant with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality objectives for these water bodies.

Table 9-15: Summary of Effects relating to Water Quality

Potential Effect and Receptor	Phase[1]		Magnitude of Effects	Sensitivity of Receptor	Significance of Effect	Significant/Not Significant	Mitigation Measures	Residual Effects
	C	O						
Mobilisation of contaminated sediments containing heavy metals	✓	✓	C: Negligible O: Negligible	C: Very High O: Very High	C: Minor O: Minor	C: Not Significant O: Not Significant – beneficial	See **Section 9.2.6.1.2**	None
Accidental spillages of dredge spoil	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.6.1.3**	None
Discharge from treatment of dredge material	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.4.1.3**	None
Release of contaminated surface water drainage	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.6.1.4**	None
Alternative management options for dredge material in the event that the volume of dredge spoil exceeds the void	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.4.1.6**	None

[1] C: Construction Phase; O: Operational Phase

Potential Effect and Receptor	Phase[1]		Magnitude of Effects	Sensitivity of Receptor	Significance of Effect	Significant/Not Significant	Mitigation Measures	Residual Effects
	C	O						
space at the Berths 52/53 basin								
General construction works	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.6.1.5**	None
Demolition waste	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	See **Section 9.2.4.1.8**	None
Abstraction of water for use in the treatment of dredged sediments	✓		C: Negligible	C: Very High	C: Minor	C: Not Significant	None	None
Routine maintenance dredging		✓	O: Negligible	O: Very High	O: Minor	O: Not Significant	See **Section 9.2.6.2.1**	None
Changes in hyromorphological supporting conditions within the Lower Liffey Estuary		✓	O: Negligible	O: Very High	O: Minor	O: Not Significant	See **Section 9.2.4.2.3**	Minor
Surface water drainage		✓	O: Negligible	O: Very High	O: Minor	O: Not Significant	See **Section 9.2.6.1.4**	None

9.2.10 Limitations of Assessment

There are no notable limitations to the data availability for the assessment. The assessment is subjective, qualitative and based on experience.

The Water Quality environment has been defined using published data sources and water quality monitoring data provided by DPC. The data used to inform this assessment is considered robust, and therefore, this approach is considered acceptable.

9.3 Flood Risk Assessment

9.3.1 Scope of the Assessment

The primary purpose of this EIAR chapter is to provide an assessment of the likely effects of the ABR2 Project on flood risk during the construction and operational phases.

9.3.2 Assessment Methodology

This section describes the methodology which has been used in the assessment of flood risk, which may impact or be impacted by the Project. The methodology and associated impact assessment had regard to the general guidance for the undertaking of an EIA, as presented in **Chapter 1 Introduction**.

The following tasks will be implemented to complete the assessment:

- identify and assess the hazard from all sources of flooding to the Project;
- appraisal of the Project with respect to the main sources of flooding;
- consideration of the impact of the Project on flooding elsewhere;
- identification of any mitigation measures required;
- assessment of any residual impacts; and
- demonstrate that the Project complies with national planning policy and guidance.

9.3.2.1 Guidance and Legislation

The Planning System and Flood Risk Management, Guidelines for Planning Authorities

'The Planning System and Flood Risk Management, Guidelines for Planning Authorities' published by Department of Environment, Heritage and Local Government (DoEHLG) & Office of Public Works (OPW) in 2009, referred to in this chapter as 'the Guidelines', introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment, and management into the planning process. Planning authorities must implement the Guidelines in ensuring that, where relevant, flood risk is a key consideration in the assessment of planning applications.

In achieving the aims and objectives of the Guidelines, the key principles that should be adopted by developers should be to:

- avoid the risk where possible;
- substitute less vulnerable uses, where avoidance is not possible; and
- mitigate and manage the risk, where avoidance and substitution are not possible.

Flood zones are geographical areas within which the likelihood of flooding is in a particular range, and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. There are three types or levels of flood zones defined for the purposes of the Guidelines:

- Flood Zone A - where the probability of flooding from rivers and the sea is highest (greater than 1% for river flooding, or 0.5% for coastal flooding).
- Flood Zone B - where the probability of flooding from rivers and the sea is moderate (between 0.1% and 1% for river flooding, or between 0.1% and 0.5% for coastal flooding).
- Flood Zone C - where the probability of flooding from rivers and the sea is low (less than 0.1% for both river and coastal flooding).

