Alexandra Basin Redevelopment 2

Bringing Dublin Port To 2040

Environmental Impact Assessment Report

Chapter 8 Land, Soils, Geology & Hydrogeology

Volume 2



CALAFORT ÁTHA CLIATH
DUBLIN PORT

TETRA TECH

8 Land, Soil, Geology and Hydrogeology

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8.1 Introduction

This Chapter of the EIAR comprises an appraisal of the existing land, soil, geology and hydrogeology conditions within the Project study area and addresses the potential effects of the ABR2 Project on land, soil, geology and hydrogeology. 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.

A Preliminary Risk Assessment (PRA) has been prepared to support this assessment. The PRA report is contained within **Appendix 8-1** of the EIAR and summarised in Section 8.3.17 of this chapter.

8.1.1 Scope of the Assessment

The primary purpose of this EIAR chapter is to provide an assessment of the likely effects of the ABR2 Project during the construction and operational phases on land, soil, geology and hydrogeology conditions.

8.2 Assessment Methodology

This section describes the methodology which has been used in the assessment of land, soil, geology and hydrogeology, 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**.

8.2.1 Guidance and Legislation

The methodology outlined within the following guidance documents was used in the assessment:

- ‘Geology in Environmental Impact Statements’, published by The Institute of Geologists of Ireland in September 2002.
- Institute for Geologists Ireland (IGI) Guidance for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements, April 2013.
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency, May 2022.
- The National Roads Authority’s guidelines: ‘Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes’, published in 2008. These guidelines aim to provide guidance on the assessment of geological, hydrological and hydrogeological impacts through the EIA process.

A Preliminary Risk Assessment (PRA) Desk Top Assessment (**Appendix 8-1**) was prepared using guidance provided by the UK Environment Agency (EA). The UK technical guidance for assessing and managing risks from contaminated land is detailed in 'Land Contamination Risk Management' (LCRM) published by the Environment Agency in 2020 (updated June 2025), and this guidance is accepted by the EPA (in the absence of Ireland Government guidance).

Underpinning the guidance within LCRM is a source-pathway-receptor methodology, which is used to identify Significant Pollutant Linkages (SPLs).

The following definitions apply:

- Source: identification of contamination source
- Pathway: the means by which the contamination can come into contact with the receptor
- Receptor: the entity which is vulnerable to harm from the contamination source

An important thread throughout the overall process of risk assessment is the need to formulate and develop a conceptual model for the site, which supports the identification and assessment of pollutant linkages. Development of the conceptual model, adheres to LCRM guidance and forms the main part of the PRA, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process. A risk is present only when a source-pathway-receptor linkage is present and active.

8.2.2 European Union Legislation

The Water Framework Directive (2000/60/EC) establishes a framework for community action in the field of water policy. The main objective of the Directive is for all groundwater, surface water and coastal water bodies to achieve 'good' status by 2015. The Directive introduced new, broader ecological objectives as well as aims to prevent the deterioration of all water bodies. The Directive must be considered in any scheme that has the potential to impact on any part of the water environment. The Water Framework Directive has been transposed into Irish law by means of a number of statutory instruments.

The Environmental Impact Assessment (EIA) Directive[1] is a key instrument of European Union environmental law. It is currently governed by the terms of European Union (EIA Directive). The EIA Directive requires that public and private projects that are likely to have significant effects on the environment be made subject to an assessment prior to development consent being granted. Before development consent can be granted, an EIA is required if a Project is likely to impact significantly upon the environment.

8.2.3 Sources of Information

The following sources of information were used in the compilation of this assessment:

- Environmental Protection Agency Map Viewer - http://gis.epa.ie/Envision/;

[1] Directive 2011/92/EU, as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private Projects on the environment.

- Geological Survey of Ireland Spatial Resources http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228;
- Geological Survey of Ireland Geotechnical Data Viewer http://spatial.dcenr.gov.ie/GeologicalSurvey/GeoTechnicalViewer/index.html
- Land and Soil EPA maps (Geohive maps)
- Internet-based aerial photography.

8.2.4 Study Area

The ABR2 Project is located within the existing northern estate of Dublin Port, immediately north of the mouth of the River Liffey. The land, soils, geology and hydrogeology study area of the ABR2 Project includes Alexandra Basin West and Berths 52/53, as shown in **Figure 8-1** below.

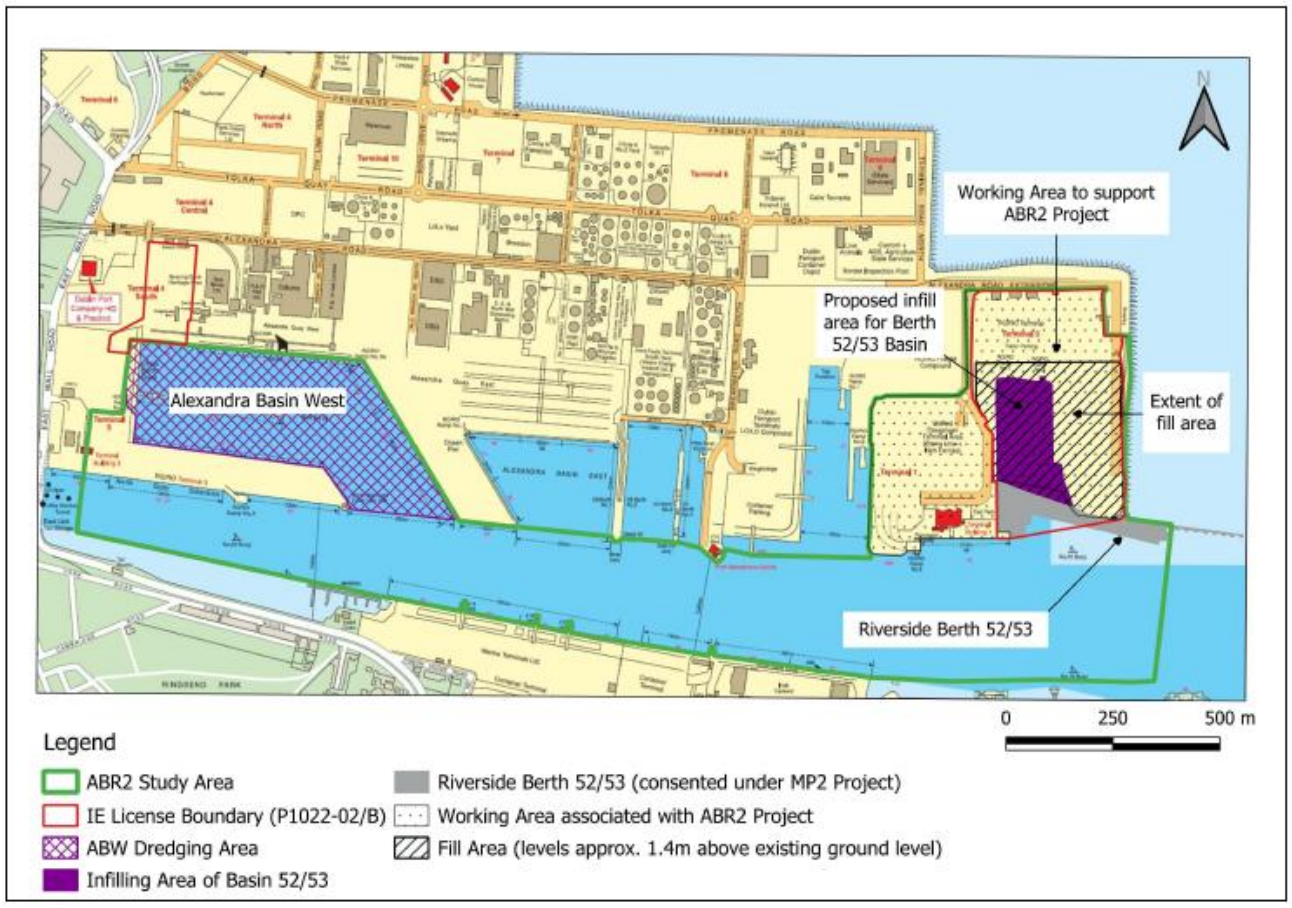


Figure 8-1: Land, Soils, Geology and Hydrogeology study area

8.2.5 Baseline

The baseline environment relevant to this EIAR Chapter was informed by a PRA Desktop study, titled; Dublin Port: ABR2 Project Preliminary Risk Assessment (Desk Study) Report (**Appendix 8-1**).

8.2.5.1 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 8-1**.

Table 8-1: Summary of Key Desktop Data Sources for land, soils, geology and hydrogeology

Data Title	Source/Author	Year
Environmental Protection Agency Map Viewer	EPA Geo Portal	2026
Geologcal Surevy of Ireland Spatial Resources	Geological Survey Ireland	2026
Ordnance Survey Ireland mapviewer	Ordnance Survey Ireland	2026
Geological Surevy of Ireland Geotechnical Data Viewer	Geological Surevy of Ireland	2026
Land and Soil EPA Maps (Geohive maps)	Geohive maps	2026

8.2.5.2 Site-specific Surveys

A PRA was carried out to assess the ground conditions and potential for any ground contamination that may have arisen from the site's present and historical use. This was undertaken through a desktop review of existing studies and datasets.

8.2.6 Consultation

Following completion of the non-statutory EIA Scoping Report, consultation was undertaken regarding the potential and scope for significant effects arising from the ABR2 Project. Specific submissions relating to land, soils, geology and hydrogeology are set out in **Table 8-2**, including where additional information in relation to issues can be found in the EIAR.

Table 8-2: ABR2 Project EIA Scoping Report Comments relating to land, soils, geology and hydrogeology

Organisation	Comment Response/Issue Raised	Response
Geological Survey of Ireland (GSI)	GSI provided a list of data sources available for use	The GSI online data viewers have been used to understand the baseline environment – See **Section 8.3**

8.2.7 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.

8.2.7.1 Sensitivity of Receptor

Effects of the development on land, soils, geology and hydrogeology receptors have been assessed taking into account the sensitivity of the receptor and magnitude of the effect. The sensitivity of the receptors is determined according to the methodology shown in **Table 8-3**.

Table 8-3: Sensitivity of receptor (Amended from 'NRA Guidelines on procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

Sensitivity	Criteria	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale.	• Geology: World Heritage Sites; sites protected under EU wildlife legislation (SAC, SPA, SSSI, Ramsar site) or • Geological features that are rare on a regional or national scale. • Surface waters: River, wetland or surface water body ecosystem protected by EU legislation.
High	Attribute has a high quality and rarity on Local scale.	• Geology: Regional important geological sites. • Soils: Well-drained and/or high-fertility soils. • Surface water: Ecosystem protected by national legislation. • Groundwater: Regionally important potable water source supplying >2500 homes, groundwater vulnerability is classified as high; principal aquifer providing a regionally or locally important resource or supporting site protected under wildlife legislation. • Future site users: Sensitive land uses proposed, such as residential housing with gardens, allotments, and schools. • Built Environment: Sites of international Importance, World Heritage Sites, Listed Buildings, and Scheduled Monuments
Medium	Attribute has a medium quality and rarity on local scale.	• Soils: Moderately drained and/or moderate fertility soils. • Groundwater: Local potable water source supplying >50 homes, moderate classification of groundwater vulnerability; secondary aquifer providing water for agricultural or industrial use with limited connection to surface water. • Geology: Regionally Important Geological Sites.

