MWP

REMEDIAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT (rEIAR)

Ros an Mhíl Deep Water Quay

Chapter 6: Land and Soils

Department of Agriculture, Food and the Marine

October 2025

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6. Land and Soils

6.1 Introduction

This chapter of the remedial Environmental Impact Assessment Report (rEIAR) considers the potential impacts and effects on the land and soils environment resulting from the deep water quay development works that were completed between January 2023 and May 2024. The works undertaken prior to the expiry of the 2018 planning permission are included to facilitate the assessment of cumulative effects. A full description of the development and the associated project elements are provided in Volume II, Chapter 2 Project Description of this rEIAR. The assessment comprises:

- A review of the receiving environment prior to commencement of works in 2023;
- Identification and characterisation of likely effects;
- Evaluation of significance of effects; and
- Review of mitigation measures for completed works

This assessment draws considerably on the baseline assessment and EIS undertaken for the Ros an Mhíl Deep Water Quay in 2017 as part of the original planning application.

6.2 Methodology

6.2.1 Desktop Review

The soils and geology assessment methodology included a desk-based study, a site visit, a qualitative assessment of the potential effects and was predominantly based on previous surveys and the EIS carried out by Mott MacDonald in 2017. These key materials included:

- Fugro Limited (2001), Ground Investigation Interpretative Report
- Hydrographic Surveys Ltd (2016), Geophysical Survey Report

6.2.2 Assessment Criteria

The assessment criteria for geology, land and soils are based on the following guidelines:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- European Union (2017): Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU);
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2005): Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018);

- National Roads Authority (2009): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

6.2.3 Site Investigation Methodology

A geotechnical site investigation (SI) was undertaken by Fugro Limited between July and August 2001 when planning permission for the deep water quay was first sought.

The objective of the SI was to determine the ground conditions and obtain geotechnical data for the Cashla harbour area including the location of the deep water quay.

The site investigation comprised 81 no. boreholes using cable percussive boring techniques. Samples of soil were taken with in-situ testing carried out where applicable in the cable percussive section of each borehole. Rock core samples were generally obtained in the rotary drill holes, with in situ testing being carried out in a few instances where considered necessary. The location of these boreholes is shown in **Figure 6-1.**

All fieldwork was directed on site by an Engineering Geologist from Fugro. The work was carried out on a 24 hour working day, with two 12-hour shifts worked daily, seven days a week. All samples obtained were logged by the Fugro shift engineer on site. All drilling was carried out from the jack-up platform Skate 1.

Cable percussive boring techniques were used in all of the boreholes to advance casing of 150mm diameter through soil and superficial material until no further progress was possible. Rotary coring was employed for drilling into bedrock. A Geobor-S triple tube wireline system with seawater flush was used to obtain 102mm nominal diameter core samples in rock. Samples were recovered and in situ tests performed.

Bulk disturbed samples were taken at regular intervals during cable percussive boring. The bulk samples were collected with a drill tube and non-return valve assembly. There was potential for some loss of fines in the samples, however undisturbed samples were also obtained to confirm laboratory test results.

The samples were described and labelled on site before being transferred to the laboratory. Small disturbed samples were also taken during boring for laboratory tests and as an aid to the production of borehole logs.

Standard Penetration Tests (SPTs) were carried out where appropriate in the boreholes to assess the relative density of the material encountered. The test procedures and equipment used were in accordance with British Standard 1337:1990. The material recovered in the split spoon was sealed in a polythene bag and retained as a disturbed sample. The penetration resistance ('N' value) obtained was recorded on the borehole logs.

A transparent, semi-rigid plastic pipe (Coreline) acting as a third inner tube was provided for nearly all core runs, and most core samples were recovered within the Coreline tube. On completion of each core run, the core samples were removed from the barrel, retained within the Coreline which was then capped, sealed, labelled and transferred to a wooden corebox.

Core was logged in detail and photographed on site. Selected samples were transported to Fugro's laboratory in Glasgow for geotechnical testing. Contaminant testing was carried out by Robertson Laboratories in Wales under subcontract to Fugro.

All samples obtained from the boreholes were logged in accordance with BS5930:1999 Code of Practice for Ground Investigations on site by the Fugro Engineering Geologist. Rock core from each of the boreholes was removed from the liner on site, photographed and logged in detail. The details were entered into the daily site reports and later incorporated into the borehole logs.

