Iarnród Éireann
Irish Rail

Rosslare ORE Hub

EIAR Environmental Topic Chapters

Chapter 7:

Soils, Geology, Hydrogeology and Contamination

venterra | GDG GAVIN & DOHERTY GEOSOLUTIONS | NICHOLAS O'DWYER an RSK company

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LIST OF ABBREVIATIONS

BCP	Border Control Post
BH	Borehole
CORINE	Coordination of Information on the Environment
DCENR	Department of Communications, Energy and Natural Resources
DEFRA	Department for Environment, Food and Rural Affairs
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMODnet	European Marine Observation and Data Network
EPA	Environmental Protection Agency
EQS	Environmental Quality Standards
GDG	Gavin & Doherty Geosolutions
GHA	Geological Heritage Area
GPP	Guidance for Pollution Prevention
GSI	Geological Survey Ireland
GWB	Groundwater Body
GWDTE	Groundwater Dependent Terrestrial Ecosystem
GWS	Ground Water Scheme
IGSL	Irish Geotechnical Services Limited
IEMA	Institute of Environmental Management and Assessment
IRCG	Irish Coast Guard
LPS	Local Port Services Plan
NDP	National Development Plan
NHA	National Heritage Area
NMS	National Monuments Services
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
oCEMP	Outline Construction Environmental Management Plan
ORE	Offshore Renewable Energy
OSRP	Oil Spill Response Plan
OSI	Ordinance Survey Ireland
pNHA	Proposed National Heritage Area
PGL	Project Geosciences Limited
RAMS	Risk Assessment Method Statement
RIGS	Regionally Important Geodiversity Site
RoRo	Roll-On-Roll-Off
SAC	Special Area of Conservation
SIS	Soil Information System
SOP	Standing Operating Procedures
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

WMP	Waste Management Plan
ZoI	Zone of Influence

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7 SOILS, GEOLOGY, HYDROGEOLOGY AND CONTAMINATION

7.1 INTRODUCTION

Iarnród Éireann – Irish Rail is applying for development permission for the Rosslare Offshore Renewable Energy Hub (hereafter the 'Proposed Development'), located immediately adjacent and to the northwest of the existing Rosslare Europort at Rosslare Harbour in County Wexford, which is operated by Iarnród Éireann. The Proposed Development includes capital dredging to achieve navigable depths for vessels delivering ORE components; land reclamation to create a storage area for these components; and construction of two new berths to facilitate loading and unloading of ORE components. The land reclamation works include infilling the existing small boat harbour, after the construction of a new small boat harbour. The Proposed Development also includes the installation of a new slipway and facility for local clubs, such as the Sea Scouts.

The purpose of the Proposed Development is to provide a facility for the efficient handling and storage, marshalling, staging and integration of ORE components to facilitate installation of offshore wind energy projects by ORE developers and operators. The Proposed Development is designed to provide facilities that accommodate a wide range of infrastructure uses, both for current requirements and anticipated future needs. For instance, the Proposed Development could be used for traditional port activities if required, including during periods of reduced ORE-related activity. Refer to EIAR Chapter 6: Project Description for further detail.

This chapter of the Environmental Impact Assessment Report (EIAR) presents the assessment of the likely significant effects of the Proposed Development on Soils, Geology, Hydrogeology receptors and Contamination arising from the construction and operation of the Proposed Development, both alone and cumulatively with other projects. The scope of this chapter was determined following issue of a scoping report to the following topic-relevant stakeholders (see EIAR Chapter 4: Scoping and Consultation for full details of consultation):

- Marine Institute

The assessment presented in this chapter is informed by the following EIAR chapters/technical appendices:

- Chapter 8: Coastal Processes
- Chapter 9: Water Quality and Flood Risk
- Technical Appendix 7: Geotechnical Interpretative Report
- Technical Appendix 8: Coastal Processes
- Technical Appendix 11: Benthic Ecology

The primary purpose of this chapter is to establish the characteristics of the construction and operational phases of the Proposed Development for the purposes of assessing the environmental impact of the development on soils, geology, hydrogeology and contamination. It provides a summary of the baseline conditions within the Proposed Development Boundary and surrounding environs, based on project specific surveys and publicly available information.

This chapter comprises the following elements:

- Summary of relevant policy and guidance
- Data sources used to characterise the Study Area
- Summary of consultations with stakeholders
- Methodology followed in assessing the impacts of the Proposed Development (such as information of the Study Area and the approach taken in assessing the potential impacts)
- Review of baseline conditions
- Assessment of likely significant effects arising from the construction and operation of the Proposed Development
- Identification of further mitigation measures and/or monitoring requirements (if any) in respect of any significant effects (following the 'mitigation hierarchy' of avoidance, minimisation, restoration and offsets in consecutive order)
- Summary of residual impact assessment determinations in the case of any additional mitigation measures identified during this process.

7.1.1 Relevant Legislation and Guidelines

The assessment of likely significant environmental effects arising from the construction and operation stages of the Proposed Development, on soils, geology, hydrogeology and contamination, has been undertaken following guidance by the EPA (2022) and in line with the EIA Regulations.

7.1.1.1 National and International Legislation

This chapter has been prepared having regard, inter alia, to the following key international and national legislation:

International (including European Union)

- Water Framework Directive (WFD) (2000/60/EC)
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment,
- Groundwater Directives 80/68/EEC (Council of the European Union, 1979) and 2006/118/EC (Council of the European Union, 2006)
- The Waste Framework Directive 2008/98/EC
- Council Directive 85/337/EEC of 27th June 1985 as amended by Directive 97/11/EC of 3rd March 1997, Directive 2003/35/EC of 26th May 2003 and Directive 2009/31/EC of 23rd April 2009
- UK Government - Environmental Protection Act 1990.

National (Ireland)

- Planning and Development Act, 2000, as amended
- Planning and Development Regulations 2001, as amended

- Planning and Development Act 2000, as amended [e.g., Sections 212 (1) f Part IV, 6 First Schedule Condition 21]
- Climate Action and Low Carbon Development Act 2015, as amended
- Statutory Instrument (S.I.) No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 and amendments S.I. 389 of 2011, S.I. 149 of 2012, S.I. 149 of 2012 and S.I. 366 of 2016)
- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) regulations and subsequent amendments (S.I. No. 84 of 1995, S.I. No. 352 of 1998, S.I. No. 93 of 1999 S.I. No. 450 of 2000 S.I No. 538 of 2001) S.I. No. 30 of 2000 the Planning and Development Act, 2000 and S.I 600 of 2001 Planning and Development Regulations and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment
- S.I. No. 4 of 1995: The Heritage Act 1995
- Local Government (Water Pollution) Acts 1977 to 2007
- Wildlife (Amendment) Act 2000
- EC (Birds and Natural Habitats) Regulations 2011, as amended.

7.1.1.2 Relevant Policies and Plans

The Proposed Development has been reviewed in relation to planning policy specific to the soils, geology, hydrogeology, and contamination. Statutory national and local planning policy frameworks, and associated supplementary guidelines, pertinent to this chapter include:

- National Development Plan (NDP) (Department of Public Expenditure and Reform, 2018)
- Our Sustainable Future – A Framework for Sustainable Development for Ireland (Department of the Environment, Community and Local Government, 2012)
- Regional Spatial and Economic Strategy for the Southern Region, 2020
- Wexford County Development Plan 2022 – 2028.

7.1.1.3 GUIDANCE

The assessment is carried out in accordance with guidance listed below:

- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU)
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- EPA (September 2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)
- EPA (September 2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements
- EPA (2003): Advice Notes on Current Practice (in the Preparation on Environmental Impact Statements)
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements
- British Standard Code of Practice for Ground Investigations, BS 5930:2015+A1:2020
- British Standard Code of Practice, Investigation of potentially contaminated sites, BS 10175:2011+A2:2017
- CIRIA (2015) C741 - Environmental Good Practice On-Site
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2008)
- European Communities 2021. Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- Institute of Environmental Management and Assessment (IEMA) Impact Assessment Guidelines (2024): Implementing the Mitigation Hierarchy from Concept to Construction

7.2 ASSESSMENT METHODOLOGY

7.2.1 STATEMENT OF COMPETENCE

Gavin & Doherty Geosolutions Ltd (GDG) is a specialist engineering consultancy with a foundation in geoscience, environmental services and geotechnical engineering. The company was founded in 2011 and is committed to supporting projects which contribute to the global sustainability agenda, such as enhancing infrastructure, supporting onshore and offshore wind farm developments and general civil infrastructure design.

The members of the GDG EIA team involved in this assessment include:

- Roy Harrison is a Chartered Geologist and Member of the Institution of Environmental Sciences with over 20 years' experience working in the sector, and has led the geoenvironmental EIA aspects of multiple large-scale developments, including wind farm projects (e.g., Middle Muir Wind Farm, Kype Muir Wind Farm, Kype Muir Extension Wind Farm), large-scale transportation

projects (e.g., Clyde Waterfront, Renfrew Riverside and Glasgow Airport Investment Area Infrastructure Development Projects, Cross Tay Link Road, A96 Hardmuir to Fochabers) and urban redevelopments (e.g., Dublin Street north, Monaghan).

- Alasdair Pilmer is a Senior Hydrogeologist at GDG and a Chartered Hydrogeologist (BSc, MSc, PGeo, EurGeol) with the Institute of Geologists of Ireland. He has six years of post-graduate experience working in the environmental, civil engineering and renewables sectors. Alasdair has worked on multiple onshore and offshore wind farm projects in the UK and Ireland including Yellow River Wind Farm, Cushaling Wind Farm, Setanta Wind Park and Codling Wind Park.
- Erin Cline is an Assistant Geoenvironmental Scientist at GDG (MEarthSci, FGS) with over three years of post-graduate experience in the geoenvironmental, civil engineering, and renewable energy sectors. She has contributed to several onshore and offshore wind farm projects in the UK and Ireland, including Drummarnock Wind Farm, Cummeennabuddoge Wind Farm, Lairdmannoch Energy Park, and Codling Wind Park.
- Callum McKenzie is graduate environmental consultant engineer (BEng, MSc), with over a years' experience in the industry prior to joining GDG. His early experience was surrounding the renewable industry and involved environmental auditing of sites, which together with his MSc in Environmental Engineering gives him a good base of relevant expertise.

7.2.2 Pre-Application Consultation

Following the EIA scoping consultation with topic relevant stakeholders, the Project Team continued to engage with key agencies and stakeholders during preparation of the EIAR and the application for development permission. Table 7.1 is a summary of the pre-application consultation as relates to this environmental topic. See Chapter 4: Scoping and Consultation for further details of the consultation process.

Table 7.1: Consultation Responses

Consultee	Consultee Comments during EIA Scoping	Addressed within EIAR
An Bord Pleanála	The Board's representatives asked if contamination issues arise with dredged materials.	A review of surveyed boreholes was undertaken, and it was determined that there is no evidence of contamination above the levels permitted for dumping at sea in any of the samples collected.

7.2.3 Data Sources

Data was compiled from publicly available datasets, the findings of ground investigations, design information, a walkover survey, and other sources, as outlined in the following sections.

7.2.3.1 Publicly Available Datasets

The publicly available datasets are listed in Table 7.2 have been acquired and consulted in the assessment of the baseline conditions. All datasets were accessed throughout 2022, 2023 and 2024.

Table 7.2: Publicly Available Datasets

Source	Name	Description
Geological Survey Ireland (GSI)	Quaternary Mapping	Geological maps of the Proposed Development Boundary produced by the GSI and available on the GSI online map viewer
	Bedrock Mapping	
	Aggregate Potential Mapping	
	Mineral Localities	
	Groundwater Aquifers	
	Groundwater Levels	
	Wells and Springs Locations	
	Karst Database	
	Active Quarries and Pits	
	Subsoil Permeability Mapping	
	Groundwater Vulnerability Mapping	
EMODnet	Seabed Sediment Substrate Map	Virtual maps are available on the online viewer
	Offshore geology	
Ordnance Survey Ireland (OSI)	Current and historical ordnance survey maps	Current and historical survey mas produced by the OSI
	Aerial photographs	
Google	Aerial photographs	Current aerial photographs produced by Google
Bing	Aerial photographs	Current aerial photographs produced by Bing
Teagasc	Teagasc Soils Data	Surface soils classification and description
Environmental Protection Agency (EPA)	Soil Information System (SIS) National soils	This dataset provides a variety of environmental information
	Corine land cover 2018	
	Waste facilities	
	Watercourses	
	WFD 3rd Cycle Status and Risk Assessments	
	EPA Catchments Unit	
National Parks and Wildlife Service (NPWS)	Mapping within the area of the Proposed Development	This dataset provides information on national parks, protected sites and nature reserves

Source	Name	Description
National Monuments Service (NMS)	State Mining and Prospecting facilities	This dataset provides all recorded archaeological monuments
Department of Communications, Energy and Natural Resources (DCENR)	Minerals Ireland	A booklet containing a list of all current and prospecting mining facilities
	Historic Mine Sites – Inventory and Rosk Classification	An inventory of historic mines in Ireland

7.2.3.2 GROUND INVESTIGATIONS

The details of the historical ground investigation reports located within the Proposed Development Boundary which have been used in the assessment of the baseline conditions are outlined below and are incorporated into the assessment in EIAR Technical Appendix 7: Geotechnical Interpretative Report. These reports are:

- A site plan showing borehole (BH) records from Coode & Partners from 1972 to 1978
- IGSL geotechnical reports from 990 & 1991
- Factual and interpretative reports from PGL from a site investigation in 2010
- Causeway Geotech BH records and photographs from 2016
- Geotechnical report from PGL for a site investigation in 2019
- Reports from IGSL for a 3-phase site investigation in 2021-2022.

7.2.3.3 PROPOSED DEVELOPMENT WALKOVER

A Site Walkover of the Proposed Development was carried out on 29th November 2023 to inform and verify the review of the publicly available datasets. This report informed the site investigation design and the assessment of geotechnical and geoenvironmental aspects given in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

7.2.4 APPROACH TO ASSESSMENT OF EFFECTS

The baseline information obtained has been used to provide an understanding of the value of each receptor relevant to this topic (the 'baseline scenario'), and its sensitivity to the potential effects associated with the construction and operation of the Proposed Development. The baseline scenario has been determined with due consideration of the 'do nothing' scenario.