Sensitivity	Criteria	Typical Examples
		• Future site users: Moderately sensitive land uses such as residential housing without gardens, commercial developments and open spaces. • Built Environment: Sites with local interest for education or cultural appreciation.
Low	Attribute has a low quality and rarity on local scale	• Soils: Poorly drained and/or low-fertility soils. • Groundwater: Local potable water source supplying <50 homes, deep secondary aquifer with poor water quality, not providing baseflow to rivers. • Geology: Rock exposures. • Future Site Users: Low sensitivity land use such as Industrial Sites, highways and rail. • Built Environment: Infrastructure (e.g. Roads, railways, tramways).
Neutral	Very low importance and rarity on local scale.	• Geology: No rock exposures. • Soils: Urban classified soils. • Groundwater: Non-aquifer/Unproductive Strata.

For the purpose of this assessment, it is considered that Regionally Important (R) Aquifers are Principal Aquifers; Locally Important (L) Aquifers are Secondary Aquifers and Poor (P) Aquifers are Unproductive Strata. Different classifications exist for each of the aquifer types, as listed below:

Regionally Important (R) Aquifers:

- Karstified bedrock (Rk) where RKc represents an aquifer dominated by conduit flow and Rkd represents an aquifer dominated by diffusive flow
- Fissured bedrock (Rf)
- Extensive sand and gravel (Rg)

Locally Important (L) Aquifers:

- Bedrock which is generally moderately productive (Lm)
- Bedrock which is moderately productive in local zones (LI)
- Sand & gravel (Lg)
- Locally important karstified bedrock (Lk)

Poor (P) Aquifers:

- Bedrock, which is generally unproductive except for local zones (PI)
- Bedrock, which is generally unproductive (Pu)

8.2.7.2 Magnitude Criteria

The magnitude of a potential effect is independent of the sensitivity of the feature. The magnitude considers the scale of the predicted change to the baseline condition, considering its duration (i.e. the magnitude may be moderated by the effects being temporary rather than permanent, short-term rather than long-term) and whether the effect is direct or indirect. Definitions for impact magnitude are described in **Table 8-4**.

Table 8-4: Criteria to determine the magnitude of effect (Amended from 'NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

Magnitude	Criteria	Typical Examples
Major Adverse	Total loss or major alteration to key features of the baseline conditions such that the post-development character / composition of the baseline condition will be fundamentally changed.	• Irreversible loss of a high proportion of local high fertility soils/sediments. • Pollution of potable sources of water abstraction • Changes to the aquifer or unsaturated zone resulting in extensive changes to existing water supply springs and wells, river baseflow or ecosystems. • Loss of, or extensive change, to nationally important geological features. • Sterilisation of high-quality mineral resources. • Long-term (chronic) risk to human health or short-term (acute) risk to human health. • Short- term risk of pollution of sensitive water resources. • Extensive damage to buildings / infrastructure (on or off site). • Generation of significant quantities of waste sediment or soils for landfill. • Contamination of offsite soils; and • Substantial geomorphology changes due to cutting.
Moderate Adverse	Loss or alteration to one or more key features of the baseline conditions such that the post-development character / composition of the baseline condition will be materially changed.	• Irreversible loss of moderate proportion of local high fertility soils/sediments. • Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. • Partial loss or change to an aquifer. • Partial loss of the integrity of groundwater supported designated wetlands. • Permanent loss of, regionally important geological features, or substantial changes to nationally important geological features. • Sterilisation of low-quality mineral resources.

Magnitude	Criteria	Typical Examples
		• Easily preventable, permanent health impacts on humans or medium-term (chronic) risk to human health. • Medium long-term risk of pollution of sensitive water resources; damage to buildings / infrastructure (on or off site); and • Localised damage to buildings/ infrastructure (on or off site).
Minor Adverse	Results in some measurable change in attributes quality or vulnerability compared to baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character / composition of baseline condition will be similar to the pre-development situation.	• Irreversible loss of small proportion of local high fertility soils/sediments and/or high proportion of local low fertility soils/sediments. • Changes to made ground deposits only. • Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. • Minor effects on groundwater supported wetlands. • Loss of, or extensive change, to locally important geological features. • Easily preventable, non-permanent health impacts on humans. • Minor low-level and localised contamination of on-site soils/sediments. • Pollution of non-sensitive water resource or low long-term risk of pollution to sensitive water resource; and • Easily repairable damage to buildings / infrastructure.
Neutral	Very little change from baseline conditions. Change is barely distinguishable approximately to a “no change” situation.	• No measurable impact upon surface waters or groundwater. • No measurable impact on geological features. • No measurable impact on soils/sediments; and • No discernible change with regards to contaminated land
Beneficial	Benefit to, or addition of, key characteristics, features or elements compared to baseline conditions.	• Improvement to geological features. • Remediation of widespread high levels of soil/sediment contamination • Removal of source of groundwater and surface water contamination; and • Re-use of significant quantities of excavated soils/sediments on-site to avoid disposal to landfill.

8.2.7.3 Significance of Effects

The significance of effects refers to the consequences of an impact. The significance of the effect upon land, soils, geology and hydrogeology 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 8-5**. 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 less than Minor have been concluded to be not significant in EIAR terms.

The significance of effects for land, soils, geology and hydrogeology has been assessed initially without taking mitigation measures into account. Residual effects (effects that remain once mitigation measures are taken into consideration) are then identified. Temporary effects are considered in the construction period, whilst permanent effects are discussed in the operation phase, albeit that the effect may first occur during construction.

Table 8-5 Assessment of Significance Matrix (Amended from 'NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

Sensitivity of Attribute	Magnitude of Effect				
		Major	**Moderate**	**Minor**	**Neutral**
	Very High/High	Major	Minor/Moderate	Minor/Moderate	Neutral
	Medium	Major	Moderate	Minor	Neutral
	Low	Minor/Moderate	Minor	Neutral	Neutral
	Neutral	Neutral	Neutral	Neutral	Neutral

8.3 Baseline Environment

A Desktop Assessment was undertaken to provide an initial overview of ground conditions at the site. The following describes the findings of this preliminary research.

8.3.1 Land

Article 3(1) of the EIA Directive provides that an EIA shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on, inter alia, land and soil. Annex IV, (1) and (5) require the developer of a Project to assess the use of natural resources and the impacts of the Project resulting from their use. In this context, the EIA Directive requires the assessment to consider the sustainability of resources as far as possible, including land and soil.

Moreover the European Commission EIAR Guidelines (2017), recommend that the topography, geology and soils of the land to be occupied by the Project and the surrounding area should be described.

The Guidelines on the Information to be contained in Environmental Impact Assessment Reports (May 2022), published by the Environmental Protection Agency (EPA), state that:

> *"The amended Directive introduces Land as a prescribed environmental factor. Recital 9 gives context to this addition, showing that it relates to the issue of 'land take'. This change aligns*

the Directive with proceedings of the United Nations Conference on Sustainable Development (Rio de Janeiro, 2012) and with Commission strategy."

The baseline characteristics of the ABR2 Project in relation to Land are set out as follows:

- Land-take, sustainable availability of land
- Quantity of land used
- Removal of productive land from potential agricultural or other beneficial uses
- Location and physical characteristics of the land
- Existing land use

8.3.1.1 Land-take, sustainable availability of land

The Dublin Port Masterplan 2040, reviewed 2018, recognises the finite availability of land for port-related activity. Dublin Port lies immediately adjacent to the South Dublin Bay and Tolka Estuary SPA, and the Masterplan commits to no further port expansion within the Tolka Estuary. DPC has adjusted its 2040 capacity forecast downwards compared to the Masterplan, due to the permanent loss of port lands to State Services as a consequence of Brexit. Taking account of this impact, DPC estimates that the port capacity at 2040 will now be 73.8m gross tonnes – assuming all components of the Masterplan, including the ABR2 Project, are delivered.

The ABR2 Project aims to provide port infrastructure which will improve the efficiency of port operations. The infilling of the basin of Berths 52/53 will create a new land area for port activities.

8.3.1.2 Quantity of land used

Dublin Port is the largest port in Ireland. The Northern Lands and Southern Lands of Dublin Port (Dublin Port Estate) comprise an area of 265ha of land entirely within the ownership of Dublin Port Company. The entire Port Estate comprises 309ha, including the lands at the Dublin Inland Port. The land element of the ABR2 Project area consists of the area of the basin of Berths 52/53 (4.5ha) to be infilled and the surrounding land to be raised by 1.4 m (9.5ha).

8.3.1.3 Removal of productive land from potential agricultural or other beneficial uses

The future land use within the footprint of the ABR2 Project will not significantly change from that of the existing Port lands and does not comprise agricultural potential.

8.3.1.4 Location and physical characteristics of the land

The application boundary for the ABR2 Project is provided in **Chapter 5 Project Description**. Land required to facilitate the proposed ABR2 Project comprises areas of existing port infrastructure and areas of marine foreshore.

8.3.1.5 Existing land use

The existing port-related land uses within the footprint of the ABR2 Project comprise the manoeuvring and berthing of vessels, the handling of Lo-Lo cargo and HGV traffic distributing cargo to and from Dublin Port.

8.3.2 Solid Geology

The bedrock geology anticipated in the vicinity of the site is shown in **Figure 8-2**. The entire Dublin area is underlain by the Lucan Formation. The formation comprises dark grey to black, fine-grained, occasionally cherty micritic limestones that weather paler, usually to pale grey. There are also rare, dark, coarser-grained, calcarenitic limestones, which are sometimes graded, present. The formation ranges from 300m to 800m in thickness and is Carboniferous.