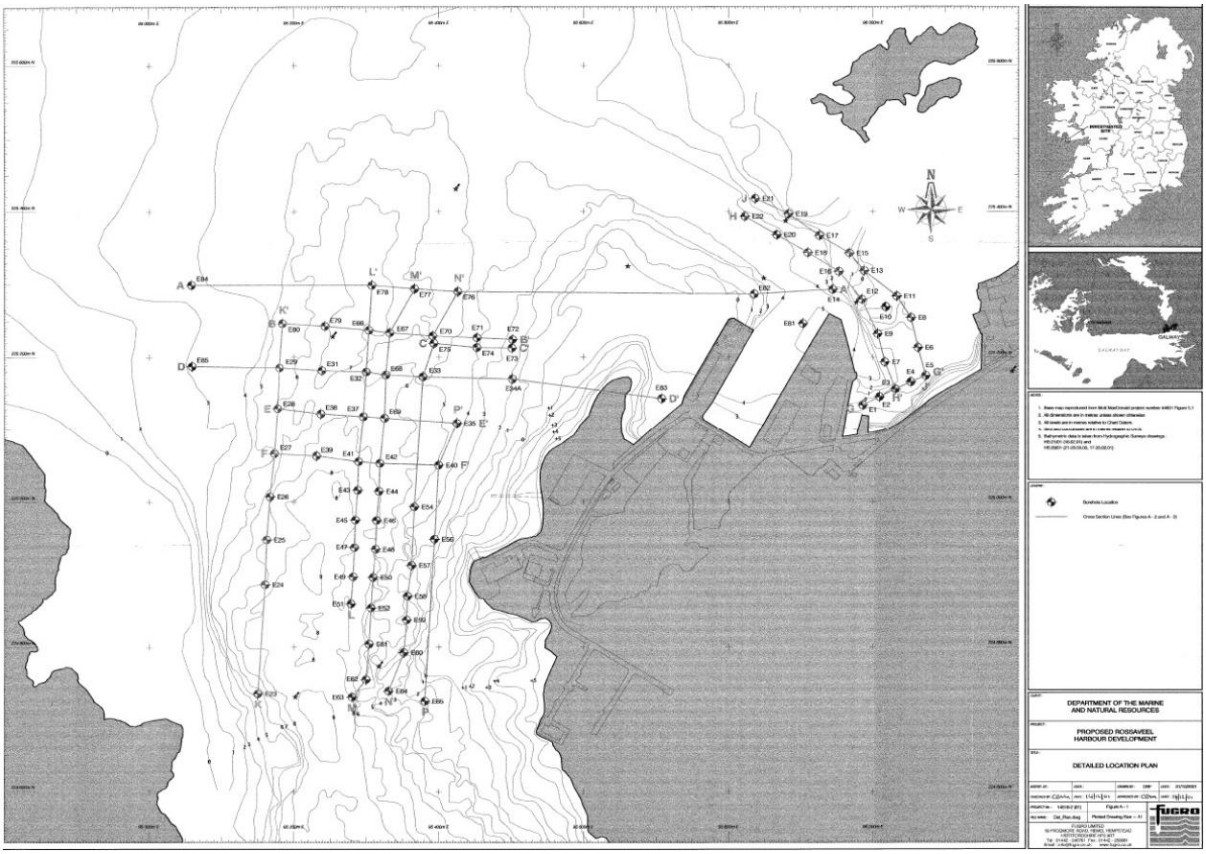

Figure 6-1: Site Investigation Boreholes

The laboratory tests were performed in accordance with BS1377 and ISRM Suggested Methods. The following tests were carried out:

- Moisture Content;
- Plasticity Index;
- Bulk Density;
- Hydrometer and Sieve Analysis of Grain Size;
- Particle Density;
- Unconsolidated Undrained Triaxial Compression;
- Lab Vane Shear Test;
- Shear Box Test;
- One-Dimensional Consolidation;
- 2.5kg Compaction;
- Organic Matter Content;
- Sulphate Content / pH value;
- Chloride Content;
- Heavy Metal Analysis;
- Polychlorinated Biphenyls (PCB) Analysis (Pesticide);
- Dibutyltin (DBT) and Tributyltin (TBT) Analysis (Marine Paint Antifoulant);
- Uniaxial Compressive Strength Tests (Rock);
- Point Load Tests (Rock); and
- Brazilian Indirect Tensile Strength (Rock).

Further details on these works are provided in the Ground Investigation Interpretative Report, which is contained in **Volume III, Appendix 6A** of this rEIAR.

6.2.4 Geophysical Survey

A geophysical survey consisting of a sub bottom profiling and side scan sonar surveying was undertaken by Hydrographic Surveys Ltd at Ros an Mhíl Harbour main channel (see **Volume III, Appendix 6B** of this rEIAR).

Fieldwork was undertaken on the 19th and 20th January 2016 across the survey area as indicated on **Figure 6-2**. The survey objectives were to:

- Define the top of rock across the survey area;
- Identify any obstructions on the surface; and
- Calculate volumes of overburden and bedrock requiring removal for the development.

The geophysical survey was a non-invasive process and involved the interpretation of readings made from the ground surface through the water column. A Knudsen Pinger Sub Bottom Profiler operating at a frequency of 3.5kHz was utilised during the survey. The instrument was mounted to the side of the survey vessel. A time varying gain was applied to the data during acquisition to maximise the return signal. Various frequency filters were used to improve the signal to noise ratio.