The methods used for assessment of effects are based the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports published by the EPA (2022), and the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes published by the National Road Authority in 2008.

The 'source-pathway-receptor' model, which considers a connection between the source of contamination and a sensitive receptor via an appropriate environmental pathway, as defined in the UK Government's 1990 Environmental Protection Act, has been used to identify potential impacts resulting from the proposed project activities on the environment and sensitive receptors within it.

This has allowed for the likely Zone of Influence (ZoI) of the development on soils, geology, hydrogeology and contamination receptors to be considered.

As such, the potential environmental impacts identified have been assessed using a systematic approach to identify and evaluate the significance of the potential impacts both alone and in combination with other plans and projects. During each phase (construction and operation) of the Proposed Development, activities will take place on site which will have the potential to cause impacts on soils, geology, hydrogeology and contamination at the Proposed Development.

The sensitivity of soil, geological and hydrogeological receptors in the study area has been determined using the criteria set out in Table 7.3. The magnitude of the potential effect has been described as per Table 7.4, which when combined with the sensitivity of the receptor has allowed an assessment of the significance of the effect to be made following the matrix presented in Figure 7.1.

The potential effects of the Proposed Development are discussed in in section 7.4. Mitigation measures, where required, are presented in section 7.5, whilst residual effects are considered in section 7.6.

Table 7.3: Sensitivity Criteria (Following EPA, 2022)

Sensitivity	Definition and Examples
High Receptors with a high quality and/or rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement.	**Geology**: Drift and solid geology underlying the Site is within a designated area (Site of Special Scientific Interest (SSSI) or Regionally Important Geodiversity Site (RIGS) and is of rare or of national importance. Geological resources (e.g., mineral reserves) within the study area are of high value and importance.
	Soils: Soils are of high value and importance, e.g., carbon rich soils, highly productive agricultural soils.
	Hydrogeology: Hydrogeological catchment area is of high value and importance i.e., provides baseflow to rivers, supports high potential Groundwater Dependent Terrestrial Ecosystem (GWDTEs) or used for local private water supplies, e.g., groundwater abstractions for private supply within 250m of the Site (greater than 1m depth excavations) or 0-100m (excavations less than 1m depth). Groundwater typically also has a vulnerability classification of High or Extreme.
	Contamination: Significant contamination of potential high risk to human health or sensitive water environment receptors.
Medium Receptors with a medium quality and/or rarity, local scale and limited potential for substitution/replacement or receptor with a low quality and rarity, regional or national scale	**Geology**: Drift and solid geology underlying the study area is not within a designated area (SSSI or RIGS) and deposits are of medium value and importance. Geological resources (e.g., mineral reserves) within the study area are of medium value and importance.
	Soils: Soils are of medium value, e.g., productive agricultural soils.

Sensitivity	Definition and Examples
and limited potential for substitution/replacement.	**Hydrogeology**: Hydrogeological catchment area is of medium value and importance and is not generally used for public or private water supplies. Groundwater supports medium potential GWDTE's. Groundwater typically also has a vulnerability classification of Moderate.
	Contamination: Contamination of potential low to moderate or moderate risk to human health or sensitive water environment receptors.
Low Receptors with a low quality and/or rarity, local scale and potential for substitution/replacement. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.	**Geology**: Drift and solid geology underlying the Site is not within a designated area (SSSI or RIGS), and deposits are of low value and importance. Geological resources (e.g., mineral reserves) on the Site are of low value and importance.
	Soils: Soils are of low value and importance, e.g., general superficial soils of low value or geological importance.
	Hydrogeology: Hydrogeological catchment area is of low value and importance and is not used for public or private water supplies. Groundwater typically also has a vulnerability classification of Low.
	Contamination: Low levels of contamination unlikely to present a significant risk to human health or sensitive water environment receptors.
Negligible Receptors with a negligible quality and/ or rarity, local scale and potential for substitution/ replacement. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.	**Geology**: Drift and solid geology underlying the Proposed Development Boundary is not within a designated area, and deposits are of low value and importance. Geological resources (e.g., mineral reserves) on the Proposed Development Boundary are of low value and importance.
	Soils: Soils are of low value and importance, e.g., general superficial soils of low value or geological importance.
	Hydrogeology: Hydrogeological catchment area is of low value and importance and is not used for public or private water supplies. Groundwater typically also has a vulnerability classification of Low.
	Contamination: No identified contamination of potential risk to human health or sensitive water environment receptors.

Table 7.4: Criteria for Rating Magnitude of Effects (following EPA, 2022)

Magnitude	Criteria
High	Results in loss of attribute, i.e., long term, permanent change to receptors resulting from activities associated with the Proposed Development, e.g., major changes to the hydrogeological regime or complete loss of soil / carbon resource.

Magnitude	Criteria
Medium	Impacts integrity of attribute or results in loss of part of attribute, i.e., short to medium term change to receptors resulting from activities associated with the Proposed Development, e.g., non-significant alteration to the hydrogeological regime or substantial loss of soil / carbon resource.
Low	Results in minor impact on attribute, i.e., detectable but non-material and transitory changes to receptors resulting from activities associated with the Proposed Development, e.g., minor alteration to the hydrogeological regime or minor loss of soil / carbon resource.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity, i.e., no perceptible changes to receptors resulting from activities associated with the proposed development.

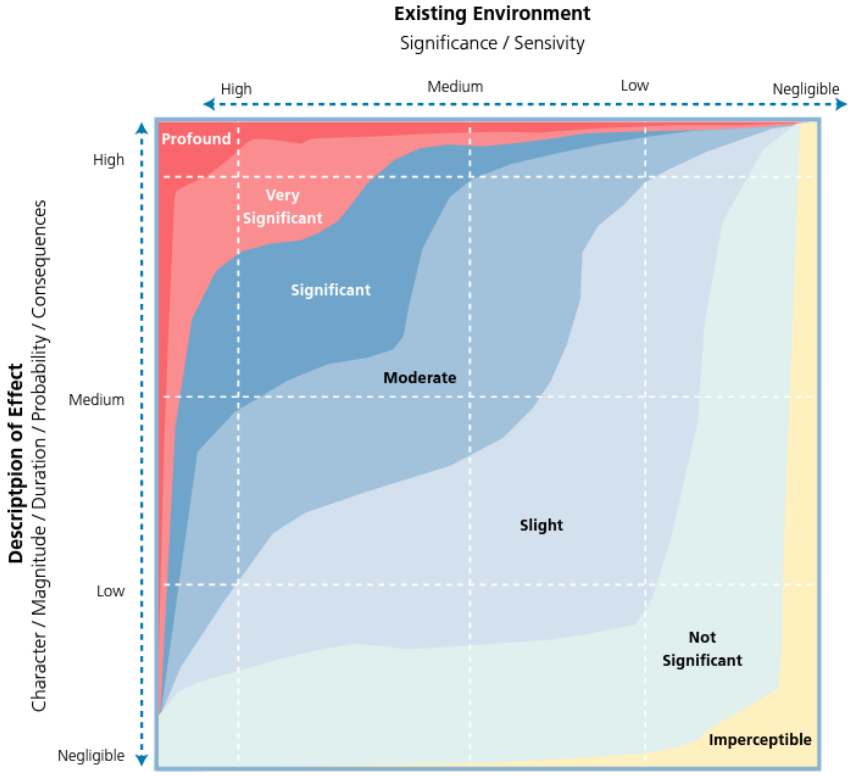

Figure 7.1: Determining the significance of effects by comparing the character of the predicted effect to the sensitivity of the receiving environment

Source: Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

The sensitivity of the receiving environment, the magnitude of the potential impact and consideration of its likelihood of occurring, helps to evaluate the significance of the effect predicted prior to and after application of mitigation measures. The significance of effect has been defined using professional judgement, following the guide in Figure 7.1.

Effects can be beneficial (positive), neutral or adverse (negative) in nature. Significance of effects has been categorised as follows:

- *Imperceptible* – An effect capable of measurement but without significant consequences

- *Not Significant* – An effect which causes noticeable changes in the character of the environment but without significant consequences
- *Slight* – An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
- *Moderate* – An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
- *Significant effects* – An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
- *Very Significant* – An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment
- *Profound Effects* – An effect which obliterates sensitive characteristics.

Adverse effects of 'Significant' significance and above are considered 'significant'. Effects of 'Moderate' significance or below are not considered to be significant.

7.2.5 MITIGATION

As discussed in Chapter 1: Introduction and Methodology, three types of mitigation measures are considered in this chapter.

- Primary mitigation
- Secondary mitigation
- Tertiary mitigation

7.2.6 RESIDUAL EFFECTS

Where relevant, residual effects have been determined for each significant effect, considering all proposed mitigation. In cases where residual uncertainty of impact is identified within the EIAR, or the success of implemented mitigation measures requires validation, commitments have been made for the provision of monitoring.

7.2.7 DIFFICULTIES AND UNCERTAINTIES

Assumptions related to the assessment undertaken at this stage are as follows:

- All publicly available scientific information ascertained to inform this assessment is accurate and up to date, reflecting the current environment baseline.

Limitations related to the assessment undertaken at this stage are as follows:

- Limited groundwater monitoring data is available, and it is not possible to determine the groundwater table level or seasonal variations in water levels without long-term monitoring
- The GSI Groundwater Wells and Abstraction database is not exhaustive. Whilst there are unlikely to be unlisted wells within the study area which have not been identified during site walkovers, the presence of additional wells cannot be ruled out.

7.3 BASELINE: SOILS, GEOLOGY, HYDROGEOLOGY AND CONTAMINATION IN RECEIVING ENVIRONMENT

7.3.1 INTRODUCTION

This section describes the existing conditions and important features in terms of soils, geology, hydrogeology, and contamination within the Proposed Development. A regional overview is provided and followed by a description of site-specific baseline conditions.

The Zone of Influence (ZoI) considered in this chapter comprises both onshore and offshore elements and is governed by the potential linkages between the Proposed Development and different interacting receptors. As a result, the ZoI comprises an area within approximately 5km of the Proposed Development, which spans onshore groundwater bodies and surface waters, from Rosslare Town and the South Slob Channel to the offshore waterbodies ranging from Wexford Harbour and Slobs to the Southwestern Irish Sea. The ZoI for other receptors is smaller as risks associated with contamination are generally localised to sources within the site or in close proximity, and the effects on solid geology are expected to be limited to areas of direct construction works on rock.

7.3.2 TOPOGRAPHY, SETTING AND LAND USE

The Proposed Development Boundary comprises coastal land and waters on the northern shore of the existing Rosslare Europort harbour, which is Ireland's main ferry port for passenger and commercial freight to the United Kingdom and European Mainland. The current port and its berths are to the east of the site and is operated by Irish Rail. The port is connected to the national roads network via the N25 and N11 roads which are both to the southeast of the site (Figure 7.2).

Within the Proposed Development Boundary, on the southern edge, is a developed small boat harbour. The southern boundary of the development is inclusive of the shoreline, comprising rock armour revetment.

Adjacent to the Proposed Development Boundary is a mix of discontinuous urban fabric and industrial/commercial transport surfaces and non-irrigated arable land. Urban areas and arable land are uphill of the site to the south. See Figure 7.3 for the CORINE (2018) land use categorisation extracted from GSI mapping viewer, in which the orange colour denotes Port Areas.