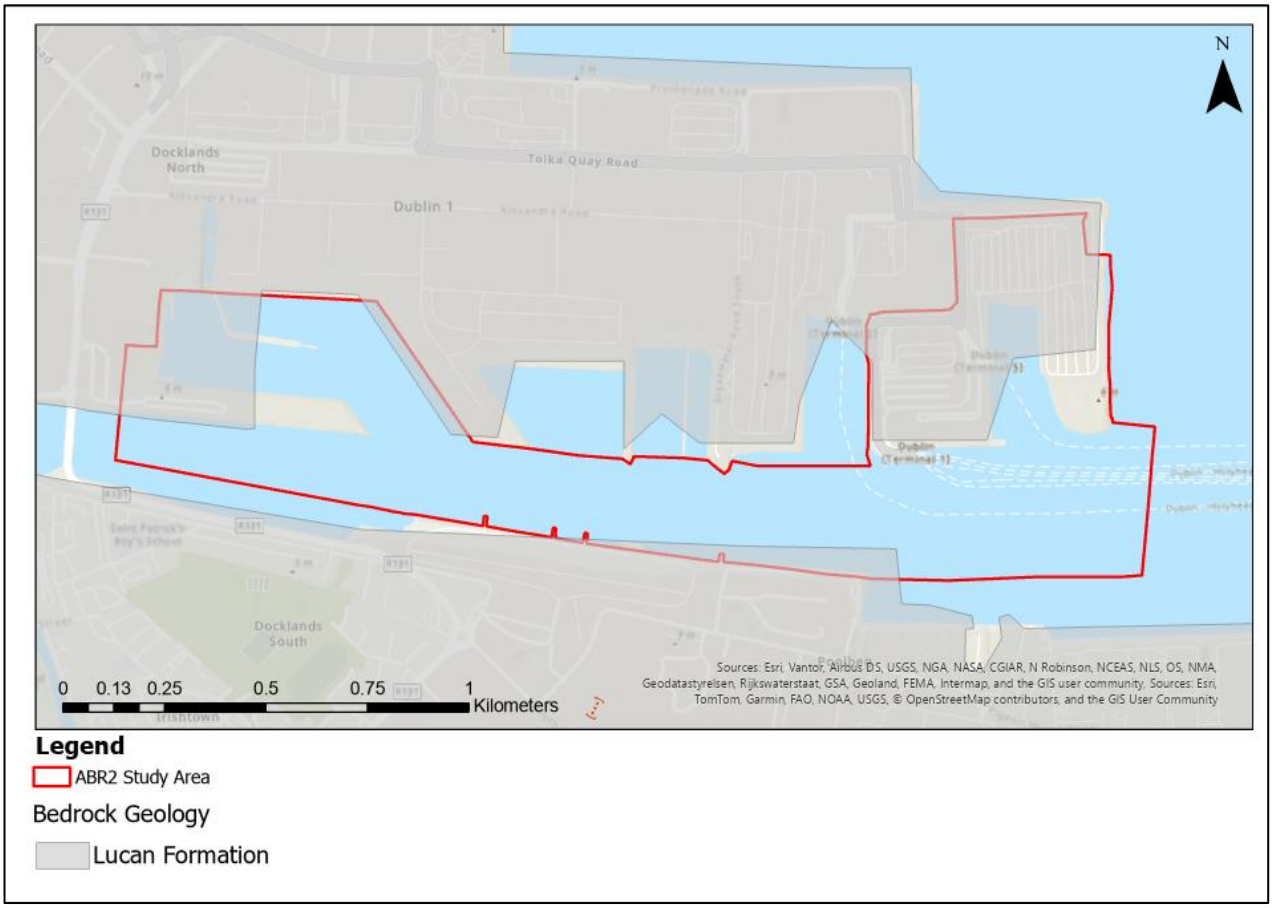


Figure 8-2: Solid Geology (Contains Irish Public Sector Data (Geological Survey Ireland) licenced under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence)

8.3.3 Drift Geology

Drift is a general term applied to all mineral material (clay, sand, silt, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from the glacier. It generally applies to Pleistocene glacial deposits.

The drift geology of the area is expected to principally reflect the depositional process of the last glaciation, when an extensive ice sheet that extended into the Irish Sea covered the region. Typically, during the ice advance, boulder clays were deposited sub-glacially as lodgement till over the eroded rock head surface, whilst moraine deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, fluvio-glacial deposits (sand, gravel and silt) were laid down by melt waters discharging from the front of the glacier. Recent deposition prior to reclamation of the site principally reflects marine erosional and depositional processes, which have modified the glacial deposits.

As shown in **Figure 8-3**, the site is anticipated to be underlain by made ground. Dublin Port is located entirely on made ground (fill deposits).

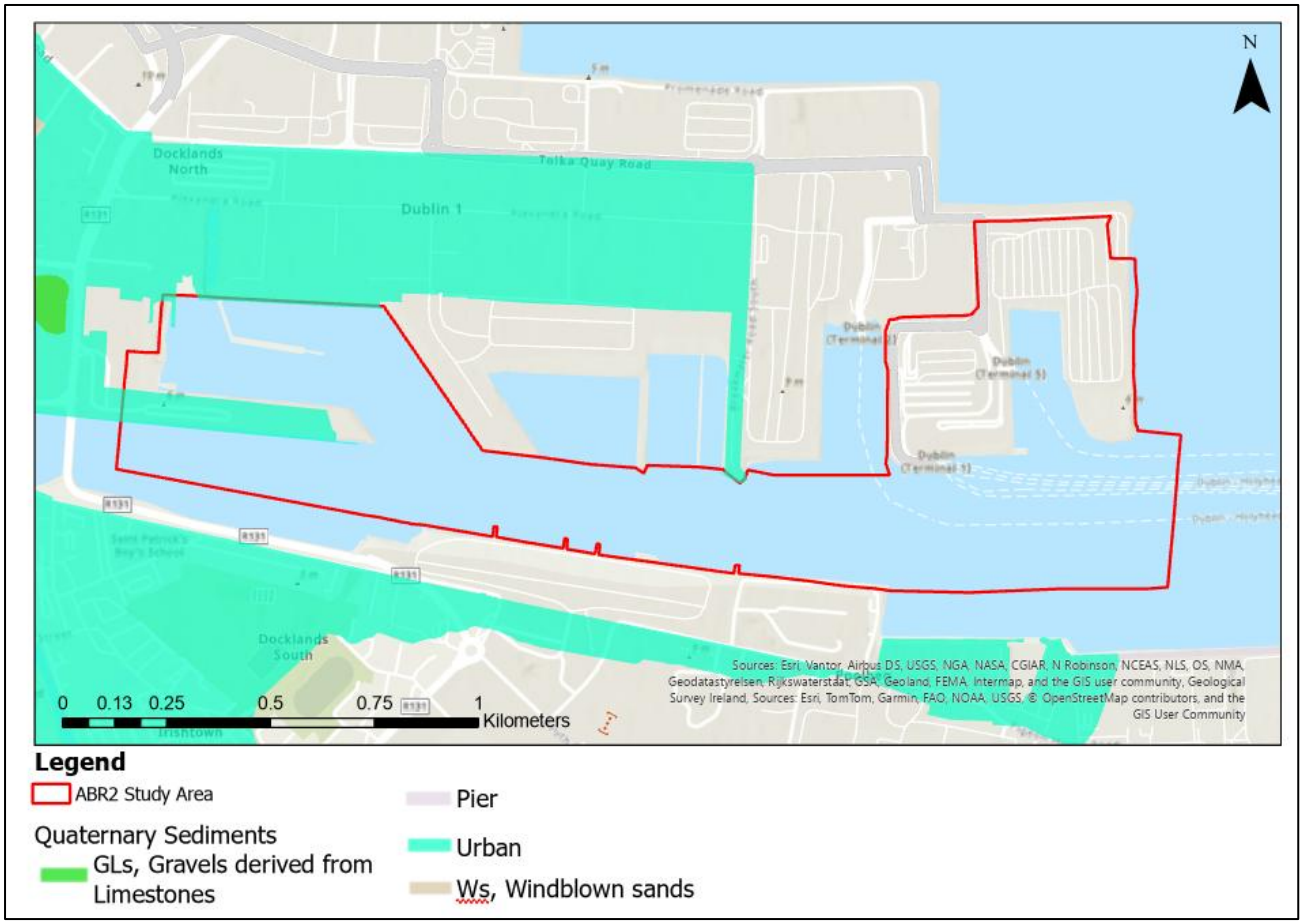


Figure 8-3: Drift Geology (Contains Irish Public Sector Data (Geological Survey Ireland) licenced under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence)

8.3.4 Hydrology

The hydrogeology of the area has been described by GSI as complex and very variable. The Limestone bedrock is generally considered to be indurated and hence dominated by fissure permeability (e.g. joints and faults). Such permeability is likely to be low except where coarse, clean Limestones are present, have been karstified, dolomitised or are highly fractured.

The Lower Carboniferous rocks that underlie the region have been classified by GSI as “Locally Important Aquifer, bedrock which is moderately productive only in local zones” (**Figure 8-4**). These locally productive zones are due to the presence of more permeable strata that are encountered in different parts of the outcrop area due to substantial faults, fractures or fissures. The limited groundwater movement within the rock tends to be restricted to the weathered horizons or to non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and low potential yield.

The Quaternary drift is considered the principal medium for groundwater movement in the area. The infiltration capacity of the clay deposits would be limited due to their low permeability, and hence groundwater movement is likely to be confined to the fluvio-glacial sand and gravel deposits that overlie the clays. The potential importance of the Quaternary drift deposits as a groundwater resource is a function of their permeability, thickness and extent. The low-permeable fine-grained glacial clays represent aquitards that limit infiltration and restrict recharge to bedrock aquifers when sufficiently thick. The overlying fluvio-glacial sand and gravel deposits represent material with a significantly higher permeability. Consequently, these deposits have a high potential recharge and storage capacity. It is generally expected that groundwater levels beneath the site will remain close to sea level and may exhibit tidal variation. Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply.

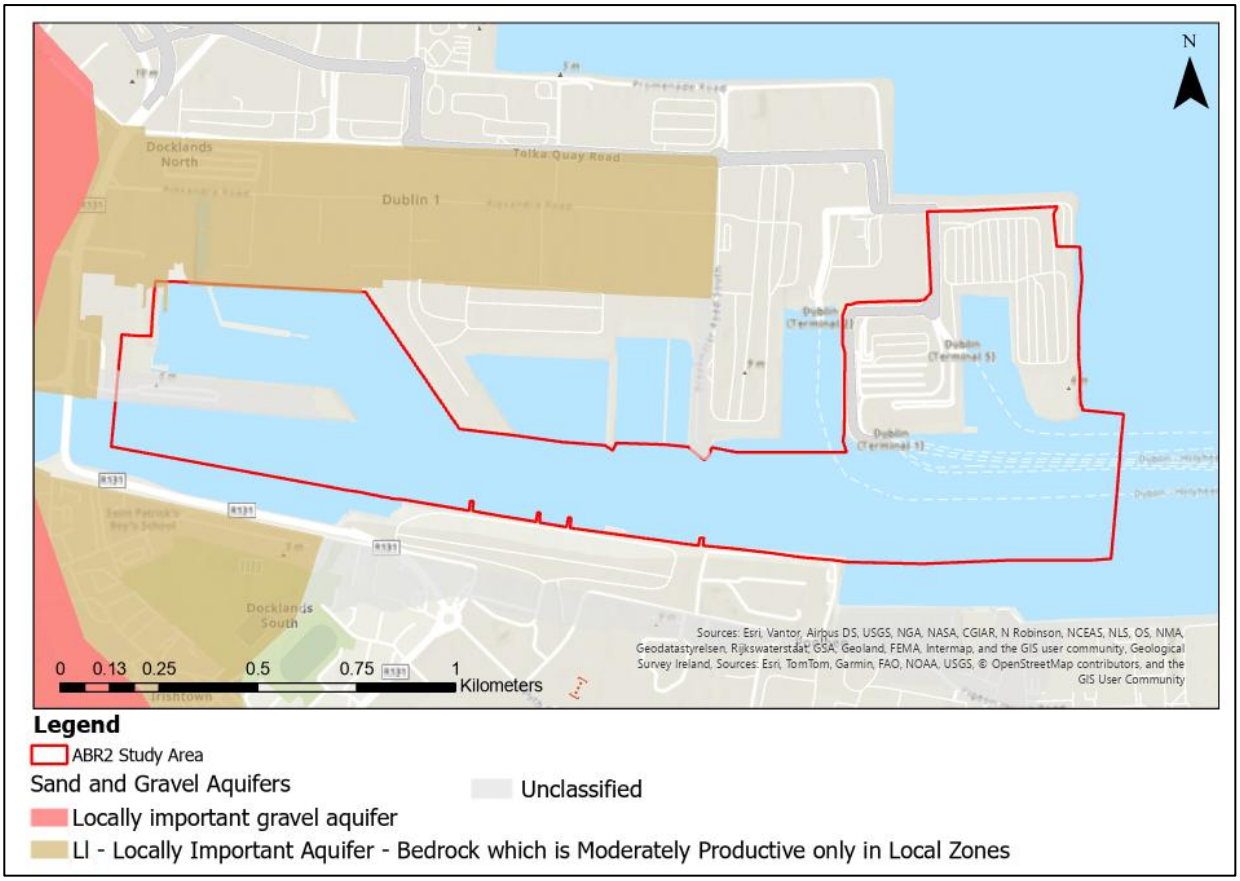


Figure 8-4: Groundwater Aquifer (Contains Irish Public Sector Data (Geological Survey Ireland) licenced under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence)

8.3.5 Groundwater Vulnerability

In accordance with the Water Framework Directive (2000/60/EC) it is necessary to understand the groundwater vulnerability of the site, which is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface.