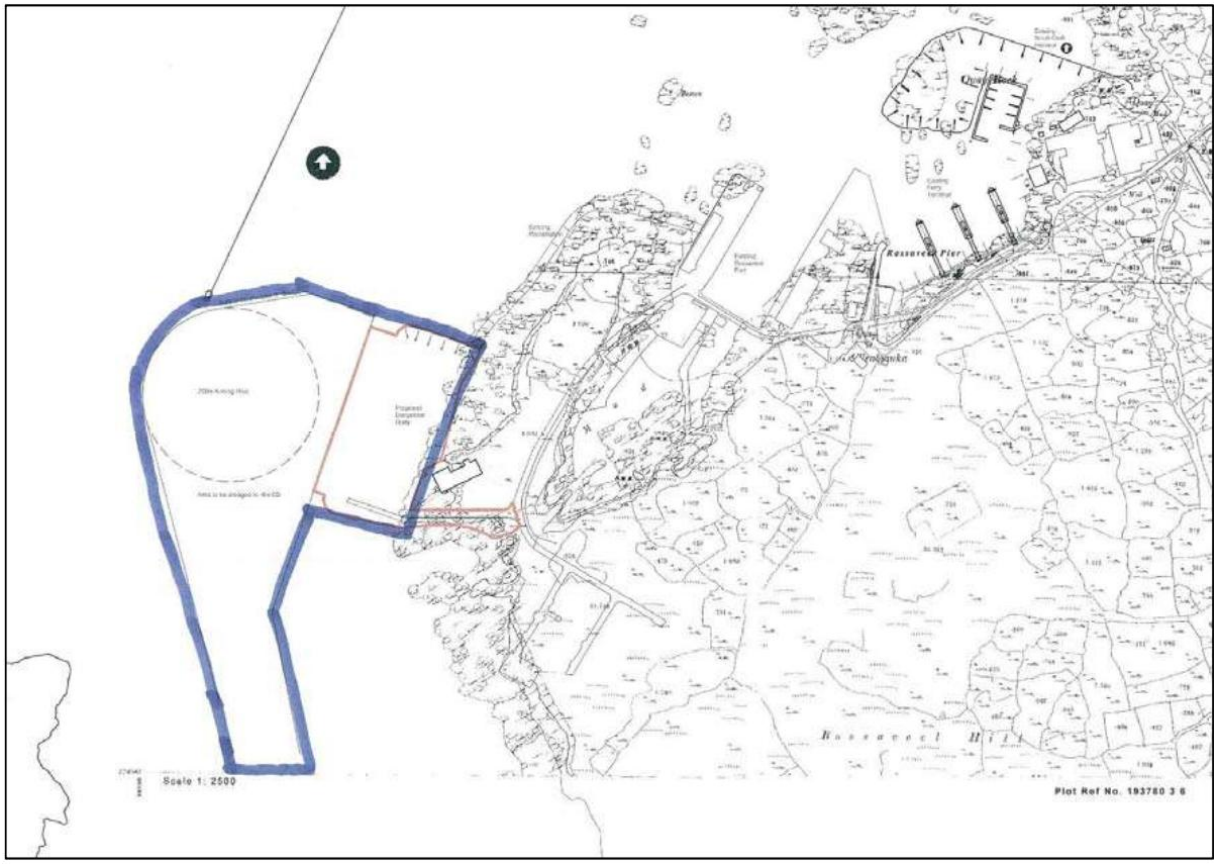

Figure 6-2: Extents of Geophysical Survey Area shown as Blue Line

6.3 Site Location

Ros an Mhíl Harbour is located on the north-east shore of Cashla Bay near the village of Ros an Mhíl in Connemara, approximately 40 kilometres to the west of Galway city, within the functional area of Galway County Council.

The location of Ros an Mhíl in a geographical context is shown on **Figure 6-3.** Ros an Mhíl village is located approximately 1km north east of the harbour. A number of residential dwellings, a local shop, a school, and a church are located within the village. Throughout the surrounding area there are a few commercial and fisheries businesses and industries making use of the harbour facilities. These include fish processing, net repairs, boat repairs and diesel and oil supply companies. These industries are dependent on the continued operation of Ros an Mhíl Harbour.

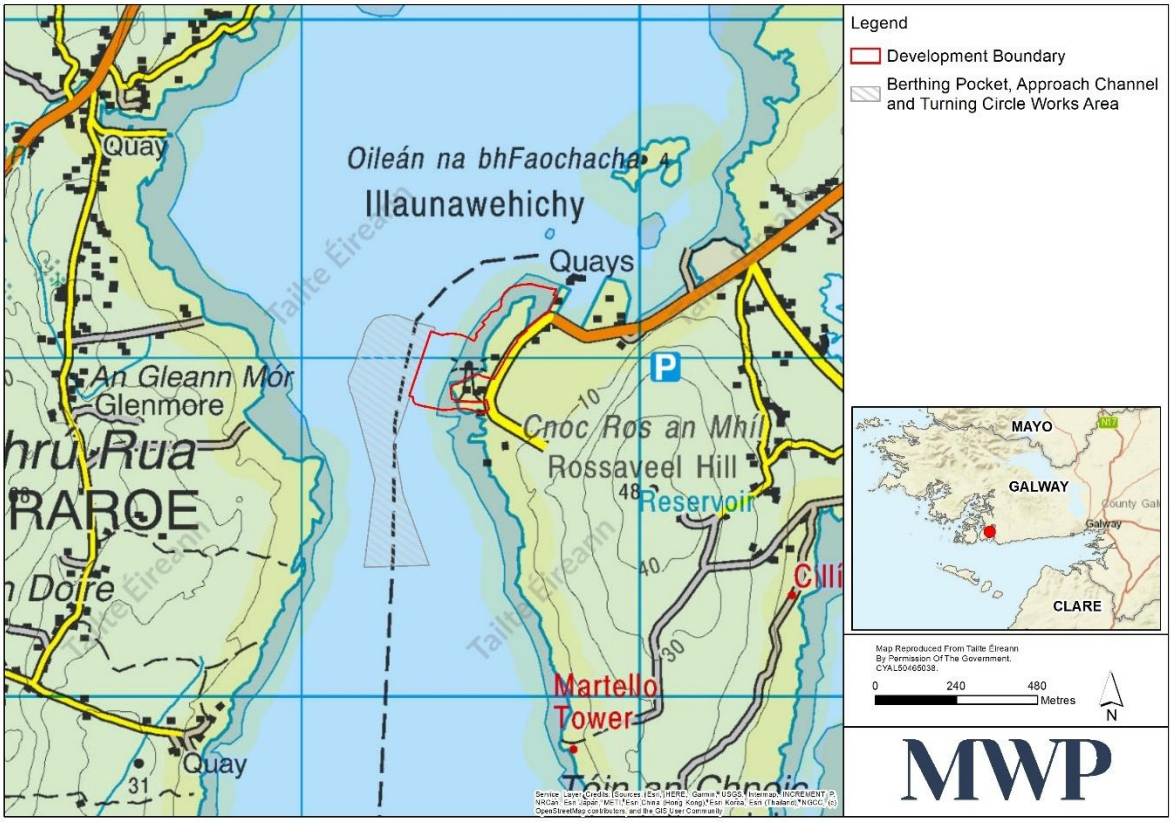

Figure 6-3: Site Location

Ros an Mhíl is connected to Galway and the national primary road network via the regional R336 and R372 roads.

Ros an Mhíl Harbour is primarily a fishing port and serves the Irish and foreign fishing fleet that operates off the coast of Galway. It lies between the major fishing ports of Killybegs to the north and Dingle and Castletownbere to the south. It can accommodate vessels up to approximately 5m draught.

The inner harbour is positioned on the north-east shore of upper Cashla Bay and is well sheltered. The existing harbour currently comprises two piers, known as Piers 1 and 2, along with a dedicated passenger ferry terminal and a small craft harbour. Pier 2 is the more recent development of the two piers. The disposition of these piers is such that they create an approximately rectangular shaped basin at the centre of the harbour. The existing partially completed deep water quay harbour layout is shown in **Figure 6-4.**

Údarás na Gaeltachta have invested in basic infrastructure in the harbour area. To date the investment has taken the form of two commercial buildings; service roads, wastewater treatment plant and a slipway. The commercial units are leased to private fisheries tenants. Other employers operating in the Harbour area include Bord Iascaigh Mhara (BIM) who operate an Ice Plant; and Iasc Mara Teoranta who operate a pelagic fish (mainly mackerel and herring) processing facility.