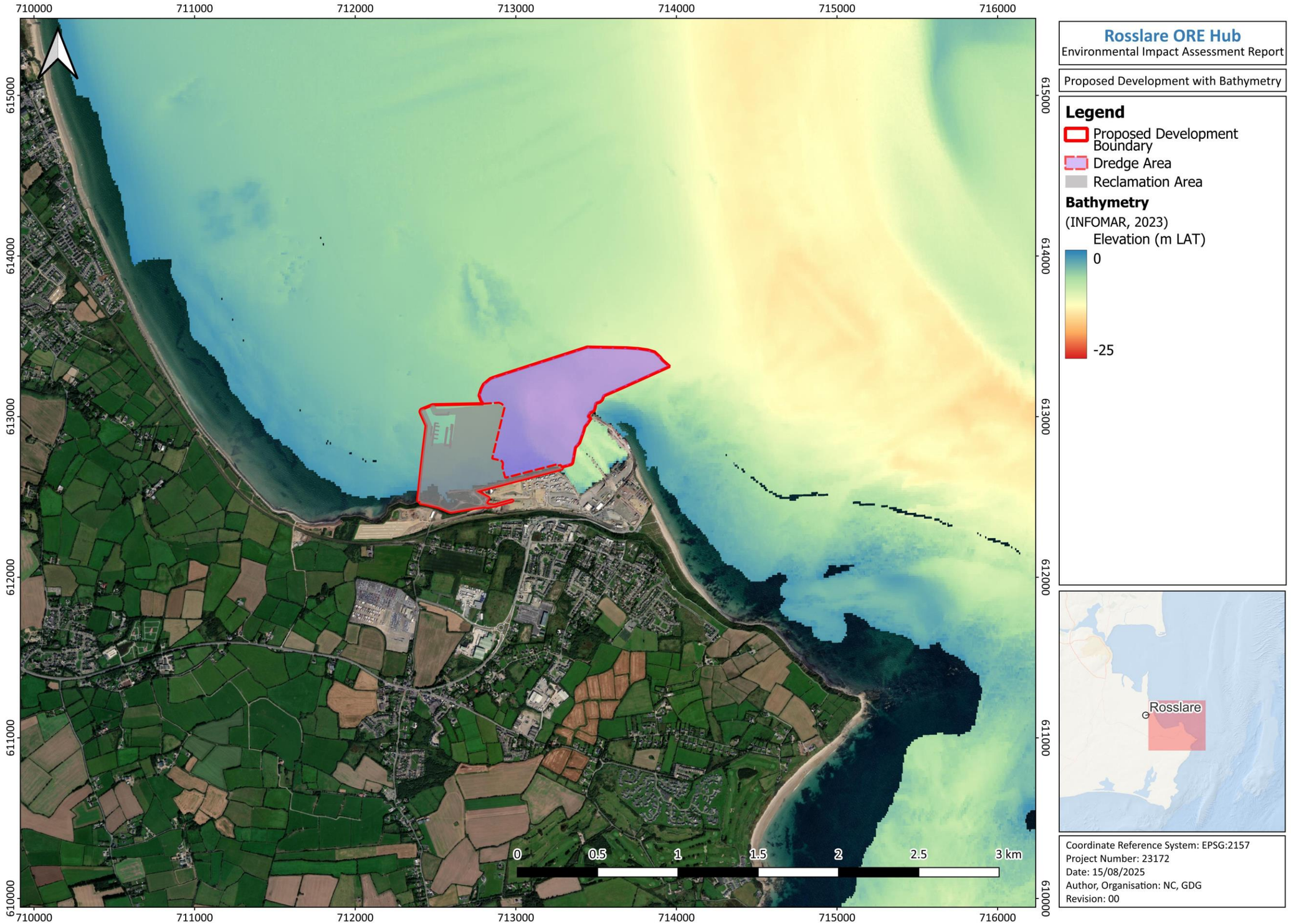

Figure 7.2: Proposed Development Boundary with Bathymetry

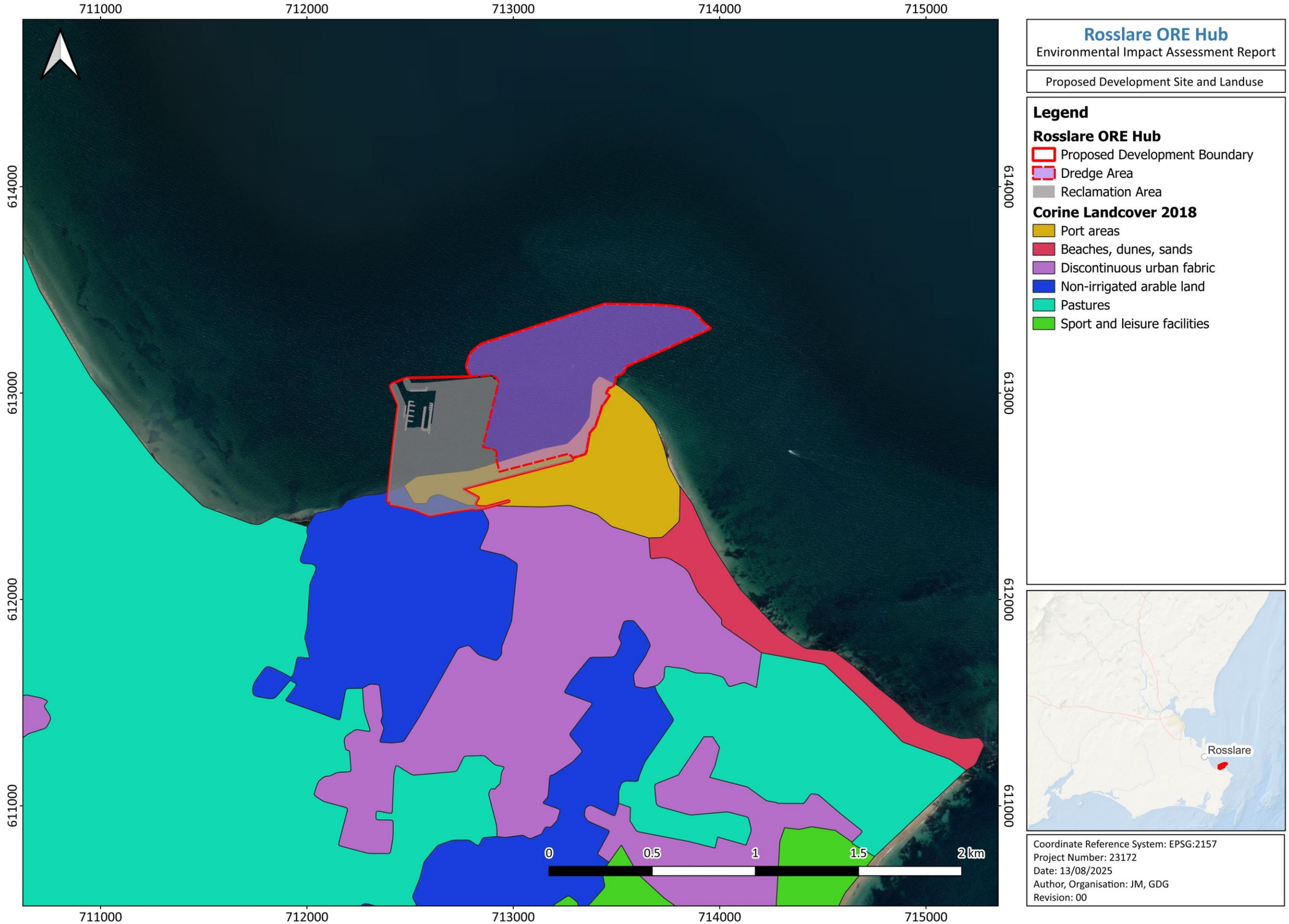

Figure 7.3: Land Use Map (CORINE, 2018)

7.3.3 Land Use and Development History

A review of the available historical maps and records regarding the development of the area within the Proposed Development Boundary and surrounding area from 1841 to the present day has been undertaken to inform this chapter. Further details of the site history, including extracts of the historical maps, can be found in EIAR Technical Appendix 7: Geotechnical Interpretative Report of this EIAR.

In summary, the earliest available historical map from 1841 shows the Proposed Development Boundary to be a natural rocky headland, which is adjacent to farmland to the south (OS 6-inch Ireland, 1841). In 1882, the development of the railway line from Wexford to Rosslare Harbour began, with the Rosslare railway station opening on 30th August 1906 (Our Irish Heritage, 2025). The Rosslare Harbour Station is located approximately 250m southwest of the Proposed Development. Historical mapping from 1888 to 1913 shows the surrounding area developing. The map records the Rosslare Pier as 'Railway and Pier in course of construction'. This has associated infrastructure including a Turn Table and a Lifeboat Station (OS 6-inch Ireland, 1903). Development began in 1906 by the Great Western Railway and the Great Southern and Western Railway to accommodate steam ferry traffic between Great Britain and Ireland.

The 1940 (revised 1955 edition) of the OS 6-inch Ireland map shows the harbour to have developed to include a long single pier and more buildings on the land that will lie southeast of the proposed development. These included various dwellings, an engine shed, sheep pen, coastguard facilities and additional rail features. The headland intended for the Proposed Development is a rocky headland on this issue of the map. The 1995 map shows the area had by then been developed into a small harbour that much resembles the current layout, and the area between the Proposed Development Boundary and the port had been reclaimed.

7.3.4 Soils

7.3.4.1 Onshore Soils and Quaternary Sediments

The EPA Soil Information System (SIS) National Soils database online mapping (EPA, 2025) shows the local soils to comprise a mixture of River Alluvium and Irish Sea Till. A total of three onshore boreholes were completed during the ground investigation, and these found the superficial layers to comprise made ground with a thickness of 3.3 to 7.5m overlying glacial till of 0.6m to 5.7m thickness. The made ground stratum was described as medium dense to very dense slightly silty gravel, with one borehole striking directly into rock armour.

Peat soils were not observed on the walkover, in the GSI mapping, or during the investigation and thus risks associated with peat (including stability and as a carbon store) are not considered further in this chapter. Detailed geological descriptions and properties of the onshore subsoil ground conditions can be found in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

7.3.4.2 MARINE SEDIMENTS

During the ground investigations, a total of 33 offshore boreholes were drilled to determine marine ground conditions. The ground investigation examined the fractions of sediments in the superficial marine deposits as well as the cohesive glacial till. Figure 7.5 shows the EMODnet mapping of seabed sediments in the area of and adjacent to the Proposed Development. The habitats mapped within the Proposed Development Boundary include sand to the west and rocks and boulders to the east. The project-specific site investigation works found the marine deposits to be predominantly silt and clay, with sand and gravel present in smaller fractions. The marine boreholes also found the glacial till covering the majority of the site to be an average thickness of 2.8m and being, on average, an even mix of gravel, sand and silt. Detailed geological descriptions and properties of the offshore subsoil ground conditions are described in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

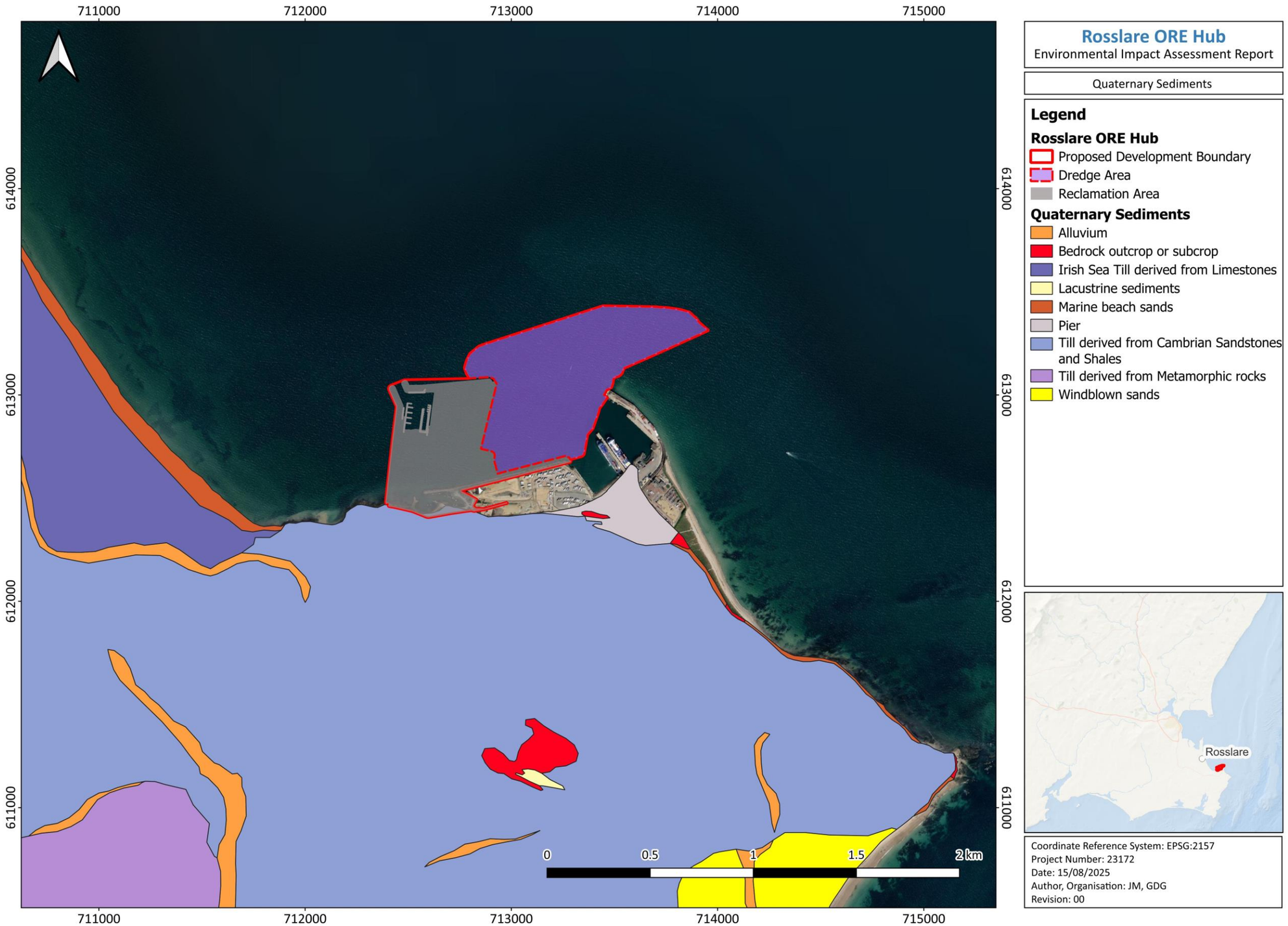

Figure 7.4: Quaternary Sediments map at 1:50,000 scale showing onshore sediments (GSI, 2024)

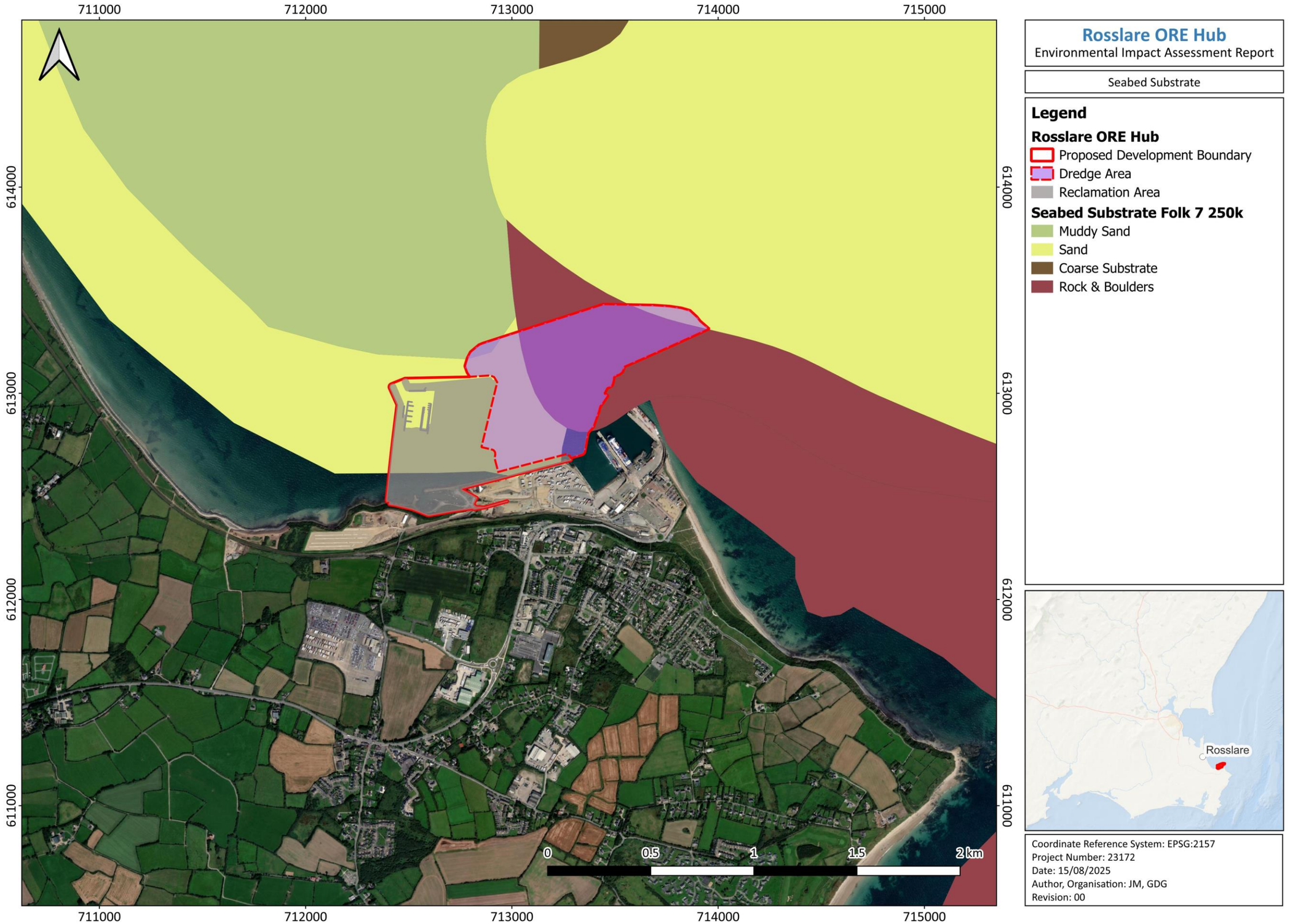

Figure 7.5: Seabed Sediment Substrate Map Folk Classification 250k Scale showing seabed sediments (EMODnet 2024)