According to the GSI map for groundwater vulnerability (**Figure 8-5**), the site is not mapped, however, the immediate surrounding areas have a low groundwater vulnerability, indicating that the natural groundwater is unlikely to be easily contaminated by human activities.

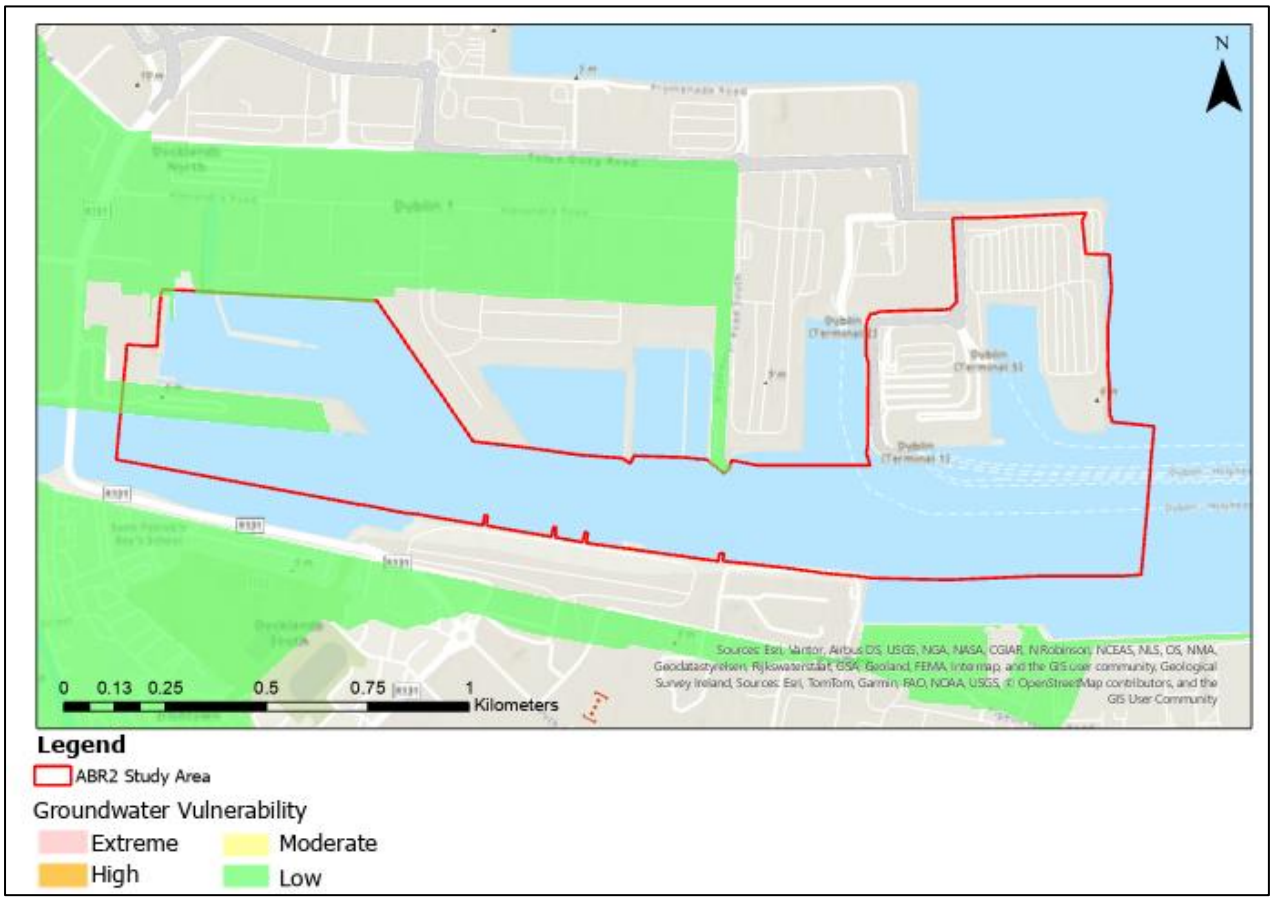


Figure 8-5: Groundwater vulnerability (Contains Irish Public Sector Data (Geological Survey Ireland) licenced under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence)

8.3.6 Groundwater Status

An assessment carried out under the Water Framework Directive (WFD) 2013-2018 groundwater body (EPA, 2022) has concluded that the groundwater within the bedrock aquifer is presently of 'Good Status'.

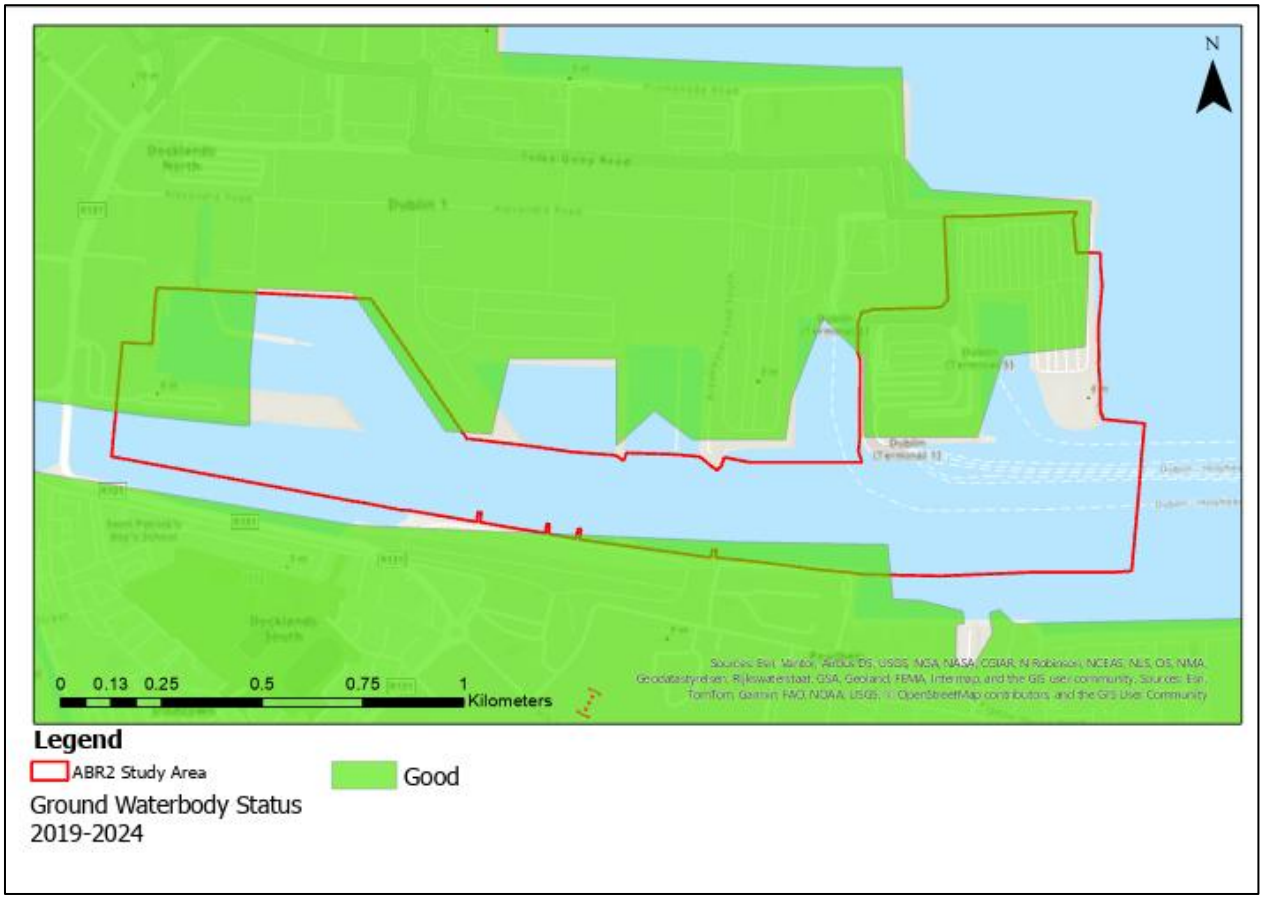


Figure 8-6: Water Framework Directive Status 2013-2018 (taken from EPA maps)

8.3.7 Water Framework Directive – Risk Status

Groundwater Risk looks at the current water quality and trends and is used to highlight waterbodies that are at risk of deteriorating or being at less than Good status in the future. As shown in **Figure 8-7**, the site is categorised as being under review.

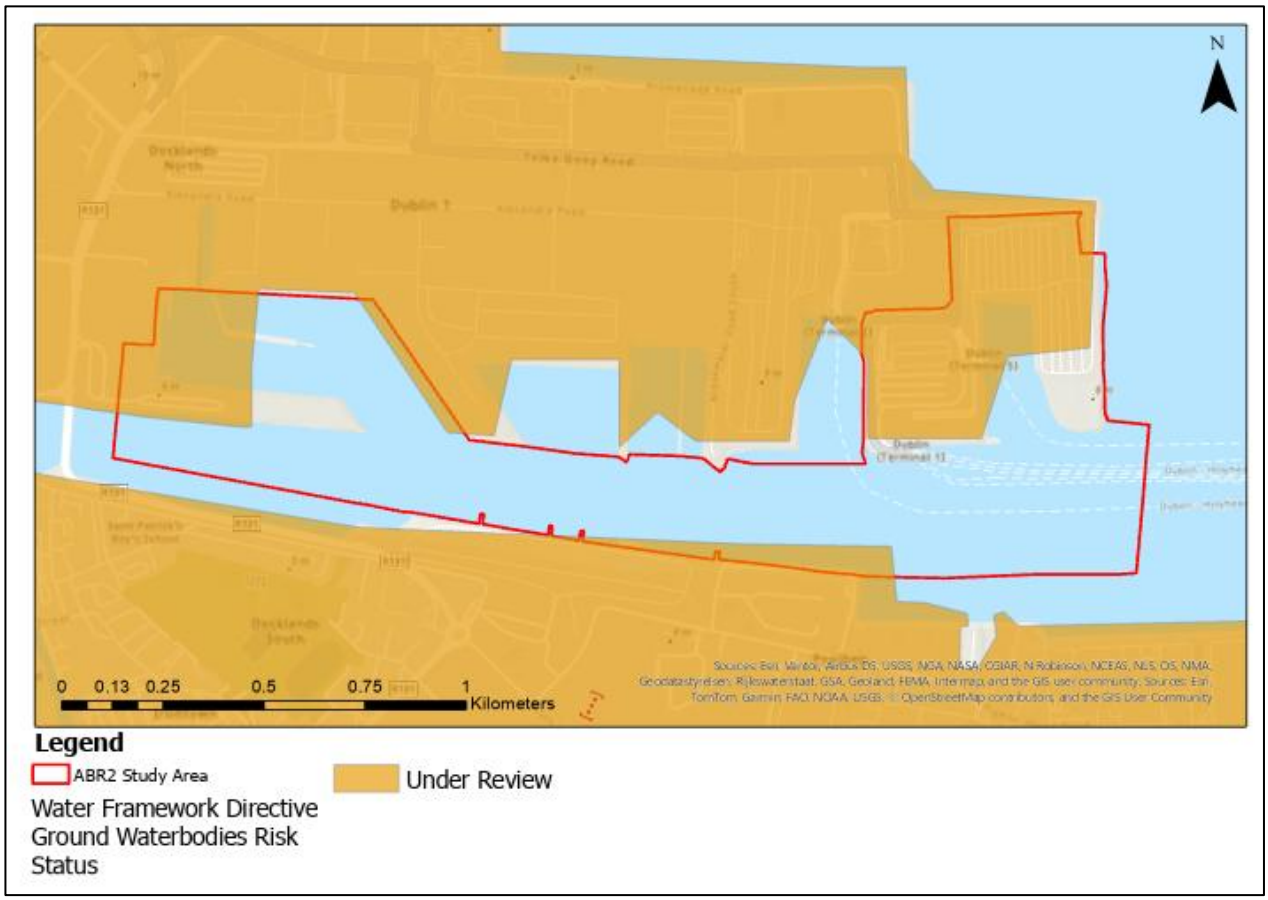


Figure 8-7: Water Framework Directive Risk Status (taken from EPA maps)

8.3.8 Groundwater Recharge

Diffuse recharge generally occurs via rainfall percolating through the subsoil and reaching the bedrock aquifer. Recharge is higher in areas where the subsoil is thinner and/or more permeable. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope.