Figure 6-4: Map of existing incomplete Ros an Mhíl Deep Water Quay Facilities

6.4 Baseline Environment

A desk-based study was undertaken to establish the baseline soils, geology and hydrogeology information within the immediate environs of the development works in accordance with the *NRA's Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (2008).

The EPA and Geological Survey of Ireland (GSI) database and mapping portals were also reviewed to determine the context of the development site in terms of geology and soils, hydrogeology, geohazards and radon. The following publicly available information was reviewed and referenced on the 25th April 2017 and again in April 2025 from the GSI website https://www.gsi.ie/Mapping.htm. The most recent mapping from these datasets is reproduced in **Figures 6-5** to **6-14.**

- National Draft Generalised Bedrock Map
- Soils and Subsoils Maps
- Aquifer Maps
- Interim Vulnerability Map

6.4.1 Land Use

Google maps was used to determine the land use in 2022/2023 prior to the commencement of development works. The land which was reclaimed during the previous works is shown as sea from an image of the

development site taken in April 2022 (see Plate 6.1). The development site was located along the shoreline. The adjacent inland area is relatively flat and there are industrial and commercial units, and a car park present.

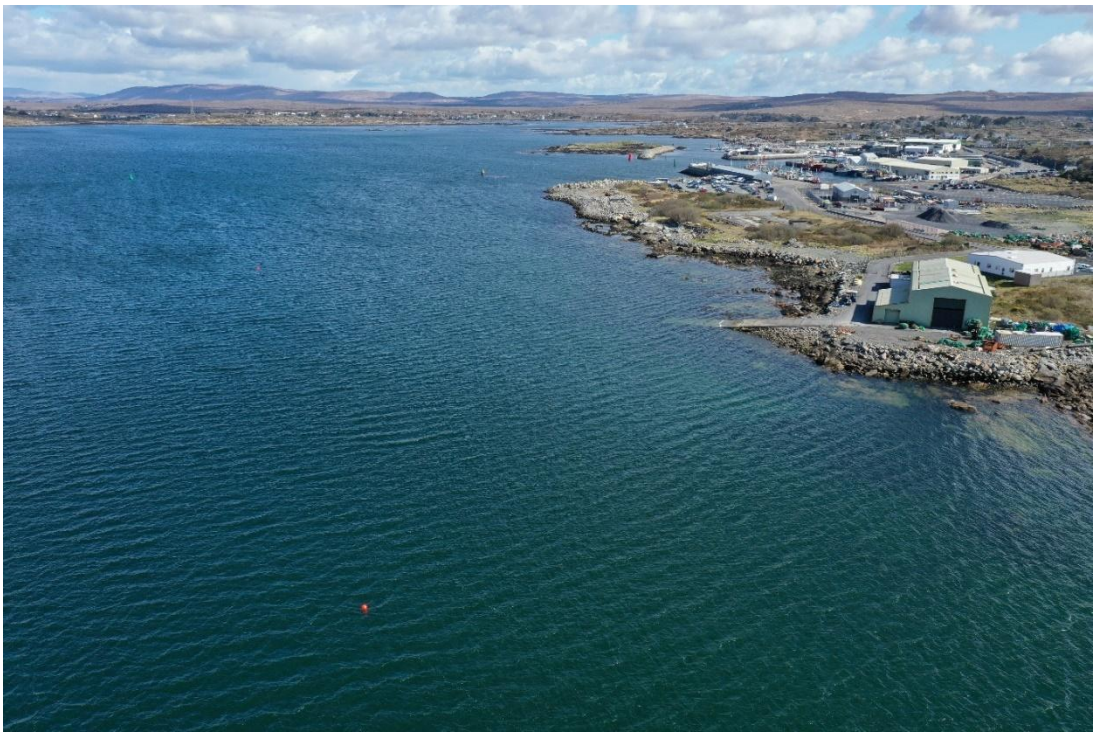

Plate 6.1: Aerial view of development site in April 2022 (prior to any works)

6.4.2 Regional & Quaternary Geology

The lithology of county Galway is mainly composed of Marine shelf facies; Limestone & calcareous shale (see category 64 in Figure 6-7), whose Geology Age is considered to be Palaeozoic, Carboniferous, Mississippian and Marine basinal facies (Tobercolleen & Lucan Fms - 'Calp'); Dark-grey argillaceous & cherty limestone & shale whose Geology age is Palaeozoic, Carboniferous, Mississippian (see category 66 in Figure 6-7). The development site is mainly composed of Granite, granodiorite whose Geology Age is (Silurian-Devonian) (see category 8 in Figure 6-7).

The quaternary sediments present at the development site are Rck, Bedrock outcrop or subcrop. TGr, Till derived from granites are present to the east of the development site.