7.3.5 GEOLOGICAL SETTING

7.3.5.1 ONSHORE BEDROCK GEOLOGY

GSI 100k bedrock mapping (GSI, 2016) identifies the Proposed Development Boundary and surrounding area to be underlain by Precambrian Quartzites, Gneisses and Shists of the Greenore Point Group. The GSI description is defined as green, foliated amphibolites with minor pelitic or semi-pelitic schists, intruded by granodiorite gneisses and locally mylonitised to chloritic schists.

A fault dissects the east of the site, on a north-south trajectory. A second fault dissects the site on an east-west trajectory with the younger geology on the north side being of the Grahomack formation, comprising Ordovician metasediments.

Bedrock onshore was encountered at levels ranging from -2.06 mCD to -4.21 mCD. Detailed geological descriptions and properties of the onshore ground conditions can be found in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

7.3.5.2 OFFSHORE BEDROCK GEOLOGY

The offshore solid geology is predominantly sedimentary rocks, mudstone and sandstone that are sometimes interbedded. These sedimentary rock areas were found to be extremely weak to medium strong and heavily weathered in some areas. 16 of the 33 offshore boreholes found metamorphic rock either directly beneath the marine deposits, glacial till or mudstone. Typically, the metamorphic rock was the gneiss identified in the GSI survey maps, with some mylonite outcroppings. The depth to rockhead was variable across the site, ranging from -1.56m to -16.1m, but generally fell with distance from shore; see Figure 7.6 for the geological map and rockhead elevations.

Detailed geological descriptions and properties of the offshore ground conditions can be found in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

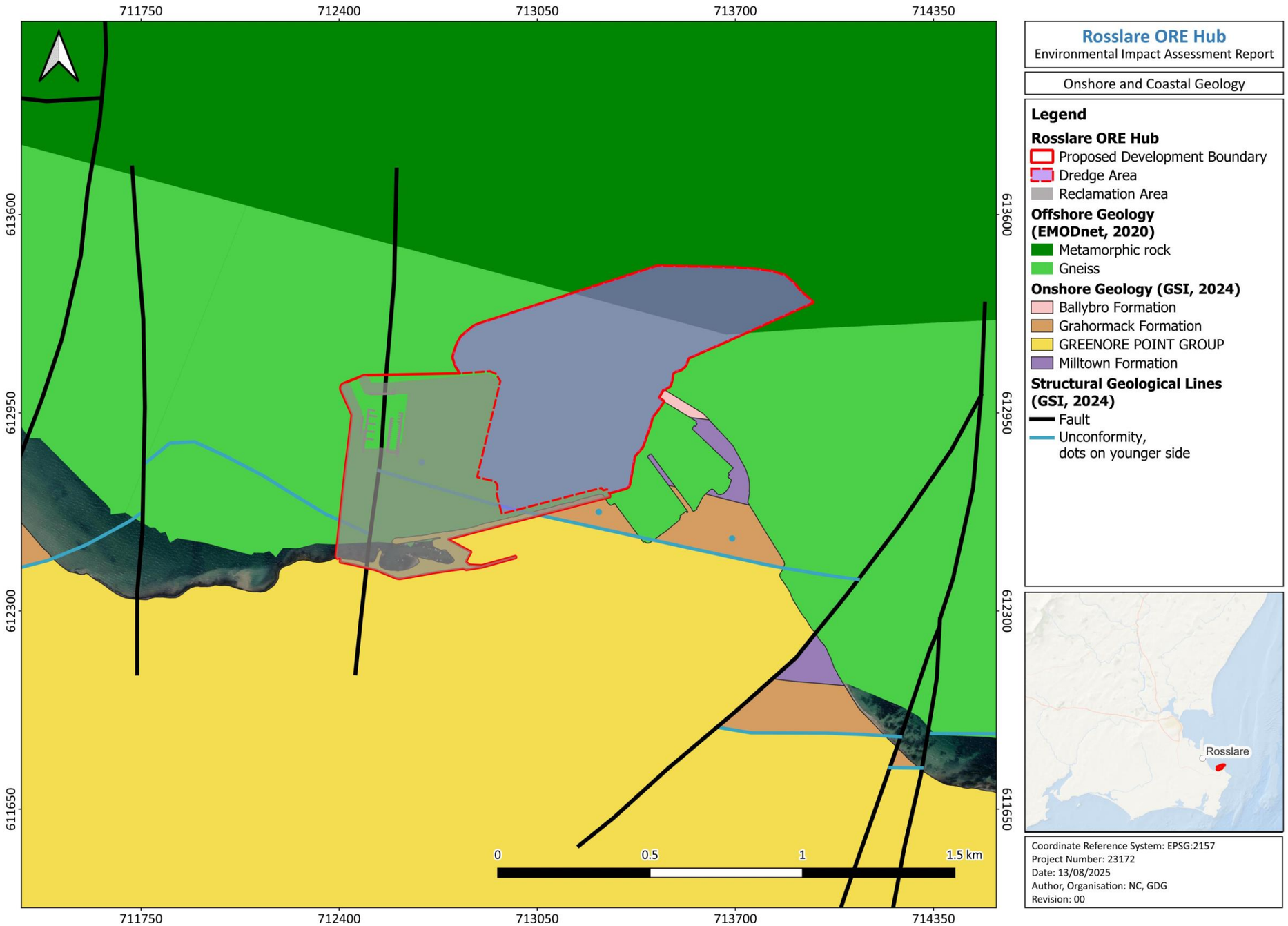

Figure 7.6: Bedrock strata encountered during Ground Investigation, rockhead elevations, with existing GSI and EMODnet geological mapping

7.3.6 GEOLOGICAL HERITAGE

Review of the EPA Mapper (EPA, 2025) indicates that there are no Natural Heritage Areas (NHA) located in southeast Ireland. There are two Geological Heritage Areas (GHA) within 5km of the site, both of them to the southeast and being the coastal rocky headland. The closest being the Greenore Point, just over 2km from the Proposed Development to the east, which is of interest due to its exposed foliated amphibolite formations on the beach. The other is St. Helen's Harbour, the northern point of which is 3.3km southeast of the Proposed Development, significant for its exposed metagabbro formations.

7.3.7 ECONOMIC GEOLOGY

According to the GSI online minerals data viewer (GSI, 2024), there are 8 mineral localities within 4km of the Proposed Development. They are referenced as 3220-3226 and 391 in the database of GSI mineral localities. Of these, six are non-metallic marl deposits, the remaining two are either shale or clay/brick. The closest to the Proposed Development is a marl deposit located approximately 2km west of the Proposed Development Boundary.

OSI mapping for the 1830s (Tailte Éireann, 2025) indicates that the nearest quarry to the Proposed Development is located approximately 3km to the west. This quarry is not referenced in more recent editions of OSI mapping, but there is a brick yard in the vicinity in later versions suggesting it was a superficial clay/brick quarry. This is consistent with the recorded GSI mineral localities.

There are no peat deposits in close proximity to the Proposed Development. The nearest recorded peat is a small, isolated occurrence more than 4km to the northwest.

The GSI aggregates potential database (GSI, 2024) shows that the Project Development Boundary itself, and the majority of the area surrounding the Proposed Development, is of low potential for crushed rock aggregates. There are some small areas with higher potential located at the eastern edge of the headland, but these are unlikely to be suitable for quarrying as they are located under existing infrastructure.

7.3.8 HYDROGEOLOGY

This section provides information on the baseline hydrogeology of the Proposed Development and surrounding area. Four hydrogeological elements are considered, to provide a comprehensive understanding of the hydrogeological conditions in and around Rosslare Harbour:

- Bedrock Aquifers: characterises the underlying geological formations, focusing on their water-bearing properties and role as a source of groundwater
- Groundwater Bodies: describes the primary groundwater bodies in the area
- Groundwater Vulnerability and Recharge: assesses the sensitivity of the groundwater to contamination, along with an analysis of recharge zones and mechanisms
- Wells and Abstractions: identifies existing wells and springs, their usage, and their significance within the local hydrogeology.

Each subsection below details the current conditions and emphasises factors relevant to environmental impacts for these elements. It is important to note that marine groundwater begins directly at the seabed and includes the water that saturates the marine sediments, the high point of the marine groundwater changing with the tide. Onshore soils have been found to have poor permeability, meaning contamination at the surface would be unlikely to penetrate to the groundwater. Given the low recharge and low mobility of the surrounding groundwaters, the moisture in the Proposed Development's soils and geology is likely to be dominated by surface water runoff.

7.3.8.1 BEDROCK AQUIFER

The regional aquifer types that Rosslare Harbour falls within is classed as "poorly productive". According to the GSI (2017), the specific code of this region "Pl" can be described as only being able to supply abstractions with low yields of <100m^3/d. GSI states this area to have generally unproductive bedrock, which will feature only a few and likely poorly connected fractures that result in the low storage capacity and recharge acceptance. A single standpipe was installed in L-BH01 during site investigations and recorded water levels between +1.60mCD and +1.80mCD from 05th March 2024 to 21st March 2024. Without long-term groundwater monitoring data, it is not possible to determine the exact groundwater table level at the site. Table 7.5 provides some further detail on this aquifer and its properties, extracted from GSI (2015), whilst Figure 7.7 shows the GSI data for bedrock aquifer classification.

Table 7.5: Aquifer properties From Kelly et al, 2015

Bedrock unit name	Rock Unit Group	Aquifer type	Best estimate transmissivity (m2/d)	Transmissivity range (5th—95th%ile) (m2/d)	Geometric mean of Storativity (-)	Geometric mean of Specific yield (-)
Precambrian Quartzites, Gneisses & Schists	PQGS	Pl	<10.0	<1.0 – 70.0	0.00026	0.017

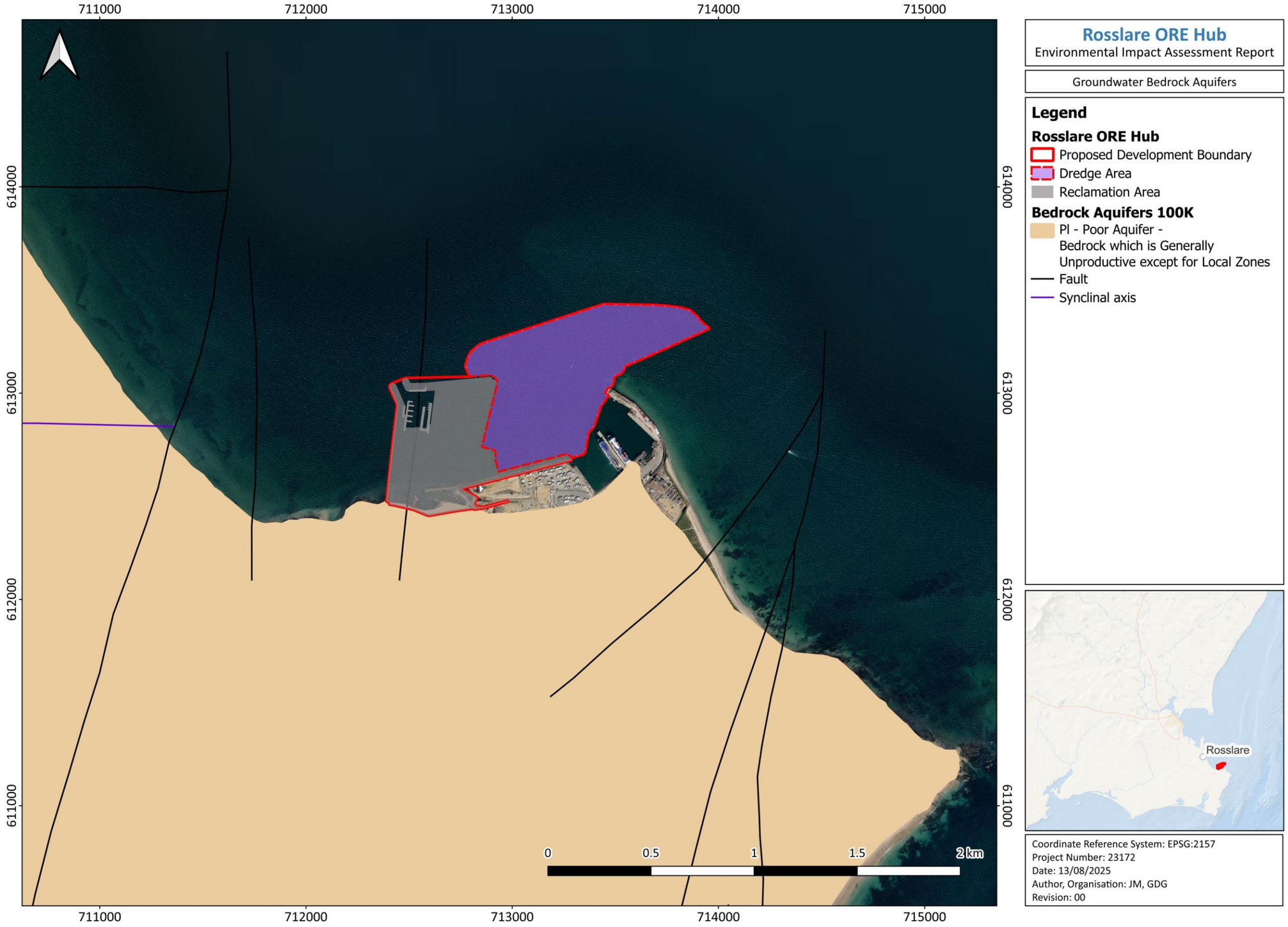

Figure 7.7: Groundwater Bedrock Aquifer Resources (GSI, 2024)

7.3.8.2 GROUNDWATER BODIES

The Proposed Development is underlain by the Bridgetown groundwater body (GWB) (Figure 7.8), which is characterised by its lack of recharge due to the impermeable till overlying it. There is little change in elevation throughout the 137km^2 GWB with the highest elevation being 30m OD, and this is located a significant distance from the Proposed Development. The GWB is defined to the northwest by the contact to the Wexford Formation and the Cambrian and Permo-Triassic rocks, whilst elsewhere the coast defines the boundary. What flow there is in this GWB, is in short shallow paths found in the upper 10m of the weathered bedrock.