Average recharge is 55mm/yr on the charted areas surrounding the site, with large proportions remaining unmapped. This does not account for leakage to the ground from water supply, storm drains and sewers.

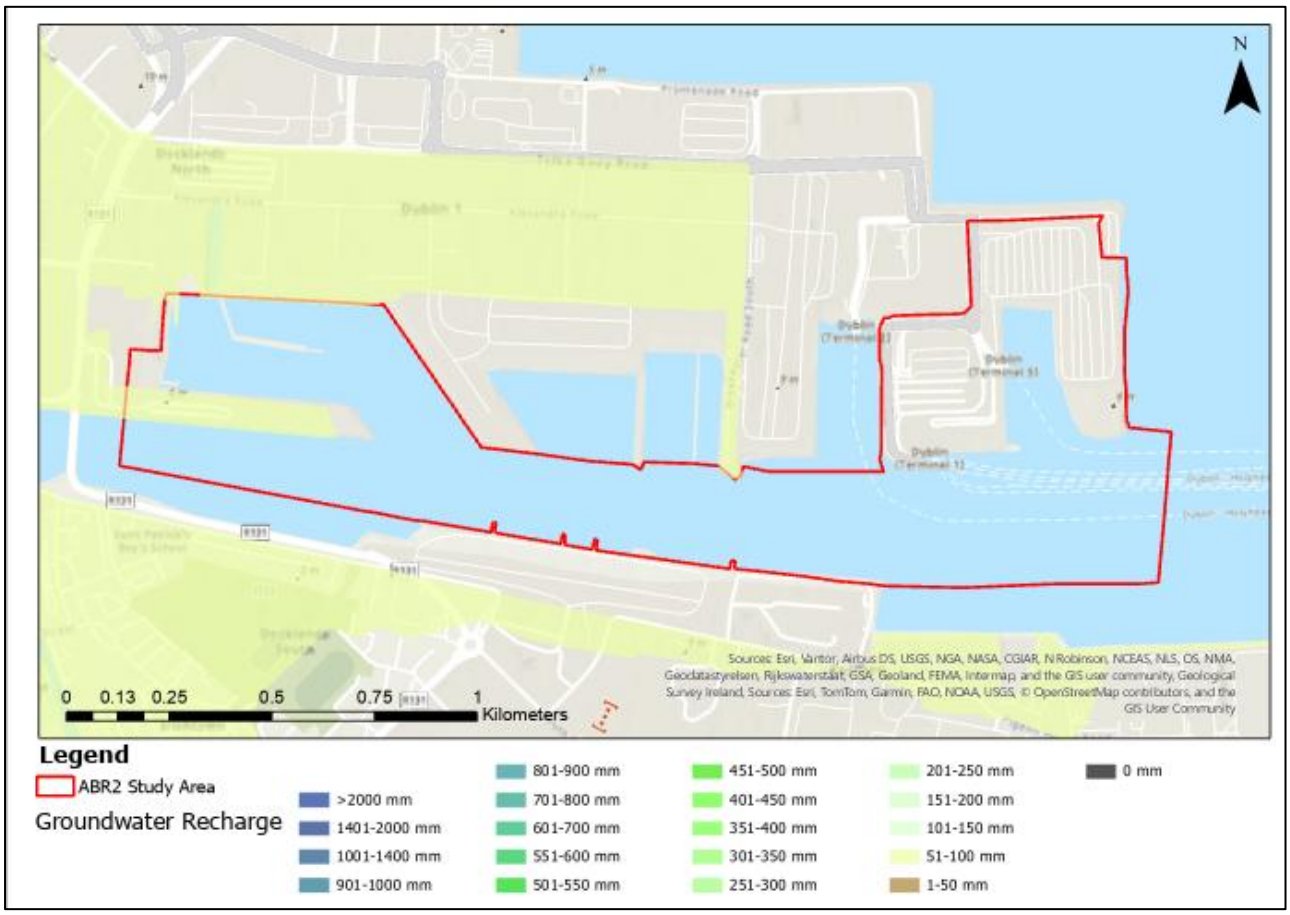


Figure 8-8: Groundwater Recharge (Contains Irish Public Sector Data (Geological Survey Ireland) licenced under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence)

8.3.9 Groundwater Wells and Springs

During consultation with the GSI GeoIndex web viewer, it was found that there were no groundwater wells and springs in a 500m radius of the site as per **Figure 8-9**.



Figure 8-9: Groundwater Wells and Springs (taken from GSI)

8.3.10 Surface Water Hydrology

The River Liffey is the dominant surface water feature that runs through the centre of Dublin, flowing from west to east before discharging into the Irish Sea. The transitional water quality status for The River Liffey from 2018 to 2020 under the Water Framework Directive (WFD), is described as being good and unpolluted. The Dodder River flows into the River Liffey just west of Tom Clarke Bridge.

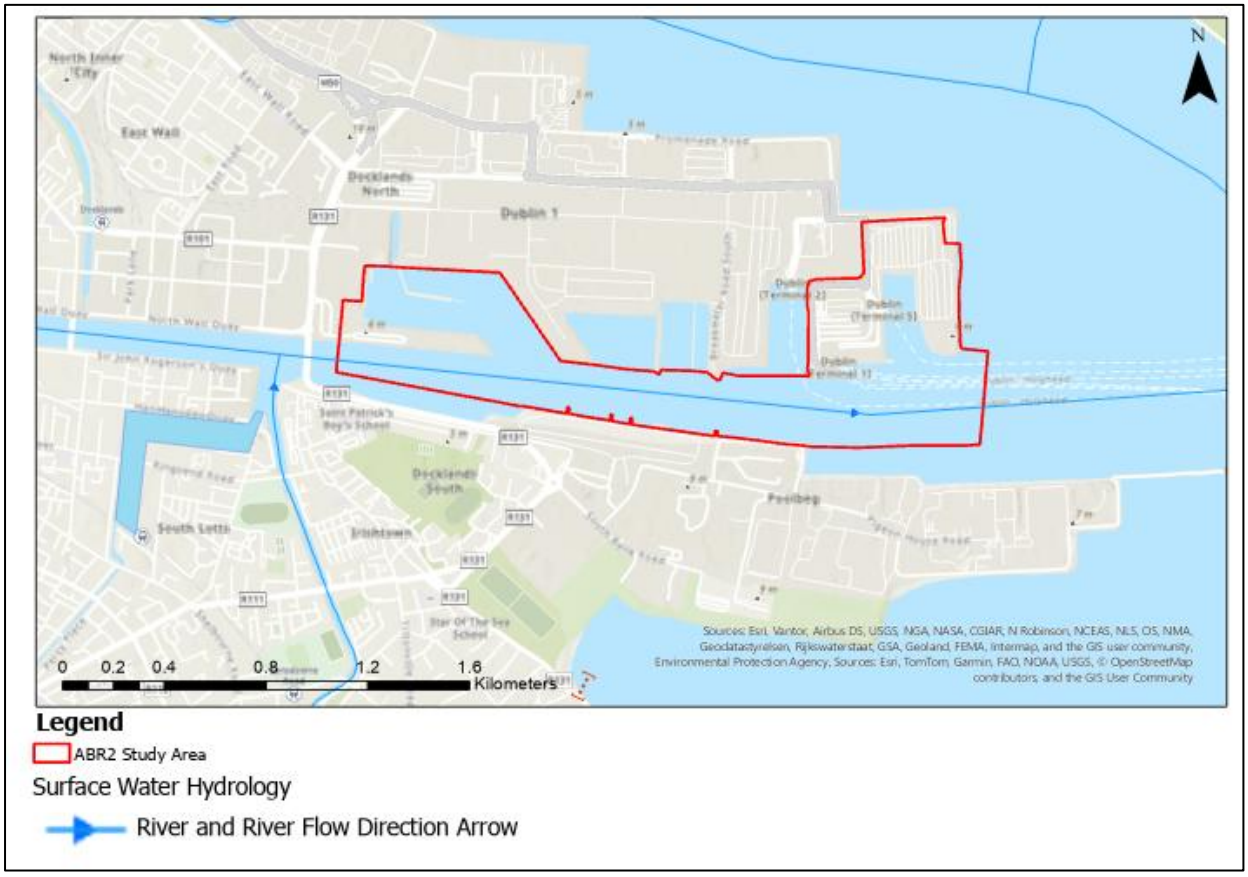


Figure 8-10: Surface Water Features (Mapping by GSI)

8.3.11 Licences and Permits

A search was undertaken on the Environmental Protection Agency map viewer to investigate if any Industrial Emission licences (IE) and Integrated Pollution Control (IPC) sites are present surrounding the ABR2 Project area.

As seen below in **Figure 8-11**, three IE licensed activities are carried out within a 500m radius of the proposed development areas. IE P1022 is situated immediately east of the basin of Berths 52/53 within Dublin Port Terminal 5, which is categorised as being licensed and industrial in nature. IE PO579 (Electricity Supply Board) is situated c.390m northwest of Alexandra Basin West within the North Wall Power Station. The IE is licensed and categorised as industrial. The IE situated c.230m north of Bert 52/53 Basin (P0321) is registered as Asahi Synthetic Fibres (Irl) Limited, categorised for industry.

A shown below in **Figure 8-11**, one IPC is registered within 500m of the development areas. P0086 is registered as Irish Tar and Bitumen Suppliers, categorised for industry.