The flood zones are based on the current (present-day) assessment of events without the inclusion of climate change factors.

The Guidelines classify different types of development in terms of their vulnerability class (Table 3.1 within the Guidelines). The Guidelines identify the type of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test (Table 3.2 within the Guidelines). Appropriate development is development whose vulnerability to flooding is such that it is generally acceptable within a particular flood zone.

Dublin City Council Development Plan 2022-2028

Policy SI15 states that all development shall carry out, to an appropriate level of detail, a Site-Specific Flood Risk Assessment (SSFRA) that shall demonstrate compliance with 'The Planning System and Flood Risk Management, Guidelines for Planning Authorities' and the Strategic Flood Risk Assessment (SFRA) prepared by the development plan. This section of the EIAR is equivalent to a SSFRA and has been prepared in accordance with the Guidelines.

The SFRA was developed to inform the preparation of land use zoning, policies and objectives for the Development Plan. The SFRA completed a Justification Test for Development Plans on the area 'Dublin Port North of Liffey to Tom Clarke Bridge', the conclusion of which was that the subject area passes the Justification Test for Development Plans for less vulnerable development. Highly vulnerable development should be avoided in Flood Zone A and B.

Dublin Port Masterplan 2040 Strategic Flood Risk Assessment

RPS (now Tetra Tech) previously carried out a Strategic Flood Risk Assessment (SFRA) in support of the Masterplan 2040 (reviewed in 2018) for the redevelopment of Dublin Port. The main purpose of the SFRA was to appraise the adequacy of existing information, prepare flood zone maps, and to highlight potential development areas that require more detailed assessment on a site-specific level. The SFRA also provides

guidance for appropriate types of development within areas at potential risk of flooding and suitable mitigation measures to ensure resilience to the predicted effects of climate change.

The SFRA provided the framework as to how all subsequent developments within the port should manage flood risk and identified the need to undertake a site-specific flood risk assessment for all sites identified as being at risk from flooding. This section of the EIAR is equivalent to a site-specific flood risk assessment and has been prepared in accordance with The Planning System and Flood Risk Management Guidelines.

9.3.2.2 Study Area

The Flood Risk Study Area is the ABR2 Project development area as shown in the Project Description in **Chapter 5**.

9.3.2.3 Baseline

The baseline environment relevant to this EIAR Chapter was informed by a Desktop Study.

9.3.2.3.1 Desktop Study

Information on the baseline environment was collected through a desktop review of existing studies and datasets. The sources used to inform the baseline environment are provided in **Table 9-16**.

Table 9-16: Summary of Key Desktop Data Sources for Flood Risk

Data Title	Source/Author	Year
Flood maps from floodinfo.ie	Office of Pubic Works	2026
Irish Coastal Wave and Water Level Modelling Study (ICWWS)	Office of Pubic Works	2020

9.3.2.3.2 Site-specific Surveys

No site-specific surveys have been undertaken to inform the EIA for Flood Risk.

9.3.2.4 Consultation

Following completion of the EIA Scoping Report, consultation was undertaken to obtain opinions regarding the Project and its potential and scope for significant effects. No specific comments relating to Flood Risk were received. Dublin City Council advised that the EIAR should take account of the Dublin City Development Plan 2022–2028. The SFRA prepared for the Development Plan has been considered in this assessment.

9.3.2.5 Assessment Criteria and Assessment of Significance

Determining the significance of effects is a process that involves defining the magnitude of the impacts and the sensitivity of the receptors. The assessment of whether the Project is likely to have significant effects on flood risk is considered using the methodology as set out in the EIA Scoping Report. The assessment is based on the following:

- **Sensitivity/ importance of the receptors** – including factors such as the vulnerability to flooding, recoverability from flooding and value / importance of the receptor; and
- **Magnitude of the impact** – including factors such as the extent, duration, and frequency of flooding, and the reversibility of the impacts.

9.3.2.5.1 Magnitude Criteria

The significance of effects refers to the consequences of an impact. The significance of effects for flood risk have been determined using the methodology as set out in the EIA Scoping Report. **Table 9-17** illustrates the assessment terminology for determination of significant effects.

For the purposes of this assessment, any effects with a significance level of less than Minor have been concluded to be not significant in EIAR terms.