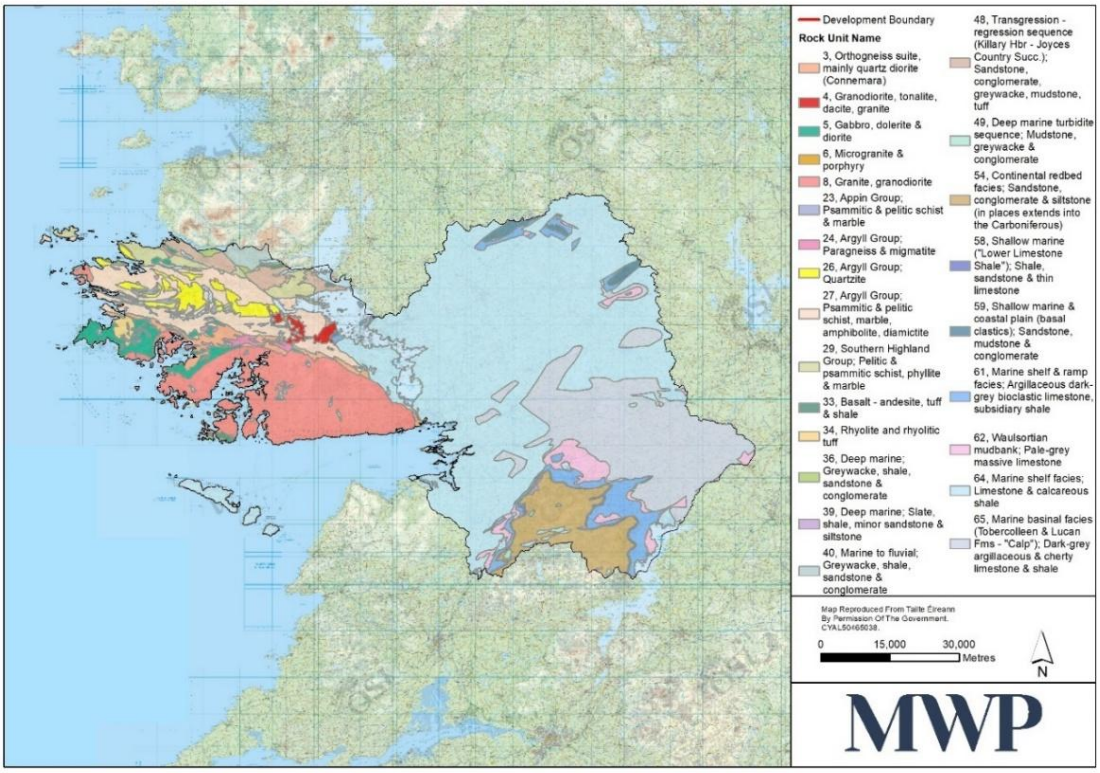

Figure 6-5: Regional Geology

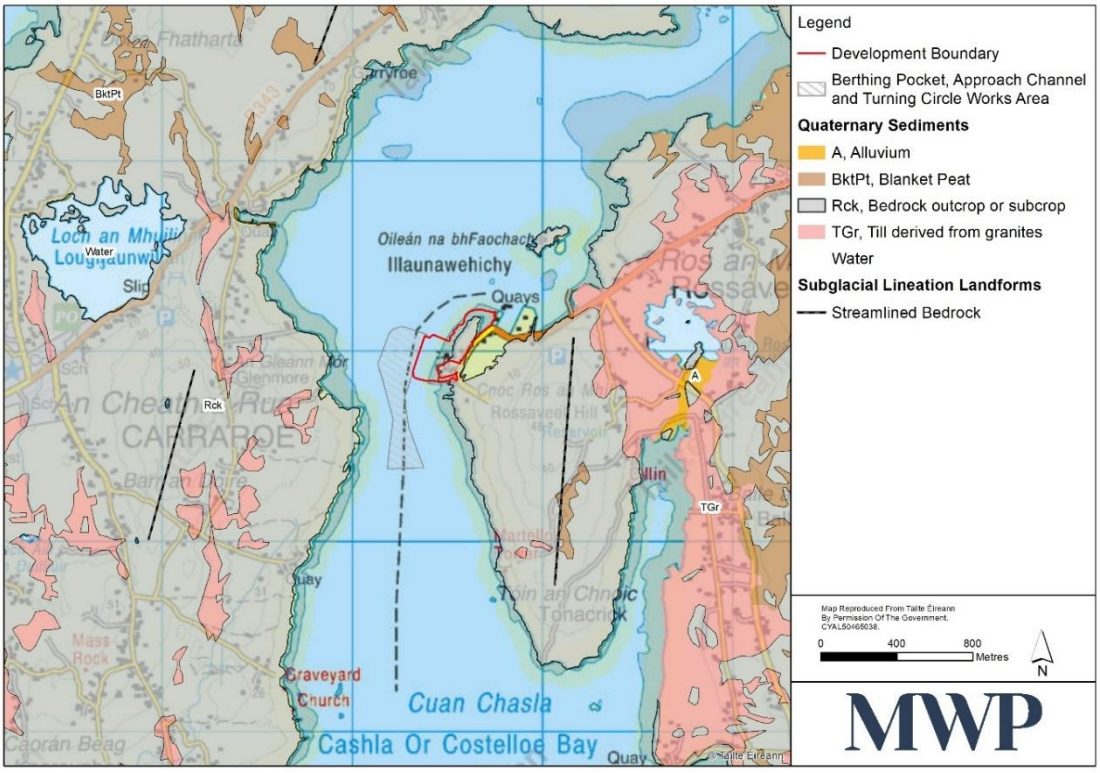

Figure 6-6: Quaternary Sediments

6.4.3 Local Geology

The geology of the site is Banded Zone (Galway Granite). The banded zone is also known as the Magma Mixing-Mingling Zone, is a 4-6km wide, east-west trending, foliated, arcurate mixed zone of granodiorite or granite and mafic quartz diorite. This rock type is complex banded zone. The system is Devonian.

Connemara is characteristically an area of glacial erosion and not deposition, however there is evidence of glacial material having been deposited in the Ros an Mhíl Harbour area in the form of large boulders and occasional till (boulder clay). Within the sheltered area of the harbour there is a deposit of alluvium comprising an organic clay/silt with shelly horizons. There are also occasional pockets of peat, interspersed within the alluvium. Carbonate sands and gravels are also present.