A review of EPA Water Framework Directive water quality mapping (EPA, accessed 2025) indicates:

- Bridgetown GWB currently achieves 'Good' status for the 2016 – 2021 assessment period (Figure 7.9). This represents no change in status since the 2015 -2018 iteration.
- According to the latest WFD 3rd risk assessment cycle (2015 – 2018), the Bridgetown GWB is currently designated as 'Not at risk' of failing to meet WFD environmental objectives by 2027 (Figure 7.10).

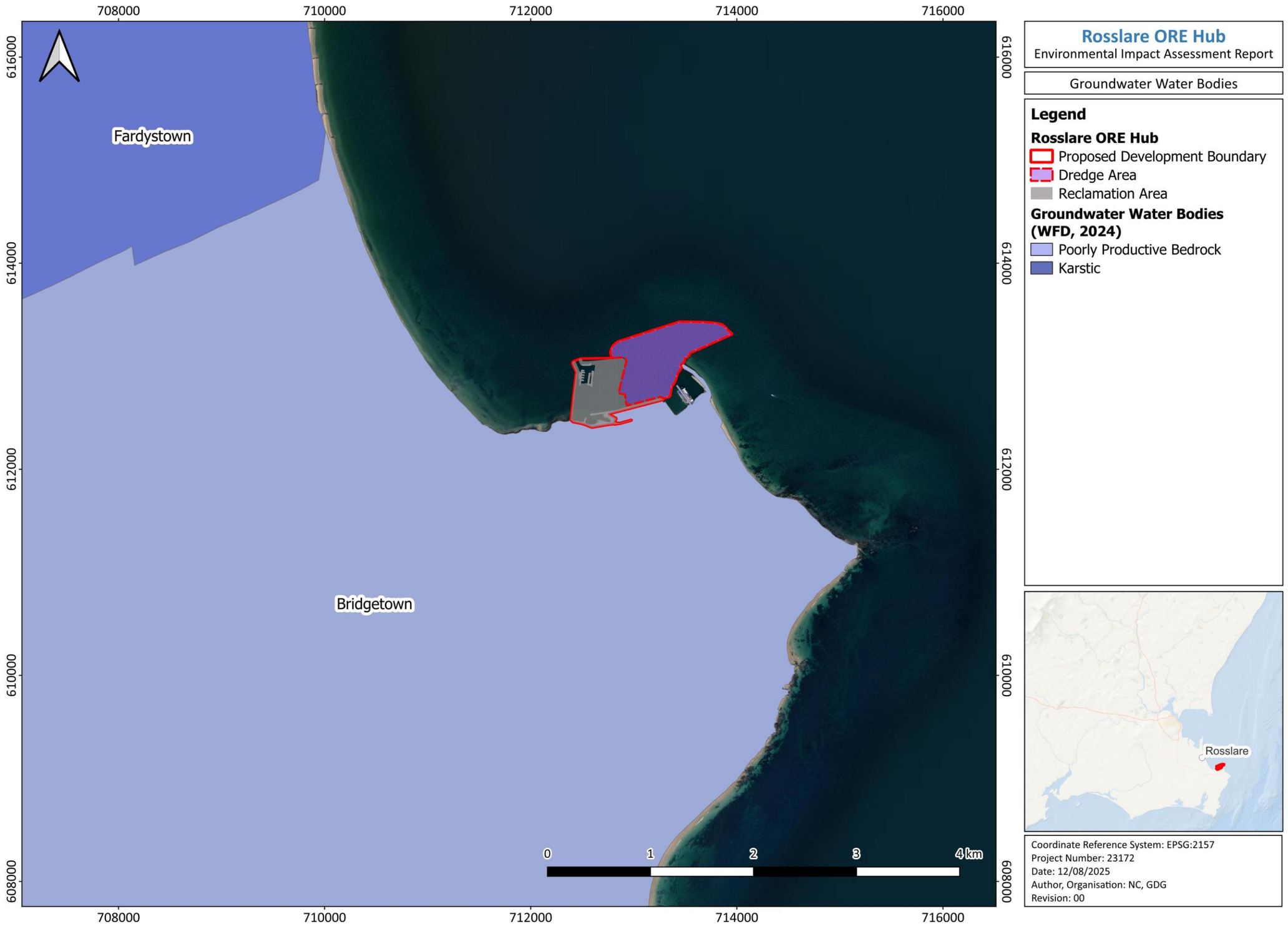

Figure 7.8: Groundwater bodies (GSI, 2024)

Figure 7.9: Groundwater bodies status (WFD 2016-2024)

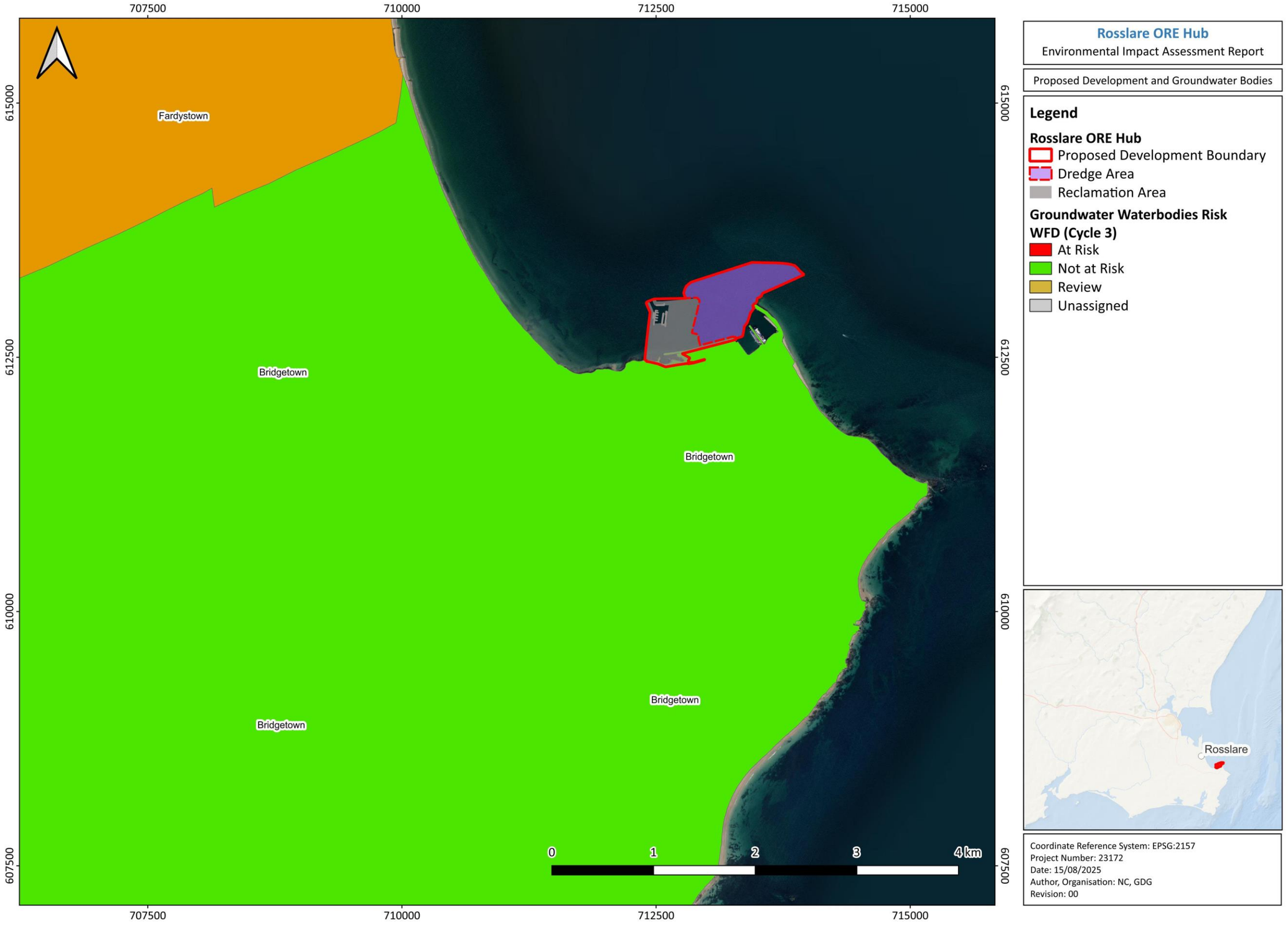

Figure 7.10: Groundwater bodies risk (WFD Cycle 3, 2015-2018)

7.3.8.3 GROUNDWATER VULNERABILITY AND RECHARGE

Groundwater data from GSI (GSI, 2005; GSI, 2017; GSI, 2021) are shown in Figure 7.11, Figure 7.12 and Figure 7.13 .

Figure 7.11 displays the local groundwater vulnerability. The yellow area, which partially overlaps with the Proposed Development, is assigned “moderate” vulnerability, meaning that if contamination were to make its way into the GWB there would be potentially significant effects. This is consistent with the stratification observed in onshore boreholes during site investigations.

Figure 7.12 shows the region features low permeability, suggesting dense and uniform sediments that will slow the movement of water through this stratum. Consequently, the subsoils will slow the downward movement of any contaminants.

Figure 7.13 shows the land adjacent to the Proposed Development to have a groundwater recharge rate of 51-100mm annually, which is relatively low given the high annual rainfall. This low recharge rate is the result of multiple factors such as the low-permeability subsoil and the poorly connected bedrock fractures restricting flow. As the demand on local aquifers and abstraction points is low in the area, this lower level of recharge can sustain the groundwater levels, meaning declining groundwater levels are unlikely. Low recharge also suggests a greater proportion of the effective rainfall will runoff directly to surface waterbodies than enter the groundwater system.

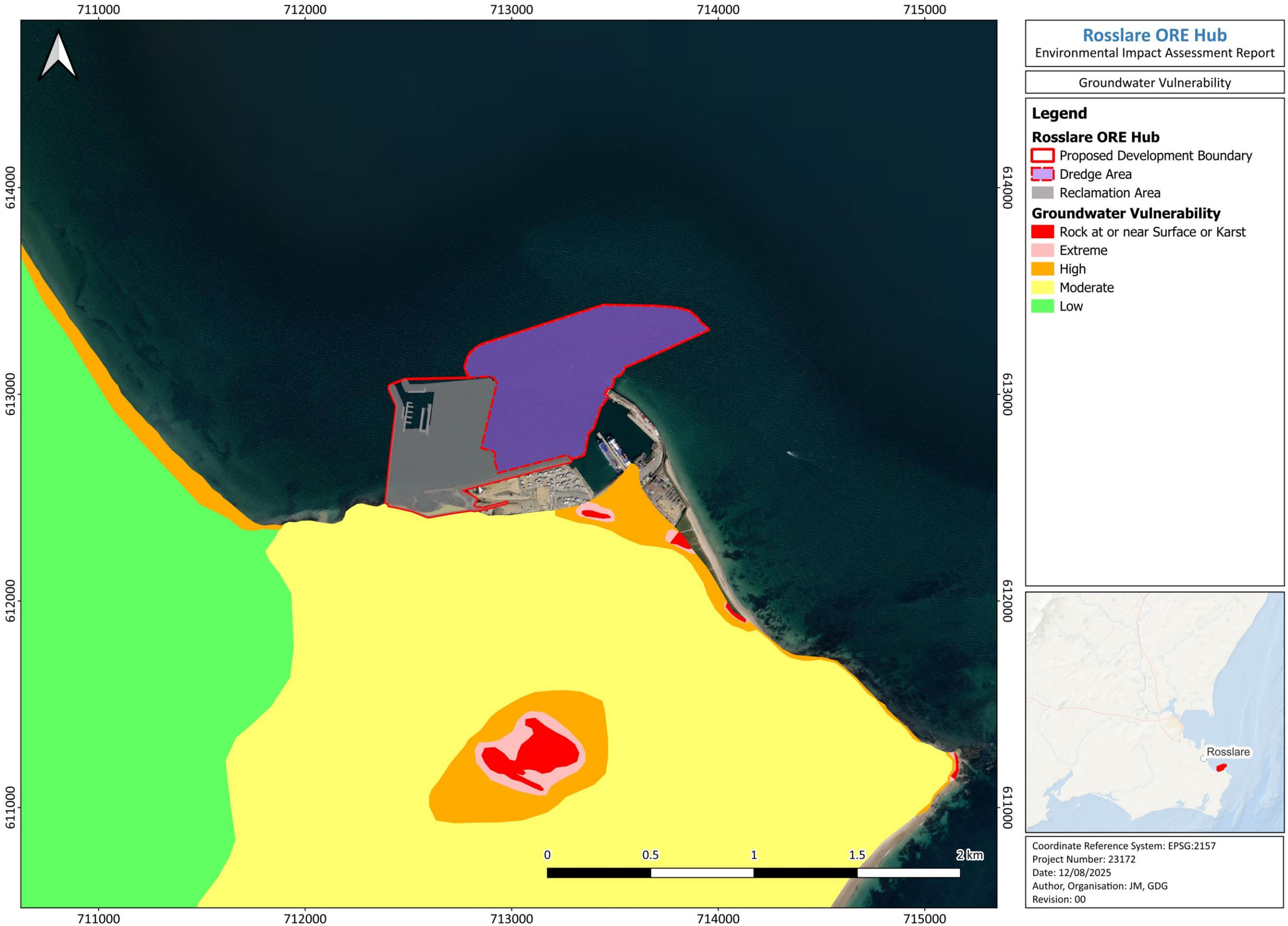

Figure 7.11: Groundwater Vulnerability 1:40,000 ROI (GSI, 2021)