Table 9-17: Matrix used for the assessment of the significance of the effect

		Magnitude of change				
		High	**Medium**	**Low**	**Negligible**	**No Change**
Sensitivity	**Very High**	Major	Major	Major / Moderate	Moderate	No Change
	High	Major	Major/ Moderate	Moderate	Moderate/ Minor	No Change
	Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor	No Change
	Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible	No Change
	Negligible	Negligible	Negligible	Negligible	Negligible	No Change

9.3.3 Baseline Environment

9.3.3.1 Flood Risk Context

9.3.3.1.1 River Flooding

The Project site is adjacent to and within the River Liffey. At this location, the River Liffey can be considered as tidal, therefore, extreme flood events are likely to be dominated by coastal flooding, and extreme fluvial events will not further increase the extreme levels predicted during extreme tidal and storm events. The river flood extents from available OPW maps within the site are shown in **Figure 9-19** for the 1% AEP (medium probability) and 0.1% AEP (high probability) events. This shows that river flooding is contained within the River Liffey channel. Fluvial flood risk has not been considered further on the basis that coastal flood risk is the predominant source of flood risk at this location. Note that the base mapping used in the OPW maps, which are presented in this chapter, is slightly different from what is currently constructed in the Study Area.



Figure 9-19: OPW River flood extents map (Present day)

9.3.3.1.2 Coastal Flooding

The Strategic Flood Risk Assessment states that a review of the most up-to-date available data should be undertaken for any Site-specific FRA. The coastal flood extents from available OPW maps within the site are shown in **Figure 9-20**, **Figure 9-21** and **Figure 9-22** show the predicted depth maps for the 0.5% AEP (medium probability) and 0.1% AEP (high probability) events.



Figure 9-20: OPW Coastal flood extents map (Present day)

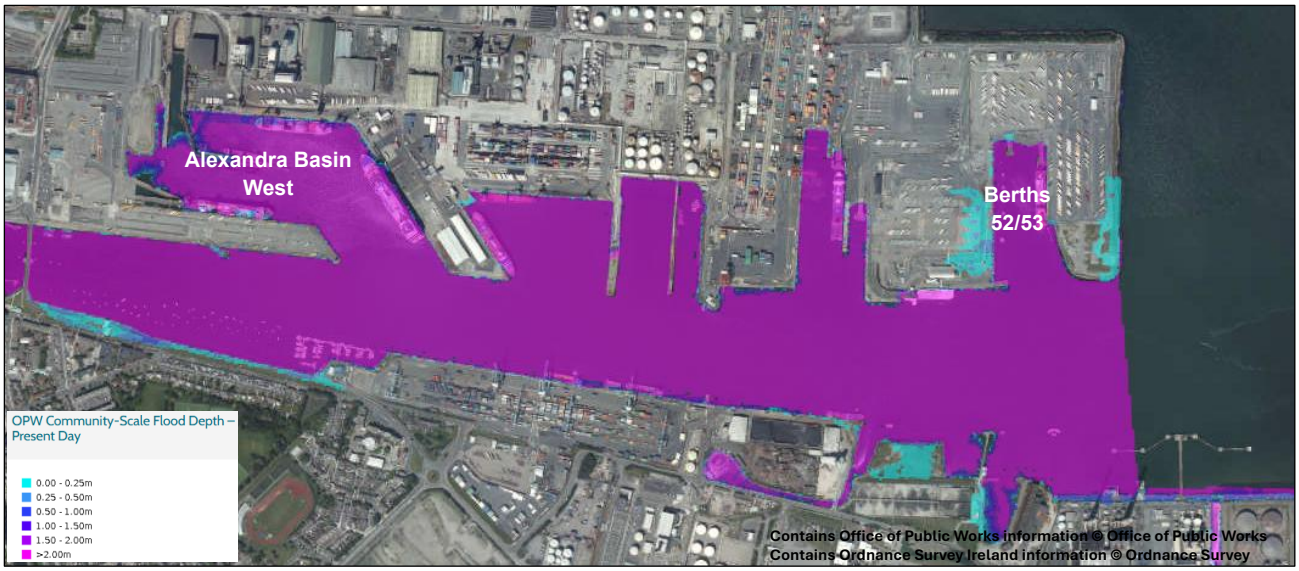


Figure 9-21: OPW Coastal flood depth map (0.5% AEP, Present day)