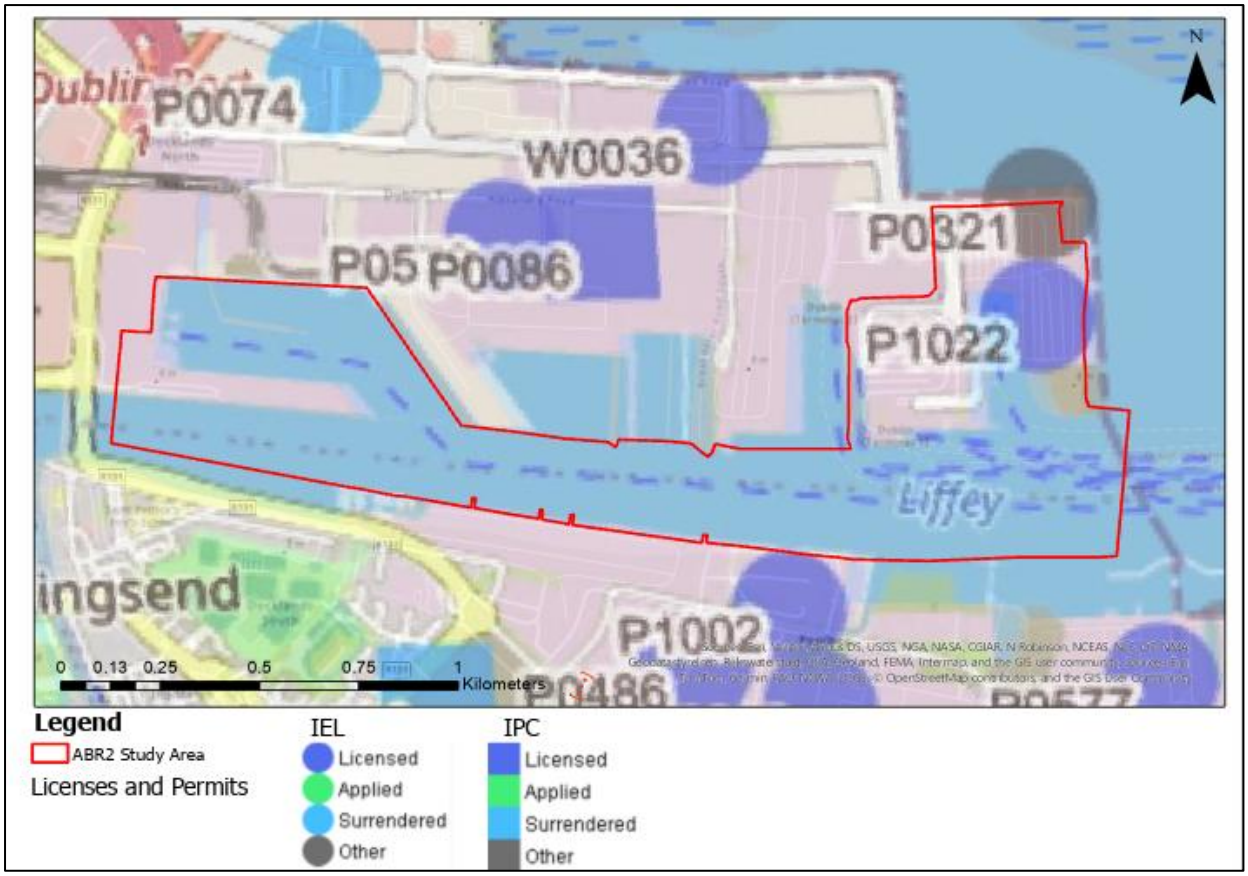


Figure 8-11: Industrial Emission Licences (IELs) and Integrated Pollution Control (IPC) (taken from EPA)

8.3.12 Previous Investigations and Reports

As part of the planning application process for the MP2 Project, RPS (now Tetra Tech) undertook a contaminated land assessment in 2018 within the Berths 52/53 area, which comprised a PRA desk study, intrusive ground investigation and production of a Generic Quantitative Risk Assessment report. The reports were produced in support of an Environmental Impact Assessment Report for the MP2 Project. Planning permission (ABP-304888-19) for the MP2 project was granted in 2020.

An intrusive ground investigation was specified in order to collect soil and groundwater samples from the identified potential sources of contamination. The ground investigation (GI) was undertaken by Causeway Geotech during August 2018. The ground investigation comprised the following (**Figure 8-14**):

- Five (5) light cable percussion boreholes to a maximum depth of 12.0m below ground level (bgl) - BH01, BH02, BH04, BH06D and BH07.
- Thirteen (13) boreholes by dynamic (windowless) sampling methods to a maximum depth of 6.0m bgl.

Environmental soil samples were taken at regular intervals throughout the length of the excavation of each borehole. A single 50mm HDPE groundwater monitoring standpipe was installed in boreholes MP2BH01, MP2BH02, MP2BH07, MP2BH09 and MP2BH11-MP2BH17. Dual installations; one targeting the shallow groundwater body and the other the deeper groundwater body, were installed in boreholes MP2BH04 and MP2BH06D. Groundwater samples were collected from all the installed boreholes except BH07 and BH09 (boreholes dry) and BH11 (no access) in August 2018, following development and purging of at least three well volumes, to ensure a representative sample of groundwater was taken from each well.

Recent groundwater monitoring (2019-2025) has been undertaken in line with the requirements of the IE License (Section 8.3.15) and a 2026 PRA completed (Section 8.3.16).

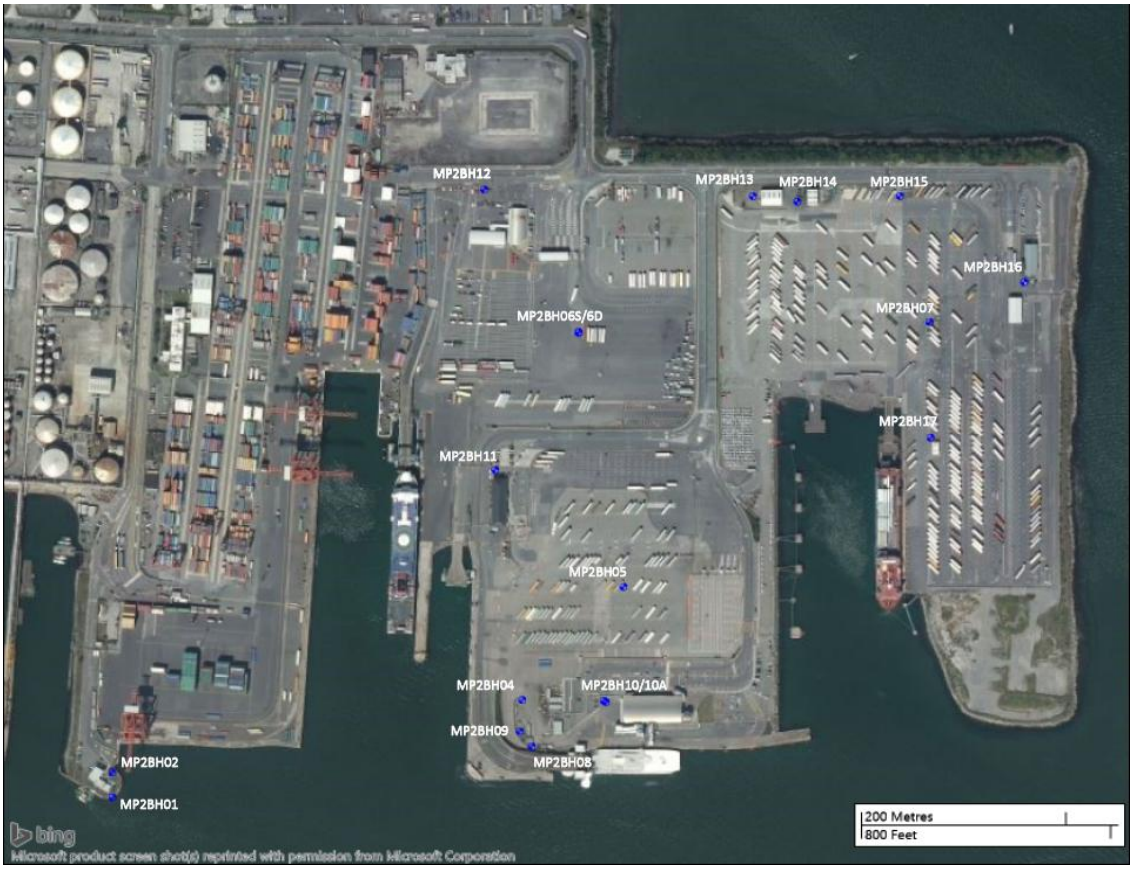


Figure 8-12: 2018 Ground Investigation Locations

8.3.12.1 Ground Conditions Encountered

The ground conditions encountered during the 2018 investigation are summarised below.

- Topsoil/concrete
- Made ground
- Gravel
- Sand
- Clay
- Gravel

Made Ground

Made ground was identified at all borehole locations to a maximum depth of 6.00m bgl. The made ground was not consistent in nature across the site; it was identified as a sand, silt, clay and gravel at different locations and depths. In places, the made ground was noted to contain pieces of red brick and concrete.

Gravel

Deposits of dense grey sandy silty subangular to subrounded fine to coarse gravel with low cobble and boulder content were encountered at BH01 between 4.9m and 7.9m bgl.

Sand

Deposits of loose to dense greyish black gravelly silty fine to coarse sand, gravel is subangular to subrounded fine to coarse were encountered at BH06 between 4.8m and 7.1m bgl, BH04 between 6m and 9.2m bgl and BH01 between 7.9m and 8.8m bgl.

Clay

Deposits of clay in the form of soft grey sandy organic clay, sand is fine to coarse were encountered at BH06 between 7.1m and 11.5m bgl.

Gravel

Deposits of greyish black, slightly silty subangular to subrounded fine to coarse gravel were encountered at BH04 between 9.2m and 12m bgl.

8.3.12.2 Groundwater

Groundwater monitoring installations were targeted to the shallow groundwater within the made ground. Follow-up groundwater level monitoring was undertaken on one occasion in August 2018. No discernible direction of groundwater flow could be interpreted from the one monitoring round completed. It is likely that the shallow groundwater within the made ground is in hydraulic conductivity with the deeper deposits, as the made ground has been shown to directly overlie deposits of sands and gravels. It is also possible that groundwater is in hydraulic conductivity with the surrounding water bodies; River Liffey and Dublin Bay.

8.3.12.3 Laboratory Analysis

Twenty-four (24) soil samples were sent to Chemtest for analysis. Samples were analysed for a mixture of; pH, Sulphate (2:1 water soluble as SO4), Sulphur (elemental), Sulphur (total), Cyanide (total), Asbestos identification, ACM type, Arsenic, Barium, Beryllium, Boron (hot water soluble), Iron (total), Cadmium, Chromium (total), Copper, Mercury, Nickel, Lead, Selenium, Vanadium, Zinc, Chromium (hexavalent), Organic matter, Total Petroleum Hydrocarbons (TPH-CWG C5 – C35 aromatic-aliphatic split), speciated Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), speciated Poly Chlorinated Biphenyls (PCBs) and Phenols (speciated HPLC).

Groundwater samples were collected from all the installed boreholes except BH07 and BH09 (boreholes dry) and BH11 (no access) in August 2018, following development and purging of at least three well volumes, to ensure a representative sample of groundwater was taken from each well. Surface water samples were also

taken; in close proximity to the Port Operations Centre, SW2 at Irish Ferries and SW3 at Seatruck. The groundwater and surface water samples were analysed for metals, phenols, TPH-CWG, speciated PAHs, PCBs, VOCs and SVOCs.

8.3.12.4 Risk Assessment

The information gathered during the ground investigation was used to complete a generic quantitative risk assessment (GQRA) report (Dublin Port Company, MP2 Project. Generic Quantitative Risk Assessment (GQRA) Report. RPS, IBR1085, September 2018).

8.3.12.5 Soils

The risk to site end users from identified sub-soil contamination (Asbestos and Lead) was minimal due to the emplacement of hard-standing across the site.