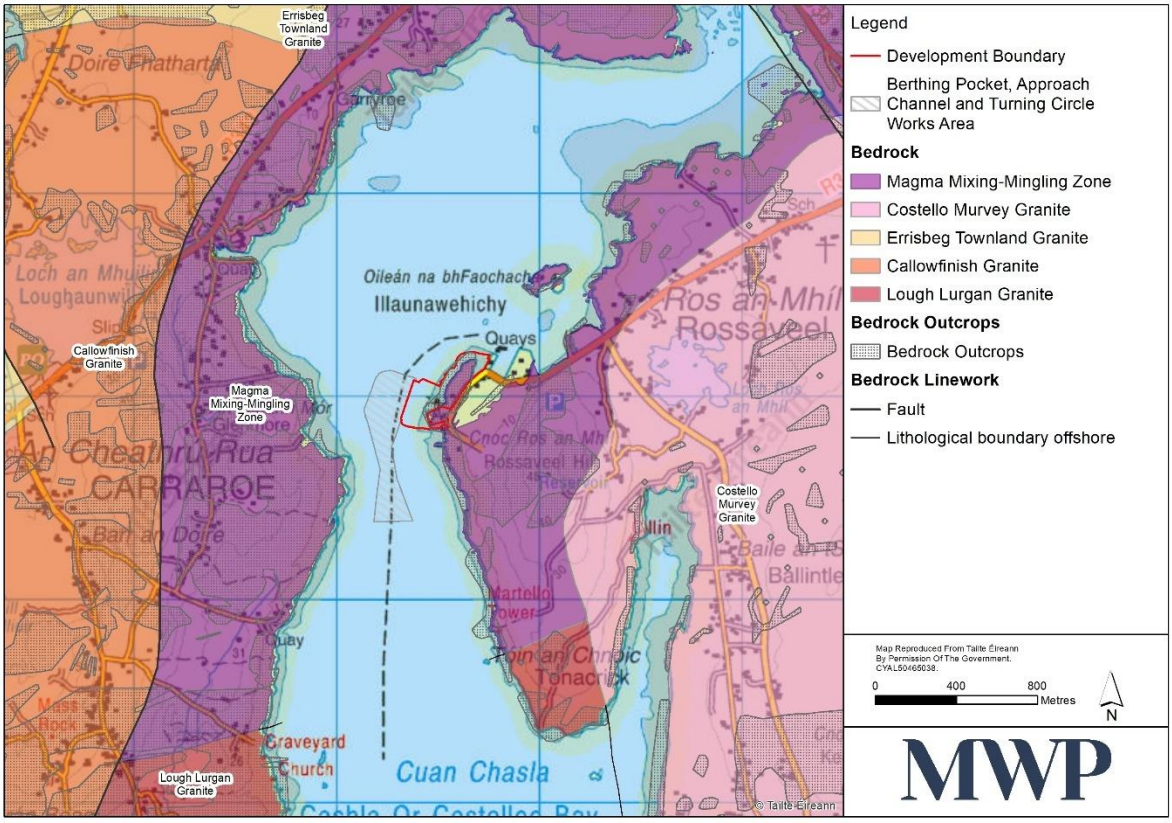

Figure 6-7: Local Geology

6.4.4 Seabed Geology

The harbour area is underlain by granite bedrock of the Galway Granite Batholith, which is of Devonian age. The granite occurs as two main types, the Shannawona Granite and the Banded Zone Granite. The Shannawona Granite outcrops in the main channel area, and consists of pale grey speckled monzogranite with megacrysts of pink potassium feldspar and green plagioclase feldspar. The Banded Zone Granite outcrops occur in the inner harbour and consists of pale grey speckled pink granodiorite mixed with a darker mafic quartz diorite. Microdiorite enclaves are found throughout the granites, which possibly relate to earlier dykes that were engulfed during the granite intrusion.

Large boulders, moraine and glacial till have been sporadically deposited throughout the area. Glacial till was not encountered in any of the marine boreholes in the harbour, although boulders of glacial origin were intersected at many locations.

In the site investigation deposits of sand and gravel were encountered in 50 no. boreholes which were located predominantly in the outer channel area and occasionally in the inner harbour, at depths ranging from +0.14m to -9.09m CD. The maximum thickness recorded was 2.19m. The stratum primarily consisted of loose granular sand and gravel sized carbonates. The material is typically described as a grey silty sand with frequent shells and shell fragments. Gravel-sized granite and shells fragments also occur. In the main channel area this horizon was generally found to be directly overlying the Granite bedrock.

Deposits representative of superficial clay were encountered in 26 no. boreholes, predominantly in the inner harbour area and occasionally in sheltered areas of the main channel, at seabed level (from -0.21m to -7.84m CD). The maximum thickness recorded was 6.40m. The superficial clay generally consisted of a very soft to soft grey/dark grey and slightly sandy gravelly clay. The gravel comprised fine to medium angular shells and shell fragments. The clay often contained a high organic content with a moderately strong to strong organic odour noted.

Deposits of organic clay with occasional discontinuous lenses of peat were encountered in 5 no. boreholes at depths ranging from -2.61m to -7.05m CD. The maximum thickness recorded was 2.52m. The peat lenses generally consisted of a firm to soft spongy slightly clayey to very clayey peat organic clay.

The geophysical survey data quality was very good with bedrock observable on all the acquired profiles. For much of the survey area the bedrock was at or very close to the surface. Where superficial deposits were present, layering was not visible/present within the deposits. Further information on the findings of the geophysical survey is presented in Volume III, Appendix 6B of this rEIAR.

6.4.5 Geological Heritage

The Geological Survey of Ireland (GSI) partnered with National Parks and Wildlife Service (NPWS) to identify, protect and promote the geologically important areas under the program of Irish Geological Heritage (IGH). These areas are protected and designated as National Heritage Areas (NHA) after audits carried out by local county authorities along with the heritage council. These protected areas are differentiated based on themes varying from Karst, Palaeontology, Quaternary, Hydrogeology, and many others.

A review of the GSI Geological Heritage Database available on the GSI online mapping system indicates that there are two Geological Heritage Site located within 5km of the development site. These are Costelloe Murvey Granite Quarry (County Geological Site Code GY042) and Costelloe Road Cutting (County Geological Site Code GY043).

Costelloe Murvey Granite Quarry (GY042) is located approximately 3.7km from the development site. This is a granite quarry by the R336 road between Indreabhán and Ros and Mhíl harbour. The site is described as an important site in terms of the extent of granite exposure, hydrothermal veins, mineralisation and the presence of a dolerite dyke.

Costelloe Road Cutting (GY043) is located approximately 2.7km from the development site. This is a rock blasted, roadside section of granite outcrop on the R336, opposite Derrynea Quay. This site is described as being significant in terms of the variety of features that are observable in outcrop. These features are characteristic of the Magma Mixing and Mingling Zone, a zone of granodiorite that stretches from Casla to An Spidéal is also located approximately 3.7km from the development site.