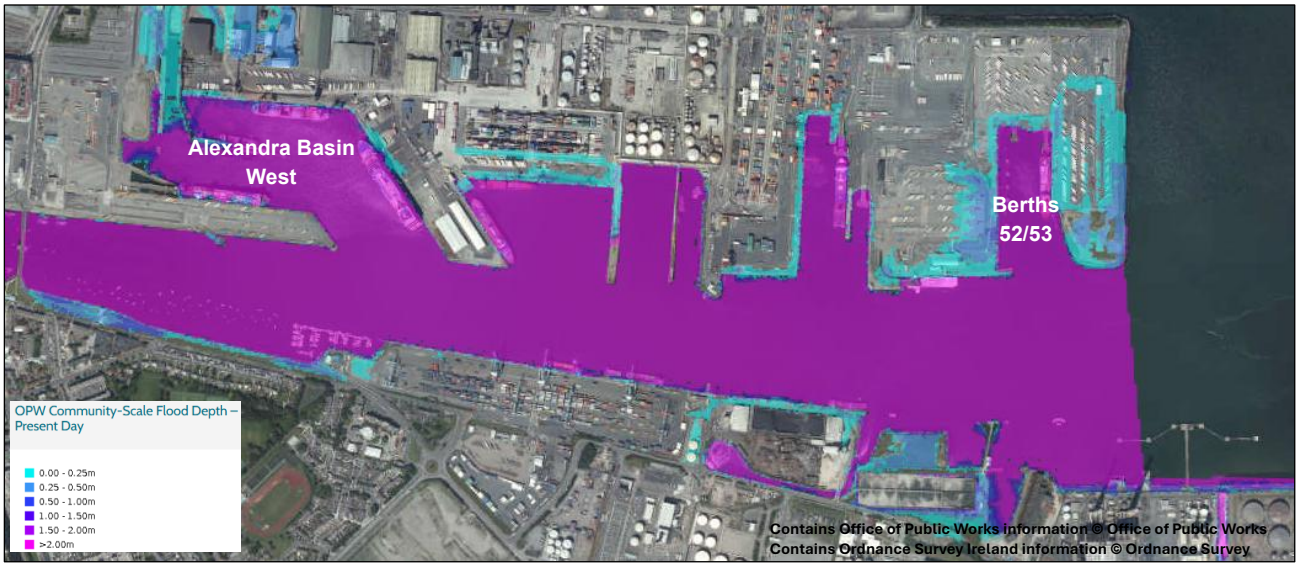


Figure 9-22: OPW Coastal flood depth map (0.1% AEP, Present day)

The most up to date extreme water levels at Dublin Port are from the Irish Coastal Wave and Water Level Modelling Study (ICWWS) Phase 1 Technical Report & Appendices published in 2020 by OPW. The predicted tidal water levels from this analysis are as shown in **Table 9-18.** These are for Estimation Point NE22, the location of which is shown in **Figure 9-23,** which is extracted from Figure 1 of Appendix C of the ICWWS.

Table 9-18: Predicted tidal water levels

Annual exceedance probability (AEP)	Return period (years)	Water level to OD Malin
0.5%	200	3.15
0.1%	1000	3.30



Figure 9-23: Location of Northeast coast estimation points (ICWWS)

9.3.3.1.3 Surface Water Flooding

Pluvial flood maps are available for this area from OPW. **Figure 9-24** shows an extract from the pluvial flood map. This shows that there are areas of the sites at risk from pluvial flooding.



Figure 9-24: OPW Pluvial flood extent map (1% AEP, Present day)

9.3.3.1.4 Historical Flooding

The Office of Public Works (OPW) gathers and collates data from reported flood events throughout the country. From a review of the OPW's flood maps, there was a recorded tidal flood event in February 2002, see **Figure 9-25** for location. This event was the highest tide ever recorded and over 1,100 buildings were recorded as flooding in Dublin.