Figure 7.12: Subsoil permeability 40,000 scale (GSI, 2024)

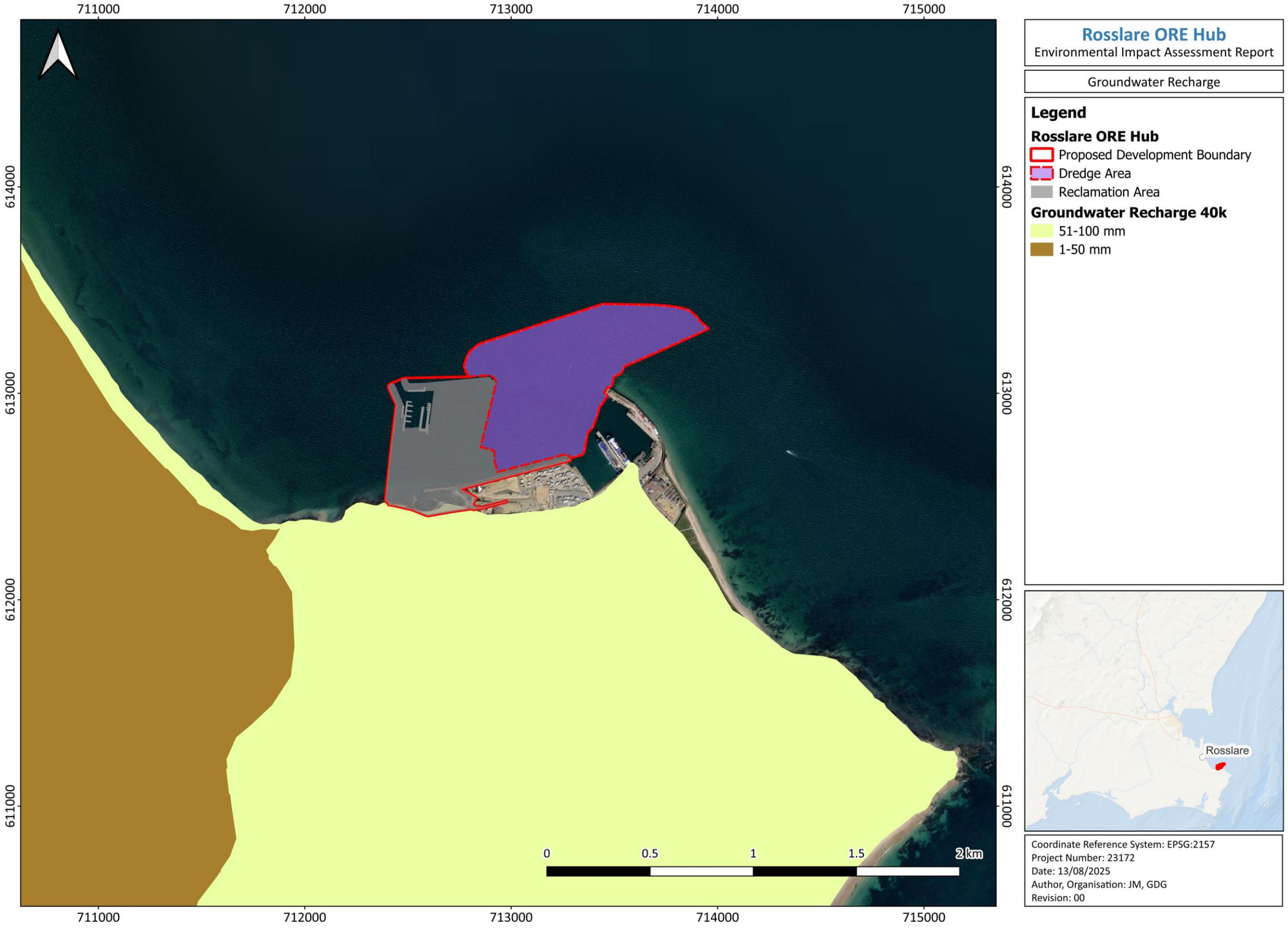

Figure 7.13: Groundwater recharge

7.3.8.4 WELLS AND ABSTRACTIONS

According to the GSI groundwater wells and springs database (GSI, 2021), two BH abstraction points are recorded within a 5km radius of the Proposed Development. These are:

- 2911SEW004 30.5mbgl BH – 4.57km away west
- 2909NEW001 38.1mbgl BH – 4.69km away south.

The distance and hydraulic gradients to these wells means connectivity is highly unlikely and given the low mobility of groundwater and lack of connectivity in bedrock fissures, a pathway for impacts to these receptors from the Proposed Development is not considered feasible. Figure 7.14 shows abstraction points within the wider Study Area. There are no Groundwater Water Schemes (GWS) or Source Protection Zones (SPZ) within a 30km distance from the Proposed Development and thus these are not considered further. As the underlying aquifer is poorly productive and likely impacted by the wider industrial uses, it is unlikely any large abstractions will be added for public water supply.

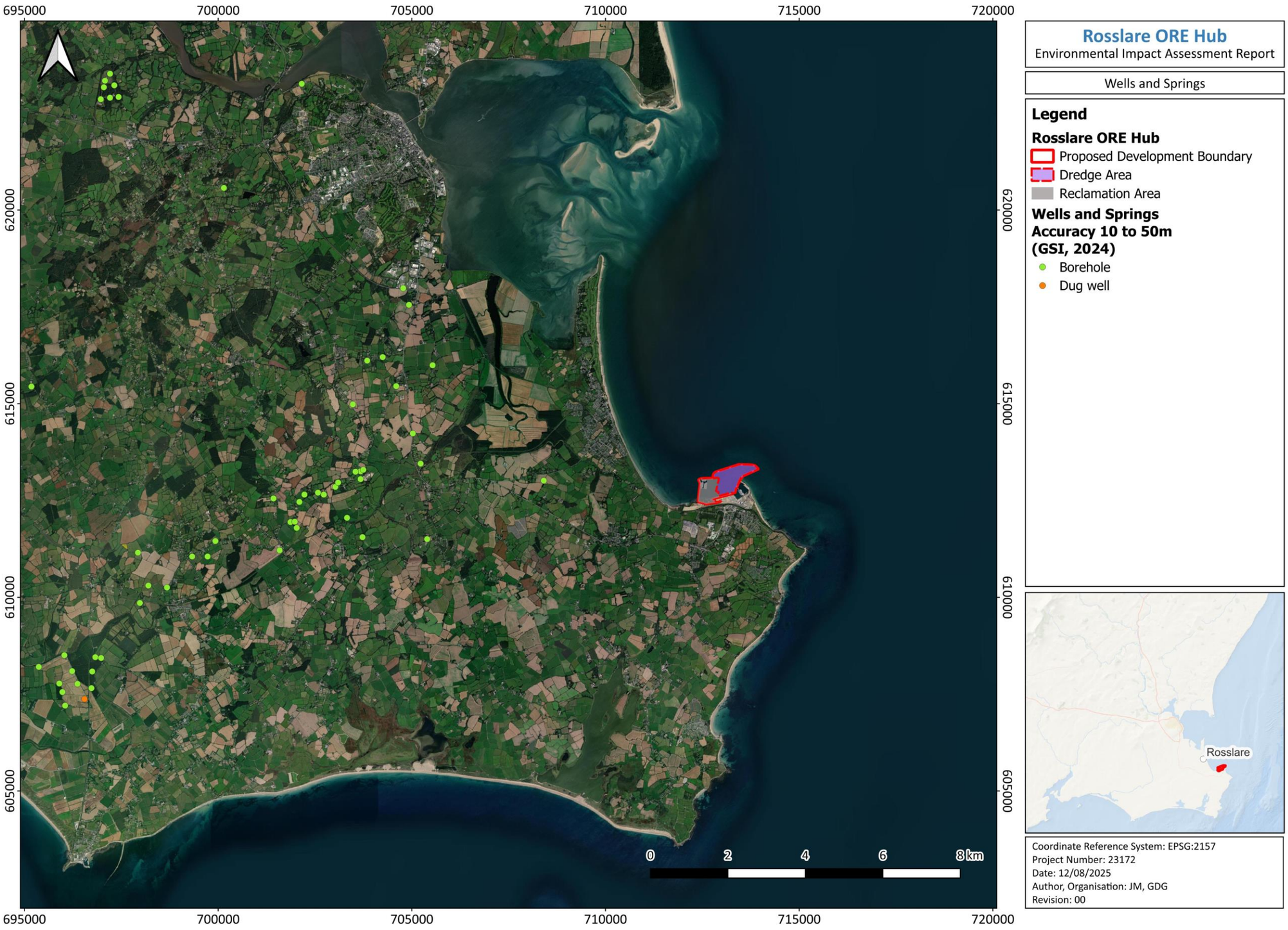

Figure 7.14: Groundwater Wells and Springs (GSI, 2024)

7.3.9 PROTECTED AREAS

A review of National Parks & Wildlife Service and EPA public map viewers was undertaken to assess potential hydrogeological connections to the following designated sites; Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs).

- There are seven SACs which are potentially hydraulically linked to the Proposed Development
    - The Milltown Rosslare_010 stream discharges to the Slane River Valley SAC approximately 5km to the northwest
    - The Long Bank SAC, Blackwater Blank SAC and Carnsore Point SAC are all located offshore within 10km of the Proposed Development reclamation area
    - The Lady's Island Lake SAC, Tacumshin Lake SAC and Ballyteige Burrow SAC are all hydraulically connected to the Bridgetown GWB. However, given the scale of the Bridgetown GWB, location of the SACs in the separate Ballyteigue-Bannow WFD subcatchment and distance to the Proposed Development, they are not considered further in this assessment.
- The Proposed Development is located within the recently proposed Seas off Wexford candidate SPA, which encompasses the majority of County Wexford's coastline.
- There are five further SPAs which are potentially hydraulically linked to the Proposed Development
    - The Wexford Harbour and Slobs SPA is located approximately 3.5km northwest of the Proposed Development and is directly hydraulically linked to the Milltown Rosslare_010
    - The Raven SPA is located approximately 9km north of the Proposed Development, downstream of the Wexford Harbour and Slobs SPA, at the outlet of the main WFD Catchment
    - The Lady's Island Lake SPA, Tacumshin Lake SPA and Ballyteige Burrow SPA are all hydraulically connected to the Bridgetown GWB. However, given the scale of the Bridgetown GWB, location in the separate Ballyteigue-Bannow WFD Catchment, and distance to the Proposed Development, they are not considered further in this assessment.
- There are no NHAs that are hydraulically connected to the Proposed Development
- There is one pNHA which is potentially hydraulically linked to the Proposed Development
    - The Wexford Slobs and Harbour pNHA, located approximately 2.5km west of the Proposed Development

The potential for the Proposed Development to adversely impact these above Natura 2000 sites has been considered within the relevant biodiversity chapters of this EIAR and the Screening for Appropriate Assessment and Natura Impact Statement which accompany the application for development permission. They are not assessed further within this chapter.

7.3.10 WASTE FACILITIES

EPA online mapping data (EPA, accessed 2025) shows that there are two records of waste facilities, approximately 1km south of the Proposed Development. These are on the same plot of land as a recycling plant operated by Bord Na Móna Recycling Ltd and Advances Environmental Solutions (Ireland) Ltd. The only active dump site in the area is 6km northeast of the Site, for the dumping of dredged material by Iarnród Éireann. There are no historic (closed) landfill sites near the proposed development. There are 29 chemical monitoring points across Rosslare Europort and current small boat harbour.

7.3.11 POTENTIAL CONTAMINATION RISKS

The Proposed Development is situated within an existing port facility, and a mixture of urban and commercial land uses are located nearby, with the potential for contamination sources that present a potential risk to the water environment. The current baseline accounts for potential diffuse runoff from these urban and commercial land uses, and the operational port activities.

To assess these risks, geochemical testing was also undertaken on soil leachate samples collected from within the Proposed Development Boundary. A full assessment of this data is given in EIAR Technical Appendix 7: Geotechnical Interpretative Report. Results have been screened against relevant inland water surface water screening values from the Water Framework Directive 2015, including Environmental Quality Standards (EQS) to assess risks to surface water. Although the Proposed Development is near a large surface water body that is likely to be a major discharge zone, for completeness the results were also compared with Drinking Water Standards to assess risks to the groundwater resource. The chemical analysis results indicate there are some potentially leachable levels of metal and organic contamination within the natural soils, although these are generally at low levels and a significant source of soil contamination has not been identified. Consequently, it is considered that the risk to the water environment from the soils within the Proposed Development Boundary is low.

Earthworks for the Proposed Development have the potential to affect the chemical quality of the water environment.

During the ground investigation no contamination with the potential to generate significant ground gas was observed, and no materials that would be expected to be a significant source of ground gas were recorded. Considering this, and the low sensitivity of the Proposed Development, the risk from ground gas is currently assessed as low. However, it is noted that this assessment is based on a review of available data and that no gas monitoring was undertaken during the 2024 ground investigation. Full details of the assessment can be found in EIAR Technical Appendix 7: Geotechnical Interpretative Report.