8.3.12.6 Shallow groundwater

The shallow groundwater was identified to be impacted by elevated levels of Nitrate as N, Arsenic, Chromium (total), Lead, Nickel and Zinc. Shallow groundwater on site was not considered to be a controlled water and does not represent an exploitable source of groundwater.

8.3.12.7 Deep groundwater

Shallow groundwater was considered likely to have a hydraulic conductivity similar to that of deep groundwater due to the permeable nature of the strata encountered across the site. Similar exceedances to those demonstrated within the shallow groundwater were determined in the deeper groundwater, reinforcing that these groundwater bodies are likely to be in hydraulic conductivity.

8.3.12.8 Surface water

No significant contamination was identified within the surface water samples.

8.3.12.9 Risk assessment conclusions

The 2018 risk assessment concluded that any risk from soil contamination would be managed due to the presence of hardstanding, which would break the source-pathway-receptor linkage.

The groundwater and surface water did not show any impact from hydrocarbon contamination despite the presence of several fuel storage tanks across the site.

8.3.13 Intrusive Ground Investigation 2015

An intrusive ground investigation was carried out between January and February 2015 in the area around the basin of Berths 52/53 to support the application for an IE licence (discussed further in **Section 8.3.18**). The

investigation comprised nine (9) hollow stem auger boreholes to a maximum depth of 18.45m bgl. All boreholes were installed with monitoring standpipes, and seven were installed with dual installations to target shallow groundwater in the made ground and deeper groundwater within the underlying sands and gravels.

Fifteen (15) groundwater samples and two (2) surface water samples were collected from the monitoring boreholes on 20th February 2015.

Subsequent groundwater monitoring (2019-2025) has been undertaken in line with the requirements of the IE licence and has indicated no change in conditions that would require further intrusive investigation.

8.3.13.1 Ground Conditions Encountered

The geology encountered around the basin of Berths 52/53 consisted of Made Ground, underlain by Estuarine deposits. The Glacial Till and Limestone were not encountered during the RPS (now Tetra Tech) site investigation. The Made Ground generally comprised gravelly sandy clay, sandy gravel and cobbles of brick and concrete; it was between 3.4 – 5.6m in thickness. The Superficial Deposits encountered below the Made Ground generally comprised silty sandy gravel and silty sand. These deposits were encountered to the maximum depth of all the boreholes between 15.00m bgl to 15.45m bgl.

8.3.13.2 Groundwater

Groundwater was encountered in all nine boreholes during excavation at depths of between 2.9m.bgl and 3.4m.bgl adjacent to the basin of Berths 52/53.

Follow-up hydraulic conductivity testing was undertaken in twelve (12) of the standpipes. The overall effect of tidal influence was measured using in-situ groundwater monitoring loggers in both boreholes screened in the Made Ground and boreholes screened through the superficial deposits. Highly variable groundwater levels were recorded in the groundwater within the Made Ground and Superficial deposits adjacent to Berths 52/53. Groundwater fluctuations within Made Ground varied between approximately 1.0m and 2.5m in BH6, BH7, BH8, BH10 and BH12. Monitoring of groundwater within the superficial deposits indicated a fluctuation of groundwater of approximately 3.0m in BH6, BH7, BH8, BH10 and BH12.

8.3.14 Detailed Quantitative Risk Assessment

In support of the application for an IE licence (discussed further in **Section 8.3.18**), RPS (now Tetra Tech) undertook a Controlled Waters Risk Assessment (Dublin Port – Alexandra Basin Redevelopment. Controlled Waters Risk Assessment. RPS, RCEI33367-001R, March 2015) to evaluate potential impacts on surface water (primarily the River Liffey) arising from the proposed reuse of stabilised dredged sediments to infill Graving Dock No.2 and the basin of Berths 52/53 as part of the parent ABR Project

The risk assessment was carried out using the UK Remedial Targets Worksheet (in the absence of an equivalent Irish Model), which was used to determine if the levels of contaminants which may leach from treated dredgings into the River Liffey were acceptable.

An assessment of site-specific conditions was carried out using data acquired from the site investigations and published data. Models were produced which derived acceptable levels (i.e. below the EU Surface Water Objectives - for the majority of contaminants) of contamination that could be leached from the infilled areas into the River Liffey. Analytical data of samples collected from the River Liffey upstream and downstream of Alexandra basin identified elevated concentrations of arsenic, cadmium and TBT. The presence of TBT in these samples suggested that the quality of the River Liffey had been impacted by contamination associated with the historical use of Port. It was likely that the primary source of TBT in the River Liffey was contamination in sediments associated with Alexandra Basin.

The model assumed leaching of the entire source area and did not take into account the structural integrity of the treated sediments; in reality leaching of the infilled areas would be confined to the surface area and the area around the cracks. The models were run with steady state conditions (i.e. no declining source term); this did not reflect reality, as leaching would occur gradually over time.

The models did not account for existing physical structures or physical structures that will be present post-development. The modelling process was therefore considered to have a high level of conservatism and in reality, it was considered that these parameters were likely to reduce the amount of contaminant that leaches and the rate of leaching from the source area.

The batch leachate data indicated that the stabilisation process significantly reduced the leachable concentrations of the vast majority of contaminants, including metals, TBT, PAHs and PCBs. This suggested that the process will result in a significant improvement of conditions.

The maximum predicted average aquifer concentrations (10 years) as derived by the Conceptual Design Model developed based on the preliminary tank test analytical data were less than the derived Remedial Target Criteria (RTCs). This provided evidence to suggest that the predicted time-averaged concentrations of TBT and nickel will be less than the published assessment criteria and the RTCs derived by RPS (now Tetra Tech). Based on this assessment, the predicted impact on surface waters (the River Liffey) was less than the published and site-specific derived target concentrations.

8.3.15 Industrial Emissions Licence

Dublin Port IE Licence

Works associated with the ABR Project commenced in 2016, pursuant to permission granted under reg. ref. no. PL 29N.PA0034). The ABR works were also subject to an IE licence issued by the EPA (Licence Register No: P1022-02) to regulate the treatment of contaminated dredge material within a licensed boundary at the Port. IE licence P1022-02 authorises the ex-situ treatment, by stabilisation/solidification, of contaminated dredge material sourced from the ABR Project. The treated waste under the terms of the IE licence is to be utilised to undertake infilling at two locations within the Dublin Port area, namely at the decommissioned Graving Dock No.2 and at Berths 52/53. A total of 1,262,800 tonnes of dredge sediment will be treated and recovered over the lifetime of the activity.

Due to the Port's operational requirements, the treatment and infilling of the treated materials have been undertaken on a phased basis.

During the initial phase (Phase 1), dredging activities resulted in the removal of approximately 97,000m^3 (net dredged material, pre-bulking) of sediments from Alexandra Basin West to a maximum standard depth of -8m CD. The dredged sediments were taken ashore, treated and used to infill Graving Dock No.2, with the quantity of the treated material which exceeded the infilling capacity of Graving Dock No.2 stockpiled in a temporary bund adjacent to the basin of Berths 52/53 in accordance with the conditions of the IE licence granted by the EPA.

8.3.15.1 Monitoring

As part of the licence conditions, regular monitoring of groundwater (GW) in the vicinity of Berths 52/53 is required. Monitoring is also undertaken on storm water emissions (SWO) and wastewater emissions to water (WW1). The monitoring locations are shown in **Figure 8-15**.



Figure 8-13: IE Licence Monitoring Locations at Berths 52/53

Groundwater was sampled from the boreholes (GW6A&B, GW7A&B, GW8A&B, GW10A&B and GW12C-S&D) surrounding Berths 52/53 on the following occasions:

- July 2019 – November 2019 (monthly)
- February 2020 – May 2021 (monthly)
- January 2022 – February 2022 (monthly)
- May 2023 (Annually)

- December 2024 (Annually)
- September 2025 (Annually)

8.3.15.2 Laboratory Analysis

In accordance with the IE licence, the groundwater samples were analysed for the following parameters:

- General Inorganics
- Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, Chromium VI)
- Organotins (TBT and DBT)
- Speciated Hydrocarbons (Aliphatic and Aromatic C5-C44)
- Speciated 16 PAHs
- VOCs
- SVOCs
- 7 PCBs
- pH, electrical conductivity, Chemical Oxygen Demand
- Nitrate
- Ammonia
- Chloride and Fluoride
- Total Nitrogen
- Nitrate as NO_3

8.3.15.3 Summary of Results

A brief summary of the groundwater monitoring results from around the area of the basin of Berths 52/53 is provided in the following sections.

8.3.15.3.1 Heavy Metals

Concentrations of heavy metals in the samples show no long-term worsening or improvement trend with infrequent exceedances over the screening values.

8.3.15.3.2 Organotins

No exceedances of Organotin compounds (TBT) were recorded during the monitoring.

8.3.15.3.3 Hydrocarbons

Across all monitoring rounds from 2019-2025, no exceedances of any petroleum hydrocarbons were recorded in any of the samples from the boreholes.

8.3.15.3.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Across all monitoring rounds from 2019-2025, no exceedances of any PAHs were recorded in any of the samples from the boreholes.

8.3.15.3.5 Semi-Volatile Organic Compounds (SVOCs)

Across all monitoring rounds from 2019-2025, no exceedances of SVOCs were recorded in any of the samples from the boreholes within the study area. VOCs show a stable, long-term pattern of non-detect results across all samples and all sampling rounds (2019–2025), with no exceedances and no temporal or spatial trends.

8.3.15.3.6 Volatile Organic Compounds (VOCs)

Across all sampling rounds in the dataset, no volatile organic compound (VOC) exceedances were reported for any of the samples from the boreholes within the study area. VOCs show a stable pattern of non-detect or below-limit results across all wells and monitoring rounds (2019–2025), with no exceedances and no temporal or spatial trends.

8.3.15.4 Summary Overview

The monitoring from 2019 to 2025 provides a good baseline for groundwater quality within the vicinity of the basin of Berths 52/53. Groundwater quality is good overall with stable low levels of TBT, Hydrocarbons, PAHs, VOCs and SVOCs with no temporal or spatial trends. Some exceedances of heavy metals were noted, but overall, there was no significant trend or change in metal concentrations in the groundwater samples.

8.3.16 Summary of 2026 Preliminary Risk Assessment

A desk study and preliminary risk assessment (Appendix 8-1) were undertaken to identify potential contamination risks associated with the historical and current use of the site and surrounding area. The assessment followed a source-pathway-receptor (SPR) approach, whereby risks were evaluated through the development of a Conceptual Site Model (CSM).

The desk study identified that the proposed development areas are located within Dublin Port on land largely reclaimed from former estuarine and marine environments. Historical port-related activities, including shipping, fuel storage, cargo handling and land reclamation, represent potential sources of contamination. In particular, contaminated dredged sediments within Alexandra Basin West have previously been identified as containing elevated concentrations of heavy metals and organotin compounds associated with historic maritime activities. However, these materials are proposed to be remediated and managed under an existing Industrial Emissions Licence.

Previous intrusive investigations and risk assessments undertaken within the Berth 52/53 area identified limited contamination within made ground and groundwater, with no evidence of significant hydrocarbon impacts despite the historical presence of fuel storage infrastructure. Long-term groundwater monitoring between 2019 and 2025 similarly demonstrated generally stable groundwater quality, with no significant contamination trends for hydrocarbons, PAHs, VOCs, SVOCs or organotin compounds.