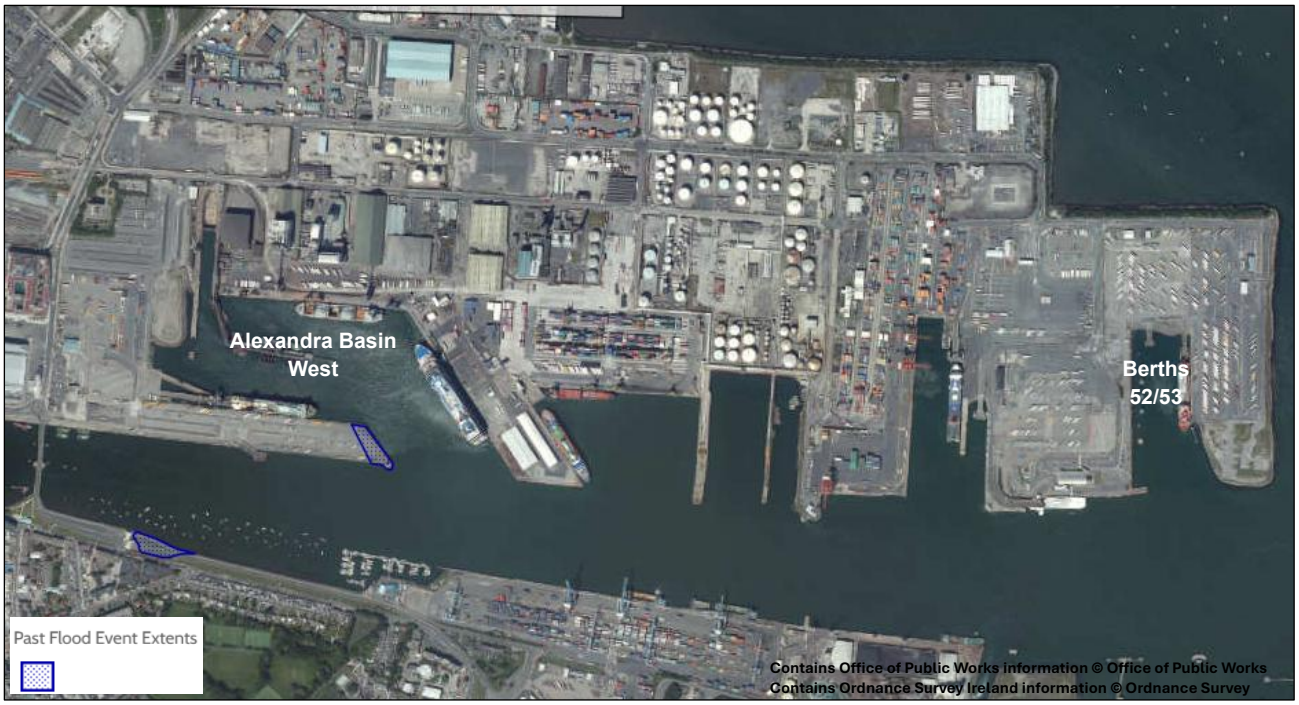


Figure 9-25: OPW Past flood event map

9.3.3.1.1 Flood Zones

The flood zones for the Project have been derived based on the predicted OPW tidal flood extents. **Figure 9-26** shows the extent of these present-day flood zones. The two areas where works are proposed under this Project, Alexandra Basin West and Berths 52/53, are located in Flood Zones A and B.