The chemical analysis screening indicates a low risk to human health and the water environment. The reuse of the materials will be within the Proposed Development and in the same general environment, so there is no increased risk to receptors.

7.3.12 Summary of Receptor Sensitivities

Table 7.6 shows the receptors outlined in this section and applies the criteria from section 7.2 to give each a sensitivity score from negligible to very high.

Table 7.6: Summary of Receptor Sensitivity

Receptor	Sensitivity	Discussion
Soils (excluding peat)	Negligible	Considering their low agricultural value and low geological importance, the sensitivity of the superficial soils is considered to be negligible.
Peat	Negligible	Peat is not present within the site, nor within a distance likely to be affected by the Proposed Development and will so not be considered further in this assessment.
Geology	Low	Both the onshore and offshore metamorphic rocks are of low geological value. There are no designated geological sites, economic geological resources or carbonate bedrock within the proposed development.
Hydrogeology	Low	The bedrock aquifer, both onshore and offshore is considered to be of low sensitivity, considering its likely poor productivity and probable impacts from saline water.
Receptors vulnerable to Contamination	Negligible	There are no sources of significant contamination within the site, and the investigation did not identify any contamination likely to present a risk to human health or the wider environment.

7.4 Assessment of Effects

7.4.1 Do-Nothing Scenario

Were the Proposed Development not constructed, there would be no change to the land use. The soils, geology and hydrogeology receptors would remain unchanged, and contamination impacts would be unlikely to alter. Current operation of the existing small boat harbour and Rosslare Harbour would continue undisturbed.

7.4.2 Primary Mitigation

The assessment of effects described below includes consideration of integrated measures built into the project design (i.e., primary mitigation), which are intended to prevent, reduce and where possible offset any significant adverse effects on the water environment.

Primary mitigation measures built into the project design which are relevant to soils, geology and hydrogeology receptors and contamination are:

- The drainage system for permeable stone-fill at the ORE Storage Area has been designed to ensure any potential contaminant that is released into the stone surface via percolating water is

expected to be collected within and conveyed to an oil/silt interceptor via a perimeter drain lined with free draining stone and a geotextile layer in the trench.

- The perimeter drainage will comprise a perforated pipe drain to capture percolating water draining horizontally from the ORE Storage Area.
- The underlying infilled dredged material will be sufficiently compacted and is not anticipated to allow any vertical migration of percolating groundwater.

7.4.3 Tertiary Mitigation

Tertiary mitigation measures are imposed as a result of legislative requirements and/or standard sectoral practices. As these measures are standardised and covered by other forms of legislation or controls, they are not presented in extensive detail in the EIAR (IEMA, 2024).

The following tertiary mitigation measures based on standard sectoral practices shall be undertaken to minimise the risk of impacting on soil or groundwater quality within the receiving environment:

7.4.3.1 General

- Sound design principles will be followed to adhere to relevant Irish guidelines and recognised international guidelines for best practice
- Temporary surface water management requirements will be identified in the Risk Assessment Method Statement (RAMS)
- Should drainage ditches or discharge of surface water from sumps be required during construction, a treatment system will be put in place (e.g., settlement skips etc) to allow additional settlement of suspended solids entrained within storm water before discharging
- A major incident response plan will be produced for the Proposed Development prior to construction
- Reuse and movement of significant volumes of materials should be assessed for the potential for ground gas generation, and this should be undertaken as part of the detailed earthworks design prior to construction
- Contamination will be considered as part of the earthworks specification to confirm the material suitability for re-use within the Site, including with respect to marine criteria.

7.4.3.2 Reclamation and Infill

- A method statement for the controlled dispersal of excess dredged materials will be set out prior to construction. This will ensure that any excavated materials or spoil are disposed of in a consistent manner at controlled sediment loading rates, to minimise over-sedimentation of the water column at any given time.
- Erosion and sediment controls during construction to prevent sediment pollution will be implemented (i.e., silt fencing or other suitable barriers will be used) at preferential surface flow paths to ensure sediment runoff does not discharge directly to waterbody receptors.

7.4.3.3 PILING

The following key relevant mitigation measures will be undertaken to ensure piling activities limit sedimentation and do not pollute the water column:

- A Piling Risk Assessment and Construction Piling Method Statement will be prepared prior to construction.
- Erosion and sediment controls during piling to prevent sediment pollution will be implemented, (i.e., silt fencing or other suitable barriers will be used at preferential surface flow paths to ensure sediment runoff does not discharge directly to waterbody receptors or drainage network.
- Vibration monitoring will be undertaken to assess and minimise the soil disturbance, and subsequently the volumes of sediment particles available to entrainment within runoff, in the immediate vicinity of piling locations.

7.4.3.4 DREDGING

A Dredging Management Plan will be prepared prior to construction.

In general, the following key relevant mitigation measures will apply to each dredging campaign in order to limit sedimentation of the water column:

- TSHD pumps will be switched off for up to 30 minutes 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 entrainment
- No over-spilling from the vessel will be permitted while the dredging activity is being conducted within Rosslare Harbour and the Proposed Development Boundary
- A maximum fill limit for the dredger hopper will be outlined to control suspended solids release in the Reclamation Area. This will include for entrained water/wet weight.
- A full record of loading and dumping trucks and a record of the material being dumped will be maintained for each trip
- Additional Accident Prevention Procedure and Emergency Response Procedure documentation will be put in place prior to dredging commencement and outlined within the Dredging Management Plan
- Dredging loading operations will be designed to minimise the disturbance and escape of material at the seabed and during removal through the water column. Loading operations are of relatively short duration and intermittent in nature and the works area is limited.

7.4.3.5 CONCRETE WORKS

The following precautionary measures shall be undertaken to minimise the risk of highly alkaline contaminants impacting on groundwater quality during berth construction and general concrete works on site.

- Use of wet concrete and cement will be carefully controlled so as to minimise the risk of any material entering the water, particularly from shuttered structures or the washing of equipment. A barrier between the dust source and waterbody receptor will be erected during the breaking of concrete (associated with existing structure demolition).
- Concrete use and production shall adhere to control measures outlined in Guidance for Pollution Prevention (GPP5): Works and maintenance in or near water (DEFRA, 2018). Any on-site concrete production during berth construction will have the following mitigation measures:
    - Bunded designated concrete washout area
    - Closed circuit wheel wash
    - Siting of concrete mixing facilities such that there is no production within a minimum of 10m from the water environment
    - Where concrete is emplaced under water or in tidal conditions, specific fast-setting mix will be mandated to limit segregation and any washout of fine material/alkaline components of cement.

7.4.3.6 OIL, FUEL AND CHEMICAL LEAKS/SPILLAGES

General effects on groundwater and soil may arise associated with works machinery, and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals. As such the potential for spillage or release of fuel oil and other dangerous substances will be mitigated through the following measures:

- The risk of water quality effects associated with works machinery, on-land operations, and leakages/spillages of fuels, oils, other chemicals and wastewater, will be controlled through good site management and the adherence to codes and practices outlined prior to construction
    - This includes management and auditing procedures such as toolbox talks, and adherence to permits, licences, certificates and development permissions
- All potentially polluting liquids will be sited on an impervious base and stored within containers and/or fully bunded areas which are secured
    - The control measures in GPP2: Above Ground Oil Storage Tanks (DEFRA, 2017) and GPP26 “Safe storage – drums and intermediate bulk containers” (DEFRA, 2021) shall be implemented to ensure safe storage of oils and chemicals
    - The base and bund walls must be impermeable to the material stored and of adequate capacity

- Safe operation of refuelling activities shall be in accordance with GPP 7 “Safe Storage – The safe operation of refuelling facilities” (DEFRA, 2011)
- Storage of hazardous material, oil and fuel containers will be distanced more 10m away from any watercourses
- A spillage control procedure and project specific Pollution Incident Response Plan will be in place prior to construction, and all staff should be trained on how to deal with spillages.
- Emergency spill kits will be readily available to protect against accidental release, leakage or spillage of potentially polluting substances
- All plant and equipment will be regularly inspected for any signs of damage leaks. A checklist must be present to make sure that the checks have been carried out.

Mitigation will also make use of the existing Rosslare Europort Oil Spill Response Plan (OSRP), (Rosslare Europort, 2018), which was prepared in 2018 in accordance with the template “expanded contents of local authority Oil/HNS contingency plan annex 3” as issued to the Harbour Master by IRCG in February 2012. The preparation of an OSRP is a mandatory requirement (as per the Sea Pollution (Amendment) Act, 1999). As such OSRPs are standard practices and are not implemented to prevent adverse effects on European Sites. Updates to the OSRP will be identified within the oCEMP and it is the responsibility of the Port Operation team to complete these ahead of construction and operation phases.

There will be no planned release of potentially harmful substances from vessels. Strict maritime regulations, normal vessel operating standards and precautions, compliant with all International Maritime Law and National Maritime Legislation, will ensure the risk of a release is low and no significant effects are predicted. In addition, all vessels used shall, as required by law, be MARPOL compliant and fully certified by the Maritime Safety Office (if required).

With the above tertiary mitigation measures in place, it is anticipated that any accidental spillage, sediments, particulate matter, chemicals, fuels during works with the potential to have direct or indirect effect on the site or surrounding area will be successfully prevented.

7.4.3.7 WASTE AND POLLUTION

A Waste Management Plan (WMP) will be prepared prior to construction and will detail the control of all site-generated construction waste and the storage and disposal of the waste.

In the event of any unexpected contamination, assessment will be undertaken to understand the nature and extent of the contamination. Any soils that subsequently need to be removed from site will be stored, removed, and treated/disposed of in accordance with guidance on managing contamination and waste management legislation. This will include the use of appropriate PPE, and measures to mitigate the generation of dust, such as damping down during dry periods. Classification and assessment of waste materials will be conducted as quickly as possible to ensure minimal exposure time to the receiving environment. Soils which are temporarily stored on-site will be stored appropriately, separate to clean materials, with covers and bunding as necessary.

The following tertiary mitigation measures based on standard sectoral practices are proposed to reduce or offset potential adverse effects on water quality due to accidental release or leakage of wastewater associated with temporary site facilities:

- Existing and proposed surface water drainage and discharge points will be mapped on a drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants.
- Containerised waste facilities will be utilised at temporary works areas to prevent accidental release, leakage or spillage of potentially polluting wastewater
- Emergency spill kits will be readily available on study area to protect against accidental release, leakage or spillage of potentially polluting substances

7.4.4 CONSTRUCTION PHASE IMPACTS

The construction programme is outlined in Chapter 6: Project Description. In total, it is expected that construction work will span up to 24 months from commencement to completion, with multiple tasks ongoing in parallel.

The construction activities associated with the Proposed Development which could give rise to potential impacts to soils, geology, hydrogeology and contamination receptors are summarised as follows:

- Temporary site establishment
- Dredging
- Land reclamation and infill
- Vehicle movements
- Piling of sheet and tubular piles
- Excavation and earthworks
- Installation of plastic porous band drains
- Site clearance, including removal of existing structures
- Road construction and upgrades
- Use of construction plant and equipment & storage of materials
- Quayside wall/berth construction
- Blasting
- Construction of rock armour revetment and placement of breakwater armour units
- Hard landscaping and surfacing.

7.4.4.1 Effects on Soil Environment

There are no significant topsoil or peat deposits within or in close proximity to the Proposed Development Boundary that are likely to be affected by the Proposed Development. There are likely to be effects on the superficial geological receptor, including through the permanent loss of resource through dredging and earthworks activities, foundation construction (including piling), blasting, and excavations onshore. The stability of excavations is also a consideration, both onshore and offshore. The onshore excavations are not expected to be significant in scale and will be undertaken safely in line with standard construction practices. Considering the granular nature of the offshore soils and their presence beneath water, there is also a low risk of offshore excavations creating steep underwater slopes on the seabed.

Considering the low sensitivity of the receptor, and the overall scale of the superficial geological unit, and low-medium magnitude of impacts, the significance of the effects is predicted to be **Not Significant**.

Consideration of impacts from the Proposed Development on ecological receptors associated with marine soils (i.e., benthic organisms) is detailed in Chapter 11: Benthic Ecology.

7.4.4.2 Effects on Geology

Impacts on geology receptors are possible through the permanent loss of resource through foundation construction (including piling), blasting, and excavations onshore. However, considering the low sensitivity and importance of the receptor, the overall scale of the geological unit and the negligible to low magnitude of the impacts, the significance of the effects is predicted to be **Not Significant**.

7.4.4.3 Effects on Hydrogeology

The following potential impacts to hydrogeology receptors have been identified:

- Accidental release, leakage or spillages of hydrocarbons, chemicals, fuel or oils from storage tanks or construction plant during construction, causing pollution of groundwater
- Localised increase in alkalinity from spillages of concrete or unset cement causing pollution of groundwater, the severity of which may be increased during times of heavy or prolonged rainfall
- Dewatering and alteration of the groundwater regime (bedrock aquifer) including potential disruption to groundwater abstractions caused by the Proposed Development, especially from excavations and piled foundations
- Potential contamination of water environment by leachable contamination from imported and site-won fill materials

The bedrock aquifer, both onshore and offshore, is of low sensitivity, considering its likely poor productivity and probable impacts from saline water, including of any groundwater beneath the narrow onshore section of the Proposed Development. Dredging and excavations associated with the construction phase will not interact with the bedrock aquifer and will be founded entirely within the superficial marine sediments. There will be no deep excavations of the bedrock aquifer, and no

dewatering of this aquifer will occur which would impact groundwater levels within the marine environment.

Potential for effects on groundwater quality arising from contaminants percolating into sensitive waterbodies will be mitigated by integrated measures built into the project design.

Considering the low sensitivity and importance of the receptor, the overall scale of the aquifer and the low magnitude of impacts, the significance of the effects is predicted to be **Not Significant**.

7.4.4.4 Effects associated with Contamination

As outlined above, the risk of contamination at the site from the Proposed Development is low and therefore related impacts on receptors are considered unlikely.

There is the potential for imported soils to be contaminated, however, as outlined in Chapter 6: Project Description, the only materials to be brought onto site are rock fill and general construction materials, which are not expected to present a contamination risk. In addition, there is a low contamination risk from use of site-won materials during infilling of the reclamation area, such as marine deposits, which display no evidence of contamination above the levels permitted for dumping at sea.