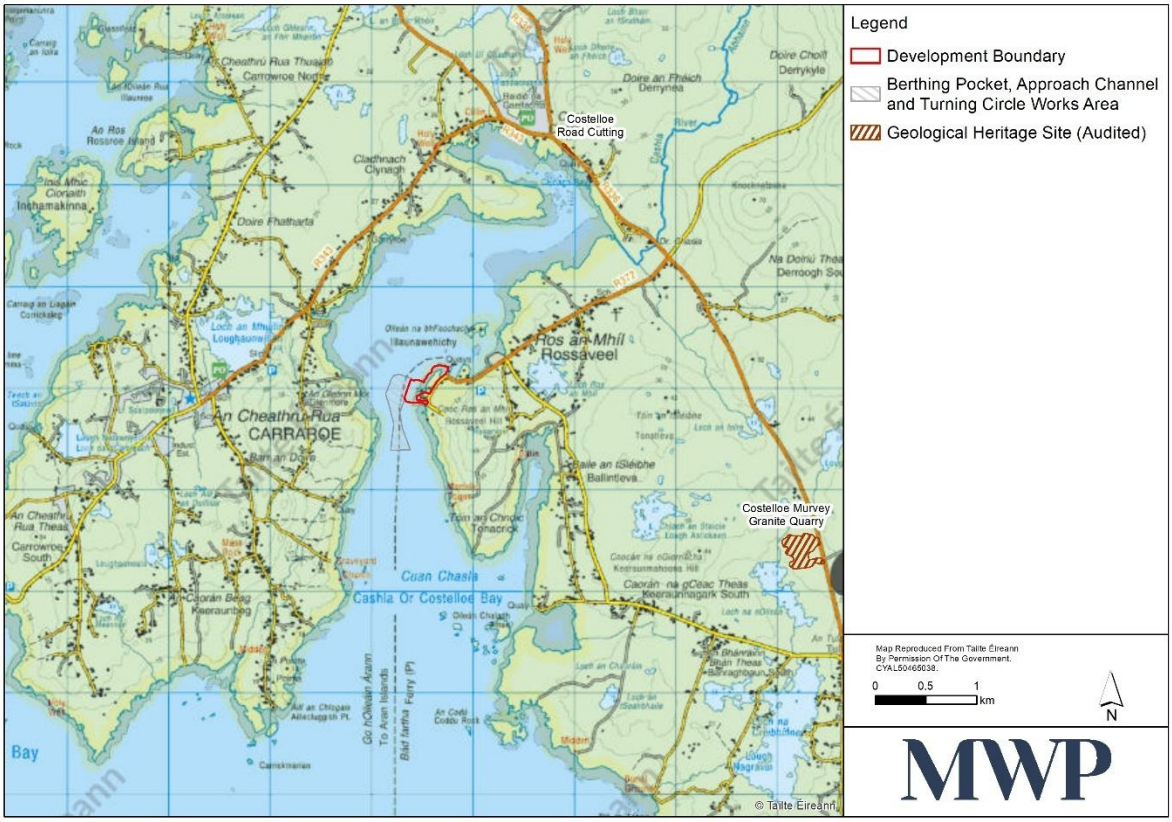

Figure 6-8: Geological Heritage

6.4.6 Soils and Subsoils

2.4ha of land was reclaimed during the development works undertaken for the deep water quay. This consists of made ground mostly composed of imported rock fill from local quarries.

The adjacent land is generally covered with poorly drained bogland peaty podzols, shrubs and grasses over shallow bedrock. The topsoil is very thin, or not present, resulting in very sparse tree growth and a relatively barren.

According to the EPA soils map shown in **Figure 6-9,** the development site is located near 'AminSRPT – Podzols Peaty'.

According to the EPA Subsoils map in **Figure 6-10,** 'Rck – Bedrock at surface' is present adjacent to the development site.