Potential receptors considered within the CSM included future site users, underlying groundwater, the bedrock aquifer, the River Liffey, Dublin Bay, and designated ecological receptors including the South Dublin Bay and River Tolka Estuary SPA. Potential pathways comprised direct contact with impacted soils, dust inhalation, leaching to groundwater, groundwater migration and surface water runoff. Ground gas generation from made ground was also considered; however, as no occupied buildings are proposed as part of the development, this pathway was not considered significant.

Based on the available desk study information, previous ground investigations and environmental monitoring data, no significant source-pathway-receptor linkages were identified. The preliminary risk assessment concluded that risks to human health, controlled waters and ecological receptors are low, and that existing and proposed management measures are sufficient to mitigate potential contamination risks associated with the development.

8.4 Description of Likely Significant Effects

8.4.1 Assessment of Construction Effects

8.4.1.1 Land, Soils/Sediments and Geology

8.4.1.1.1 Dredging

The dredging works will involve the removal of approximately 334,000m³ of contaminated sediment from Alexandra Basin West to a depth of -10m CD. The activity will remove existing sediment deposits but will not result in the loss of any geological resource, designated geological feature or soil resource of recognised value. The sediments are anthropogenically influenced harbour deposits that have accumulated as a result of historical port operations and previous maritime activities.

The PRA (Appendix 8-1) identified contaminated sediments within Alexandra Basin West as a potential source of contamination, principally comprising metals and organotin compounds associated with historical ship maintenance and cargo handling activities. Removal of these sediments will permanently eliminate this contamination source from the basin environment for subsequent treatment and recovery.

Given the low sensitivity of the dredged sediment resource and the absence of any significant geological feature within the dredge footprint, the impact on land, soils and geology is assessed as **Neutral**. However, the removal of contaminated sediments for treatment and beneficial reuse will reduce the volume of contaminated material remaining within Alexandra Basin West and therefore constitutes a **Beneficial** effect in contaminated land terms.

8.4.1.1.2 Land Take

The ABR2 Project will not result in the loss of undeveloped land, agricultural land or other productive soil resources. The development is located entirely within the operational boundary of Dublin Port and comprises redevelopment of existing port infrastructure and marine areas.

The infilling of the basin of Berths 52/53 will create approximately 4.5ha of additional operational port land and raise ground levels over approximately 9.5ha. The Project therefore represents an intensification and optimisation of existing port lands rather than the permanent loss of a land resource. As no sensitive land or soil receptors will be lost and the Project supports the more efficient use of existing port lands, no adverse effects on land resources are predicted. Accordingly, the effect on land is assessed as **Neutral.**

8.4.1.1.3 Treatment of dredged material

The dredged sediments will be treated through a stabilisation/solidification process undertaken under EPA Industrial Emissions Licence P1022-02 prior to reuse within Berths 52/53. The treatment process has previously been demonstrated through detailed risk assessment and environmental monitoring to significantly reduce contaminant mobility and leachability, including metals, TBT, PAHs and PCBs.

From a land and soils perspective, the treatment process converts contaminated dredged sediment into a material suitable for beneficial recovery and reuse, thereby avoiding disposal to landfill and supporting circular economy principles. The treatment process also reduces the potential for contaminants to pose a future risk to human health, groundwater and surface water receptors.

Given that contaminated material is being remediated and recovered as an engineering material rather than disposed of as waste, the effect on land, soils and geology is considered **Beneficial.**

8.4.1.1.4 Infilling of the basin of Berths 52/53

The basin of Berths 52/53 will be infilled using treated and validated dredged sediments. The infilling works will take place within an existing artificial basin constructed as part of Dublin Port operations and will not result in the loss of any geological feature of local, regional or national importance.

The material used for infilling will have undergone treatment and validation in accordance with the requirements of EPA Industrial Emissions Licence P1022-02. Previous detailed quantitative risk assessment and groundwater monitoring have demonstrated that the use of treated material does not present a significant risk to controlled waters and that groundwater quality in the area remains stable with no evidence of contamination trends associated with earlier phases of sediment treatment and reuse.

The infilling activity will alter the physical configuration of the existing basin but will not adversely affect soil resources, geological features or mineral resources. Consequently, the magnitude of change is considered negligible and the effect on land, soils and geology is assessed as **Neutral.**

8.4.1.2 Hydrogeology

The treatment and remediation of dredged sediment is subject to an IE licence issued by the EPA (Licence Register No: P1022-02). Previous groundwater monitoring undertaken during the Phase 1 treatment of material used to infill Graving Dock No. 2 (See **Section 8.3.16.1**) indicated that groundwater quality was good overall with stable low levels of TBT, Hydrocarbons, PAHs, VOCs and SVOCs with no temporal or spatial trends. Some exceedances of heavy metals were noted, but overall, there was no significant trend or change in metal concentrations in the groundwater samples.

The treatment process will produce wastewater; however, this will be subject to treatment and discharge limits as outlined in Schedule B2 of the IE licence.

The treatment process will have a **Neutral** impact on groundwater as there will be no significant measurable impact on groundwater quality.

The detailed quantitative risk assessment undertaken in 2015 (See **Section 8.3.15)** indicated that the treated sediment material placed within the basin of Berths 52/53 would not leach significant contaminants (TBT, PAHs, PCBs and Metals) into the underlying groundwater and surrounding surface water (River Liffey). The infilled area will be capped, and a drainage system will be used to ensure rainfall/precipitation and surface water runoff will not migrate downwards and come into contact with the infilled material.

The infilling of the basin of Berths 52/53 will have a **Neutral** impact on groundwater, as there will be no significant measurable impact on groundwater quality.

8.4.2 Assessment of Operational Effects

The operation of the infilled area will have a **Neutral** impact on land, soils, geology and hydrogeology as there will be no measurable impact on soil or geological features or groundwater quality.

Following the completion of the treatment and infilling works, the treatment infrastructure will be decommissioned in accordance with the IE licence.

8.5 Inter-relationships

Effects on Land, Soils, Geology and Hydrogeology also have the potential to have secondary effects on other receptors, which are considered in relevant topic-specific chapters. These receptors and effects are:

- Water Quality (Considered in **Chapter 9 Water Quality**)

  -Dredging of sediments may impact upon surface water quality

  -Treatment process of dredged sediments may impact upon surface water quality

- Waste (Considered in **Chapter 20 Resource and Waste**)

  -Treatment and re-use of dredged sediments will significantly reduce disposal to landfill

-Any surplus dredged sediment material may need to be disposed as waste or sent off site to a recovery/soil treatment facility

8.6 Mitigation and Monitoring

8.6.1 Mitigation

8.6.1.1 Dredging

The dredging methodology will be the same as that undertaken for the previously authorised ABR Project dredging, which will comprise the use of a floating pontoon with an excavator mounted environmental bucket adapted for environmental dredging. This will minimise the disturbance and escape of material at the seabed and during removal through the water column. A silt curtain will be used around the dredger whilst the dredging of contaminated material is ongoing.

A contingency bubble curtain will be available which will be installed across the entrance to Alexandra Basin West, in the event of a breach of the silt curtain around the dredger.

No overtopping of barges will be permitted when transporting the dredged sediment to the treatment area and spill plates will be utilised to prevent spillage during offloading operations.

8.6.1.2 Treatment of contaminated dredged sediment material

Best practice industry techniques (utilising Best Available Technology (BAT)) will be used to treat the contaminated material arising from the dredging of Alexandra Basin West.

8.6.1.3 Industrial Emissions Licence

The operation of the treatment works will be undertaken in accordance with the EPA issued IE Licence P1022-02. Following the completion of the treatment and infilling works, the treatment infrastructure will be decommissioned in accordance with the IE Licence.

8.6.2 Monitoring

8.6.2.1 Treatment of contaminated dredged sediment material

Monitoring of the treatment process will be undertaken before, during and after the sediment treatment process in accordance with the IE licence P1022-02.

- Environmental testing to measure the leaching of contaminants from the treated material as per the IE licence requirements;
- An ongoing monitoring programme will be undertaken prior to, during, and post the sediment recovery operations as per the IE licence requirements of Schedule C Control and Monitoring; and

- A Quality Assurance/Quality Control (QA/QC) programme will be established.

8.7 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 ABR2 Project. The projects which have been considered within the assessment of cumulative effects are outlined in **Chapter 21 Cumulative Effects and Environmental Interactions**.

Given the nature of the ABR2 Project, which is focussed on marine activities which are spatially confined to Alexandra Basin West and the Berth 52/53 basin, the cumulative impacts of nearby developments on land, soil, geology and hydrogeology have been assessed and there are no potential cumulative effects arising from adjacent or nearby development, together with those predicted for the ABR2 Project.

With regard to the assessment of cumulative effects with plans, the Dublin Port Masterplan 20240 and Dublin City Development Plan 2022-2028 are considered.

Dublin Port Masterplan 2040

The proposed development forms part of the wider Dublin Port Masterplan 2040, and will complete the previously-permitted ABR Project, the permitted MP2 Project, and the proposed 3FM Project. These projects have been conceived as components of a coordinated and integrated programme of development, which has had regard to potential cumulative environmental effects. As part of this approach, mitigation measures have been embedded within the programme, including the careful scheduling of construction activities to avoid overlap during environmentally sensitive periods, particularly in relation to designated sites in proximity to the Port. This integrated approach ensures that cumulative impacts are appropriately managed and minimised.

Dublin City Development Plan 2022-2028

The Dublin City Development Plan 2022-2028 (the Development Plan) is the primary statutory land-use planning policy document guiding development within Dublin City. Dublin Port is wholly situated within the boundaries of Dublin City. The Development Plan is emphatically supportive of the role that Dublin Port plays in the city and the country. The Strategic Environmental Assessment (SEA) considers three Strategic Environmental Objectives (SEO) for Soil & Geology:

(SG_1) Safeguard sensitive soil, resources and geological heritage sites against pollution and degradation.

(SG_2) Promote the sustainable use of infill and brownfield sites over the use of greenfield within the city.

(SG_3) Safeguard designated geological sites.

No significant adverse effects have been identified on the environment as a result of the implementation of the Plan and therefore no cumulative effects between the ABR2 Project and the Development Plan are predicted.

8.8 Residual Impacts

In circumstances where the mitigation measures are effectively implemented during the construction and operational phases, as outlined in **Section 8.6**, no residual effects of the ABR2 Project on the Land, Soils, Geology and Hydrogeology are predicted for the construction or operational phase.

8.9 Summary of Effects and Conclusions

A summary of the impact assessment is provided in **Table 8-6**.

Table 8-6: Summary of Effects relating to Land, Soils, Geology and Hydrogeology

Potential Effect and Receptor	Phase[2]		Magnitude of Effects	Sensitivity of Receptor	Significance of Effect	Significant/Not Significant	Mitigation Measures	Residual Effects
	C	O						
Dredging – soils/sediments and geology	✓		C:Neutral	C: Low	C: Neutral	C: Not Significant	Silt curtain to be used. A contingency bubble curtain will be installed across the entrance to Alexandra Basin West	No residual effects
Treatment of dredged material - soils/sediments and geology	✓		C: Beneficial	C: Low	C: Beneficial	C: Not Significant	Treatment activity will be undertaken in accordance with IE licence P1022-02	No residual effects
Treatment of dredged material and infilling of Berths 52/53- Hydrogeology	✓		C: Neutral	C: Low	C: Neutral	C: Not Significant	Treatment activity will be undertaken in accordance with IE licence P1022-02	No residual effects

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

8.10 Limitations of Assessment

No limitations have been identified during this assessment process.