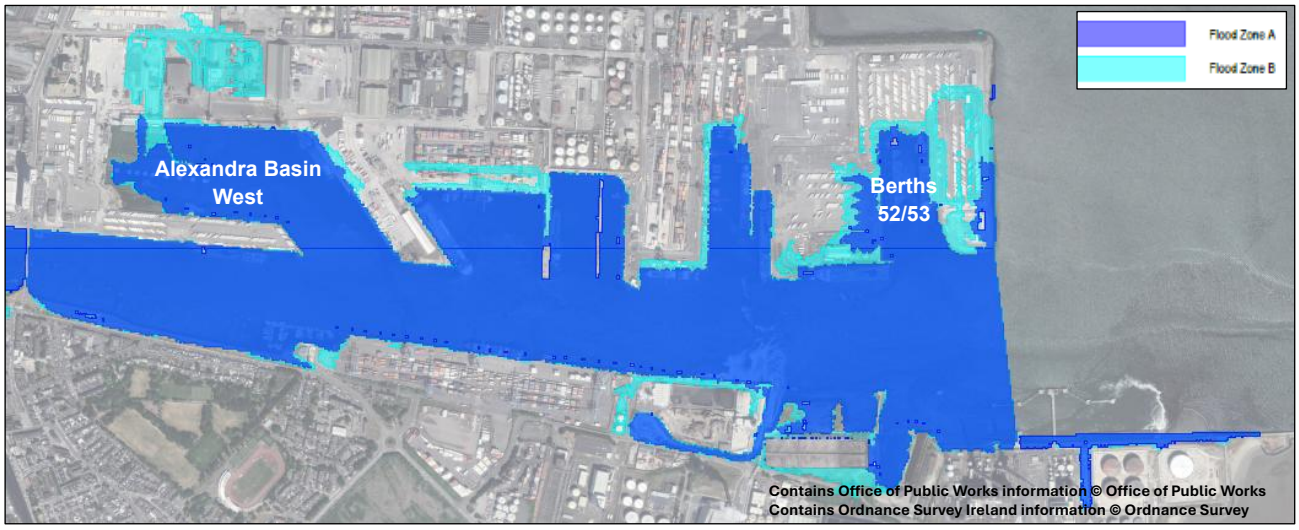


Figure 9-26: Flood Zones within the ABR2 Study Area

9.3.3.2 Future Baseline Scenario

OPW flood maps are produced for two scenarios: the Mid-range future scenario (MRFS) and the High-end future scenario (HEFS). The mid-range future scenario (MRFS) coastal flood extents from OPW maps within the site are shown in **Figure 9-27** for the 0.5% AEP (medium probability) and 0.1% AEP (high probability) events. These maps show a significant increase in the extent of flooding when compared to **Figure 9-20**.

Whilst there is a clear consensus that climate change will present significant challenges in the future, some uncertainty remains regarding the extent and magnitude of change, particularly within the coastal environment. The ICWWS considers four future scenarios - the Mid-Range Future Scenario (MRFS), which is an allowance of 0.5m on extreme water levels; the High End Future Scenario (HEFS), which is an allowance of 1m on extreme water levels; H+EFS which is an allowance of 1.5m on extreme water levels; and the H++EFS, which is an allowance of 2m on extreme water levels. In 2021, RPS (now Tetra Tech) completed the report 'Dublin Port Bull Walls- Considering the Impact of Future Climate Change' on behalf of DPC. The primary objective of this study was to review national guidance documents and the plethora of scientific literature to identify a likely set of future scenario conditions that could be used to assess the impact of climate change on the historical structures at Dublin Port by 2100. The report recommended a 1m increase in sea level rise. It is recommended that an allowance of 1m for climate change be included for the ABR2 Project, which takes the coastal level to 4.15m OD.



Figure 9-27: OPW Coastal flood extent map (MRFS)

9.3.4 Description of Likely Significant Effects

This section outlines the significance of effects on flood risk that could arise due to the construction and operation of the Project. The matrix as shown in **Table 9-17** was used for the determination of significant effects.

9.3.4.1 Assessment of Construction Effects

During construction, there is a risk of flooding to the works from extreme tidal events that will need to be managed. Impacts would include flooding of the works, flooding of plant and machinery, and a risk to construction workers.

The vulnerability of the construction works to flooding is High and the recoverability of any affected receptors is High. The impacted receptors are of High value/ importance. The overall sensitivity is therefore considered to

be **High**. The duration of impacts is only expected in the short-term during the construction phase. The effects are not expected to occur often, and any longer-term impacts are reversible. The overall magnitude of effects is likely to be **Negligible**. Therefore, according to the matrix in **Table 9-17**, the overall significance of effects is **Minor**.

9.3.4.2 Assessment of Operational Effects

Both elements of the Project are in Flood Zones A and B. The Project can be classified as 'Docks, marinas and wharves', which is defined as a 'Water-compatible development' in The Planning System and Flood Risk Management Planning Guidelines (Table 3.1 in the Guidelines). Under the Guidelines (Table 3.2), 'Water-compatible developments' are appropriate to locate in all flood zones and there is no requirement to undertake a Justification Test. It is however, necessary to show that the Project will not be impacted by flooding and that it does not increase the risk of flooding elsewhere.

Once construction is completed, the dredging works at Alexandra Basin West will not be impacted by flooding.

As part of the ABR2 Project, the proposed basin of Berths 52/53 will be infilled, and the existing levels of the surrounding area will be raised by 1.4m. There are no operational activities or infrastructure associated with the ABR2 Project that will be at risk of flooding. The infilling of the basin of Berths 52/53 and the raised area adjacent to the infill site will allow the future delivery of the Unified Ferry Terminal as consented under the MP2 Project. The operation of the MP2 development works is outlined in the documents supporting the planning consent for MP2. Following infilling, the original ground levels of the surrounding area of the existing basin of Berths 52/53 will be raised to a level of 4.58m OD, which is above the site-specific analysis of predicted tidal flood levels.