Considering the negligible magnitude of impacts predicted, the significance of the effects is predicted to be **Not Significant**.

7.4.5 Operational Phase Impacts

The operational activities associated with the Proposed Development which could give rise to potential impacts on soils, geology, hydrogeology and contamination receptors are summarised as follows:

- Vehicle movement, ongoing operation of maritime landside works, and storage of materials which may cause pollution from accidental fuel or chemical compound leakages.
- Accidental release or leakage of other liquids on-site such as wastewater associated with site facilities, wastewater treatment and foul drainage system.

7.4.5.1 Effects on Hydrogeology

The following potential impacts to hydrogeology receptors have been identified:

- Accidental release, leakage or spillages of hydrocarbons, chemicals, fuel or oils from storage tanks or construction plant during operation, causing pollution of groundwater
- Localised increase in alkalinity from spillages of concrete or unset cement causing pollution of groundwater, the severity of which may be increased during times of heavy or prolonged rainfall
- Dewatering and alteration of the groundwater regime (bedrock aquifer) including potential disruption to groundwater abstractions caused by the Proposed Development, especially from increased hardstanding cover

- Potential contamination of water environment by leachable contamination from imported and site-won fill materials
- Pollution events, including surface runoff from the new infrastructure, causing pollution of groundwater.

The bedrock aquifer, both onshore and offshore, is of low sensitivity, considering its likely poor productivity and probable impacts from saline water, including of any groundwater beneath the narrow onshore section of the Proposed Development. In general, long-term impacts are unlikely due to the heavy tidal influence, and groundwater here is unlikely ever to be used as a resource due to the industrial use and low quality due to saline intrusion.

Potential for effects on groundwater quality arising from contaminants percolating into sensitive waterbodies will be mitigated by integrated measures built into the project design.

Considering the low sensitivity and importance of the receptor, the overall scale of the aquifer and the low magnitude of impacts, the significance of the effects is predicted to be **Not Significant**.

7.4.5.2 Effects associated with Contamination

As outlined above, the risk of contamination at the site from the Proposed Development is low and therefore related impacts on receptors are considered unlikely.

There is the potential for imported soils to be contaminated, however, as outlined in Chapter 6: Project Description, the only materials to be brought onto site are rock fill and general construction materials, which are not expected to present a contamination risk. In addition, there is a low contamination risk from use of site-won materials during infilling of the reclamation area, such as marine deposits, which display no evidence of contamination above the levels permitted for dumping at sea.

Considering the negligible magnitude of impacts predicted, the significance of the effects is predicted to be **Not Significant**.

7.4.6 Cumulative Effects and Other Interactions

7.4.6.1 Other Projects

Potential cumulative effects may arise from the Proposed Development when combined with other existing and/or planned projects where the zones of influence overlap. In accordance with the EPA Guidelines (2022), existing and/or planned projects with the potential for cumulative impacts have been identified. These include projects within the Rosslare Europort Masterplan area, those located outside but proximal to the Proposed Development, and those offshore projects located a greater distance from the Proposed Development entirely. A summary table of all potentially relevant projects and plans is provided in Chapter 25: Interactions.

In the context of soils, geology, hydrogeology, and contamination the following developments may give rise to cumulative effects in conjunction with the Proposed Development.

- Within Rosslare Europort:

- **20211672:** Permission for an extension to the existing Berth 3, the replacement of the existing linkspan at Berth 3 with a new linkspan and support structures, and the demolition and removal of the existing Berth 4 linkspan within Rosslare Europort.
- **20211322:** Permission for the construction of Rosslare Europort Terminal 7, a new Border Control Post (BCP) at Rosslare Europort. The development will consist of:
  - Demolition of existing structures
  - Construction of Rosslare Europort Terminal 7, a new Border Control Post (BCP) with a total gross floor area for development of 10,645m^2 on a site with an area of 44,895m^2

- Nearby onshore projects outside of the Rosslare Europort:
  - **314015**: Development of the N25 Rosslare Europort Access Road. The proposed scheme will improve the existing L3068 Ballygeary Link Road to national standards and to meet the future demand for port traffic. A new section of road then extends from the western end of the existing L3068 Ballygeary Link Road at its junction with the existing L7021 Churchtown Road. The new section of road then turns to the north, crossing over the existing Dublin to Rosslare Harbour rail line before continuing east to connect into Rosslare Europort, via a new roundabout proposed as part of the Masterplan Phase 1 development of Rosslare Europort.
- Offshore projects of a greater distance outside the Rosslare Europort development area:
  - Dumping at sea permit **S0016-02**: Permit for the loading and dumping at sea of dredged material, arising from maintenance dredging at Rosslare Europort and Ballygeary Harbour, Co. Wexford. The proposed activities involve the loading and dumping of 478,500 tonnes of dredged material from 2023 to 2027. The established dumping site is located approximately 6km northeast of the port.

7.4.6.2 CUMULATIVE EFFECTS ASSESSMENT

There may be minor cumulative effects on the groundwater due to excavations and hardstanding cover associated with future developments, although these are localised and not considered to be significant considering the size and scale of the catchment.

Considering the generally low sensitivity of the superficial and solid geology resource, it is not predicted that there would be any significant construction or operational cumulative effects from identified future developments.

Considering the apparent lack of the soil contamination within the site, there are unlikely to be any significant cumulative effects associated with contamination on either human receptors or the wider environment (including water environment receptors). Additionally, the proposed primary mitigations for contamination that are part of the project design will reduce the overall impact of contamination on receptors.

In summary, the significance of cumulative effects of the Proposed Development and nearby projects and plans on soils, geology and hydrogeology receptors, or related to contamination is predicted to be **Not Significant**.

7.4.6.3 TRANSBOUNDARY EFFECTS

No transboundary effects are likely to occur with respect to geology, soils, hydrogeology, and in relation to contamination, as a result of the Proposed Development, owing to the localised Zone of Influence of all impacts considered.

7.4.7 SUMMARY OF EFFECTS

The effects of the construction and operation of the Proposed Development on the receiving geological and hydrogeological environment are discussed in section 7.4.1 to section 7.4.5. Each effect has been assigned a ranking of Importance and Magnitude (based on the respective receptor sensitivity and criteria for assessing magnitude given in Table 7.3 and Table 7.4). Significance has been assessed using the methodology described in section 7.2, whereby the significance of the effect is determined by comparing the character of the predicted effect to the sensitivity of the receiving environment, as outlined in Figure 7.1.

Table 7.7: Summary of effects

Receptor	Potential Effects (Construction and Operation Phases)	Sensitivity	Magnitude	Significance
Offshore Soils	Potential adverse effects (loss of resource) to the superficial seabed sediment, due to dredging and removal	Negligible	Medium Adverse	Not Significant
	Potential adverse effects (loss of resource) to the superficial seabed sediment, due to accidental fuel or chemical compound leakages from vessels	Negligible	Low Adverse	Imperceptible
	Potential to create unstable seabed structure giving rise to dangerous sudden underwater movement	Negligible	Low Adverse	Imperceptible
Onshore Soils	Potential adverse effect (loss of resource) to superficial onshore soils, as a result of excavation	Negligible	Low Adverse	Imperceptible
	Potential adverse effects to stability of superficial soil surfaces and slopes due to excavation of site soils	Negligible	Medium Adverse	Not Significant
Geology (onshore and offshore)	Potential loss of the solid geological resource beneath permanent excavations for ORE hub and associated road infrastructure	Low	Negligible	Imperceptible
	Potential damage to surrounding geological resource to areas of piling and blasting	Low	Low Adverse	Not Significant
	Potential adverse effects on groundwater supply through direct contamination through piles	Low	Low Adverse	Not Significant

Receptor	Potential Effects (Construction and Operation Phases)	Sensitivity	Magnitude	Significance
Hydrogeology (onshore and offshore)	Potential adverse effects on the groundwater environment due to accidental fuel or chemical compound leakages from construction plant, equipment & storage of materials polluting waterbody.	Low	Low Adverse	Not Significant
	Potential adverse effects on the groundwater environment due to accidental release or leakage of other liquids on-site such as wastewater associated with temporary site facilities.	Low	Low Adverse	Not Significant
	Potential adverse effects on the groundwater environment through release of highly alkaline contaminants from concrete and cement during construction of buildings and quayside walls.	Low	Low Adverse	Not Significant
	Dewatering and alteration of the groundwater regime (bedrock aquifer) including potential disruption to groundwater abstractions caused by the Proposed Development, especially from excavations and piled foundations or from increased hardstanding cover.	Low	Negligible	Imperceptible
	Pollution events, including surface runoff from the new infrastructure, causing impacts on groundwater.	Low	Low Adverse	Not Significant
	Potential contamination of the water environment by leachable contamination from imported and site-won fill materials.	Low	Low Adverse	Not Significant
Contamination	Potential impacts on human health from site soils (on construction staff and future site users)	Negligible	Negligible	Imperceptible
	Potential impacts on human health from imported and site-won contaminated soils.	Negligible	Negligible	Imperceptible
	Potential wider environmental impacts from contamination associated with incorrect disposal of site soils.	Negligible	Negligible	Imperceptible
	Potential for contamination present in soils to have increased mobility and cause further impact, due to construction activities, on both human health and the wider environment	Negligible	Negligible	Imperceptible

7.5 Mitigation Measures for Soils, Geology, Hydrogeology and Contamination

No 'Significant' effects have been identified, and consequently further mitigation measures (i.e., secondary mitigation) are not considered necessary.

7.6 Residual Effects

There are no significant residual effects from the Proposed Development on geology, soils, hydrogeology or associated with contamination.

7.7 Monitoring

Specific monitoring plans to ensure primary and tertiary mitigation measures outlined above are successfully implemented during construction will be prepared prior to construction and will include the following:

- The contractor's own Environmental Management System
- All project activity
- Roles and responsibilities for those undertaking audits and monitoring
- Frequency of inspection activities (i.e. daily, weekly, monthly)
- Process to deal with corrective actions/non-compliance
- Reporting procedures (including non-compliance)

The operational phase will be subject to Rosslare Europort's Local Port Services Plan (LPS). The LPS will be updated to include all new infrastructure within the Proposed Development and is supported by a comprehensive suite of Standard Operating Procedures (SOPs) providing mitigation of all environmental aspects identified and mechanisms to ensure effective implementation.

7.8 Summary

This chapter of the EIAR has assessed the potential environmental impacts on Soils, Geology, Hydrogeology and Contamination from the construction and operation phases of the Proposed Development, the assessment is summarised in Table 7.8.

Table 7.8: Assessment Summary

Potential Effect	Construction/ Operation	Beneficial/ Adverse/ Neutral	Extent (Site/Local/ National/ Transboundary)	Short term/ Long term	Direct/ Indirect	Permanent/ Temporary	Reversible/ Irreversible	Significance of Effect following primary and tertiary mitigation (according to defined criteria)	Proposed secondary mitigation	Residual Effects (according to defined criteria)
Potential adverse effects (loss of resource) to the superficial seabed sediment, due to dredging and removal	Construction	Adverse	Site	Long term	Direct	Permanent	Irreversible	Not Significant	n/a	n/a
Potential adverse effects (loss of resource) to the superficial seabed sediment, due to accidental fuel or chemical compound leakages from vessels	Construction & Operation	Adverse	Local	Short term	Direct	Temporary	Reversible	Imperceptible	n/a	n/a
Potential to create unstable seabed structure giving rise to dangerous sudden underwater movement	Construction	Adverse	Local	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential adverse effect (loss of resource) to superficial onshore soils, as a result of excavation	Construction	Adverse	Site	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential adverse effects to stability of superficial soil surfaces and slopes due to excavation of site soils	Construction & Operation	Adverse	Local	Long term	Direct	Permanent	Irreversible	Not Significant	n/a	n/a
Potential loss of the solid geological resource beneath permanent excavations for ORE hub and associated road infrastructure	Operation	Adverse	Site	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential damage to surrounding geological resource to areas of piling and blasting	Construction	Adverse	Local	Long term	Direct	Permanent	Irreversible	Not Significant	n/a	n/a
Potential adverse effects on groundwater supply through direct contamination through piles	Operation	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a
Potential adverse effects on the groundwater environment due to accidental fuel or chemical compound leakages from construction plant, equipment & storage of materials polluting waterbody.	Construction	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a
Potential adverse effects on the groundwater environment due to accidental release or leakage of other liquids on-site such as wastewater associated with temporary site facilities.	Construction	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a
Potential adverse effects on the groundwater environment through release of highly alkaline contaminants from concrete and cement during construction of buildings and quayside walls.	Construction	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a
Dewatering and alteration of the groundwater regime (bedrock aquifer) including potential disruption to groundwater abstractions caused by the Proposed Development, especially from excavations and piled foundations or from increased hardstanding cover.	Operation	Adverse	Local	Long term	Direct	Temporary	Reversible	Imperceptible	n/a	n/a
Pollution events, including surface runoff from the new infrastructure, causing impacts on groundwater.	Operation	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a

Potential Effect	Construction/ Operation	Beneficial/ Adverse/ Neutral	Extent (Site/Local/ National/ Transboundary)	Short term/ Long term	Direct/ Indirect	Permanent/ Temporary	Reversible/ Irreversible	Significance of Effect following primary and tertiary mitigation (according to defined criteria)	Proposed secondary mitigation	Residual Effects (according to defined criteria)
Potential contamination of the water environment by leachable contamination from imported and site-won fill materials.	Operation	Adverse	Local	Short term	Direct	Temporary	Reversible	Not Significant	n/a	n/a
Potential impacts on human health from site soils (on construction staff and future site users)	Construction & Operation	Adverse	Local	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential impacts on human health from imported and site-won contaminated soils.	Construction & Operation	Adverse	Local	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential wider environmental impacts from contamination associated with incorrect disposal of site soils.	Construction & Operation	Adverse	Local	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a
Potential for contamination present in soils to have increased mobility and cause further impact, due to construction activities, on both human health and the wider environment	Construction & Operation	Adverse	Local	Long term	Direct	Permanent	Irreversible	Imperceptible	n/a	n/a

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