As the ABR2 Project includes dredging and infilling, it has the potential to change the tidal flow within the River Liffey estuary and thereby change the flood risk associated with neighbouring areas, which are known to be susceptible to flooding. Coastal process modelling has been undertaken (see **Chapter 14**), which shows that the Project does not impact on predicted coastal flood levels that would increase flood risk elsewhere.

The sensitivity of the coastal floodplain to an increase in flood risk is **Low**. The extent of the potential effect is relatively small as areas impacted by the ABR2 Project only cover a small geographical area and the duration of impacts is short-term. The effects are not expected to occur often, and any longer-term impacts are reversible. Therefore, the overall magnitude of effects is likely to be **Negligible**. Therefore, according to the matrix in **Table 9-17**, the overall significance of effects on river flood risk is **Negligible**.

9.3.5 Inter-relationships

Wider coastal processes should always be considered when assessing coastal flood risk, in particular, thinking about how coastal flooding may be exacerbated in certain locations due to physical factors that can occur individually or in combination. The coastal process modelling as described in the Coastal Process chapter (**Chapter 14**) has therefore been used and considered within this assessment.

9.3.6 Mitigation and Monitoring

9.3.6.1 Mitigation

9.3.6.1.1 Construction Phase

Temporary works may be required to prevent coastal waters from interacting with works activities throughout the duration of the construction period, particularly the materials handling infrastructure at Berth 52. The temporary works design to ensure flood protection will be the responsibility of the appointed Contractor.

Tidal early warning systems will be used by the Contractor during the construction phase. Triton and Tidewatch are two tidal flood forecasting and warning systems developed by Dublin City Council that make use of weather and/ or surge forecasts in the Irish Sea to provide future predictions of tide levels, with Tidewatch providing forecasts up to five days in advance and Triton providing forecasts up to two days in advance. The latest tidal flood warnings and forecasts are available on Dublin City Council's flood forecasting and warning page. The Contractor can subscribe to DCC Alerts is which is a free notification service from Dublin City Council.

9.3.6.1.1 Operation Phase

The physical infrastructure of the Project will not be adversely impacted by flooding. There are no operational activities or infrastructure associated with this Project that will be at risk of flooding. Therefore, no mitigation measures are proposed for the operation phase.

9.3.6.2 Monitoring

Following an extreme tidal event, the Project will be checked for damage, and any repairs will be made as soon as possible.

9.3.7 Potential Cumulative Effects

Chapter 21 Cumulative Effects and Environmental Interactions outlines the methodology used to complete the assessment of cumulative effects, which may arise from adjacent or nearby development together with those predicted for the Project. The projects which have been considered within the assessment of cumulative effects are outlined in **Chapter 21 Cumulative Effects and Environmental Interactions**.

As described above, the flood risk to the Project is from coastal flooding. Infilling of the coastal floodplain to construct the Project will have a negligible effect on the extent of the coastal floodplain, now or in the future, considering the anticipated climate change. The same can be said of all adjacent or nearby development. Therefore there are no potential cumulative effects arising from adjacent or nearby development, together with those predicted for the Project.

9.3.8 Residual Impacts

Residual risk is the risk that remains after all mitigation measures have been taken to reduce the frequency of flooding. As with any development within a coastal floodplain, there is always a residual risk linked with a more extreme event, greater than the design event, occurring. There are no operational activities or infrastructure

associated with the ABR2 Project that are at risk from an extreme tidal event. The overall residual risk is therefore considered to be low.

9.3.9 Summary of Effects and Conclusions

The flood risk to the ABR2 Project has been assessed, and the predominant source of flood risk emanates from tidal flooding from the River Liffey.

A summary of the impact assessment is provided in **Table 9-19**.

Table 9-19: Summary of Effects relating to Flood Risk

Potential Effect and Receptor	Phase[2]		Magnitude of Effects	Sensitivity of Receptor	Significance of Effect	Significant/Not Significant	Mitigation Measures	Residual Effects
	C	O						
Coastal flooding to Proposed Development	✓	✓	C: Negligible O: Negligible	C: High O: Low	C: Negligible O: Negligible	C: Not Significant O: Not Significant	Tidal warning	Extreme coastal event

[2] C: Construction Phase; O: Operational Phase

9.3.10 Limitations of Assessment

There were no limitations that would affect the robustness of the assessment for EIA purposes.