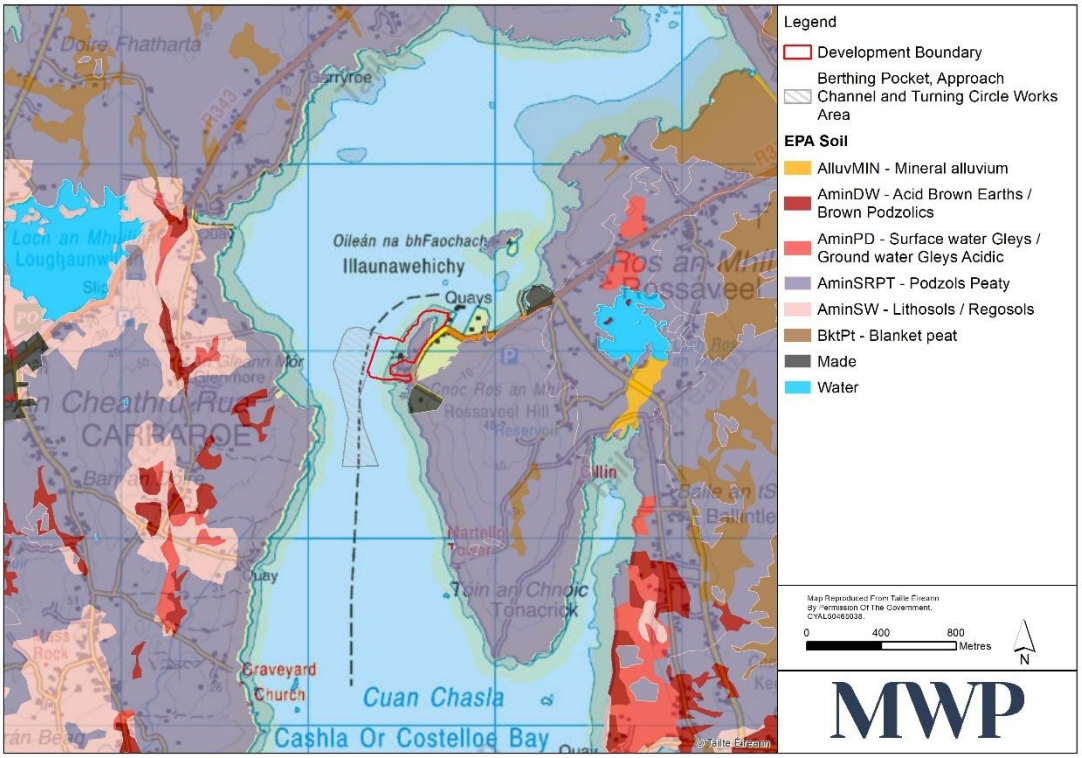

Figure 6-9: EPA Soils

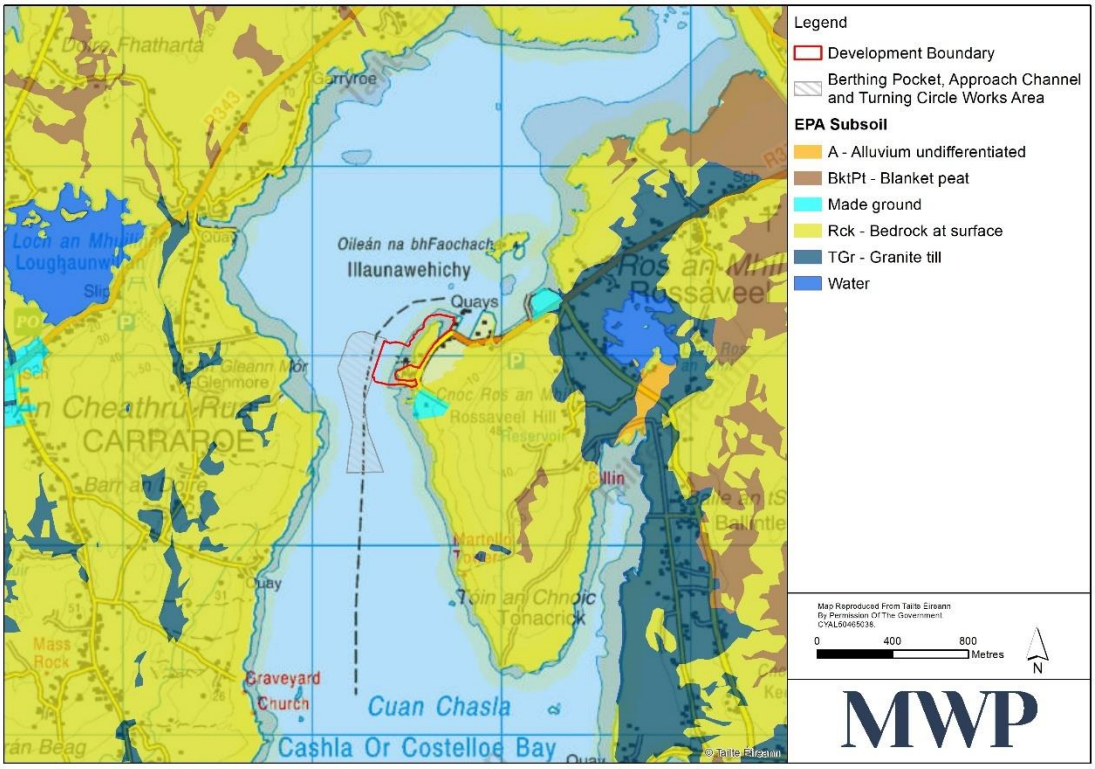

Figure 6-10: EPA Subsoils

6.4.7 Groundwater

The hydrogeology of the Galway granite is controlled by the presence of fractures in the rock mass. Where present, water tends to flow along lines of structural weakness, particularly along fault zones.

The overlying peat exhibits poor drainage due to the low rock mass permeability and is generally wet.

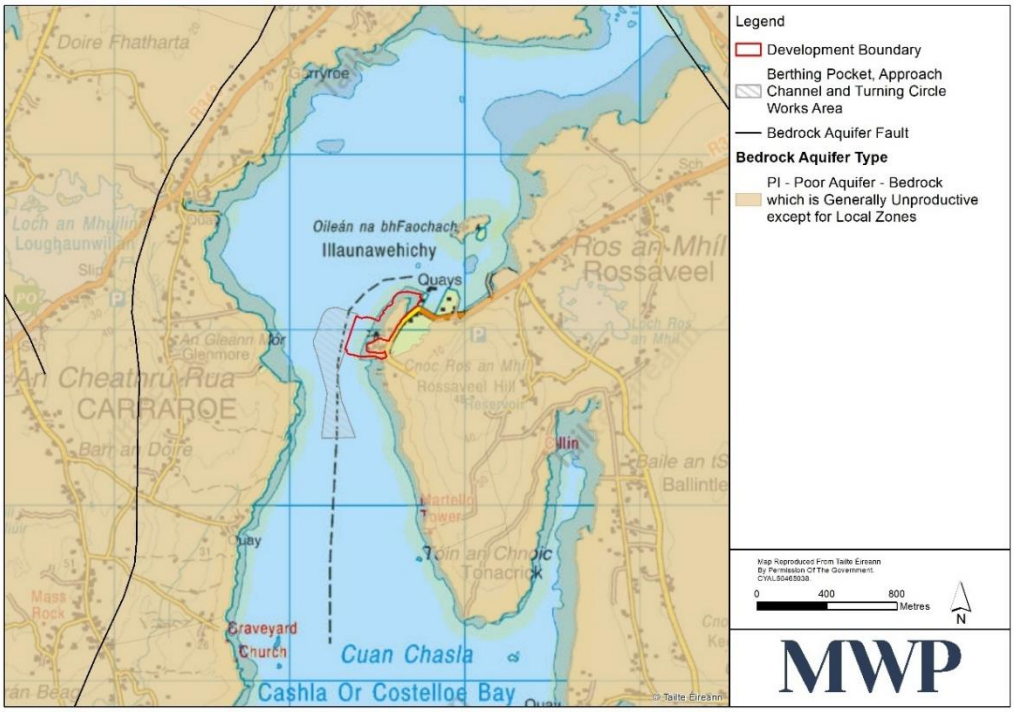

Figure 6-11: Bedrock Aquifer

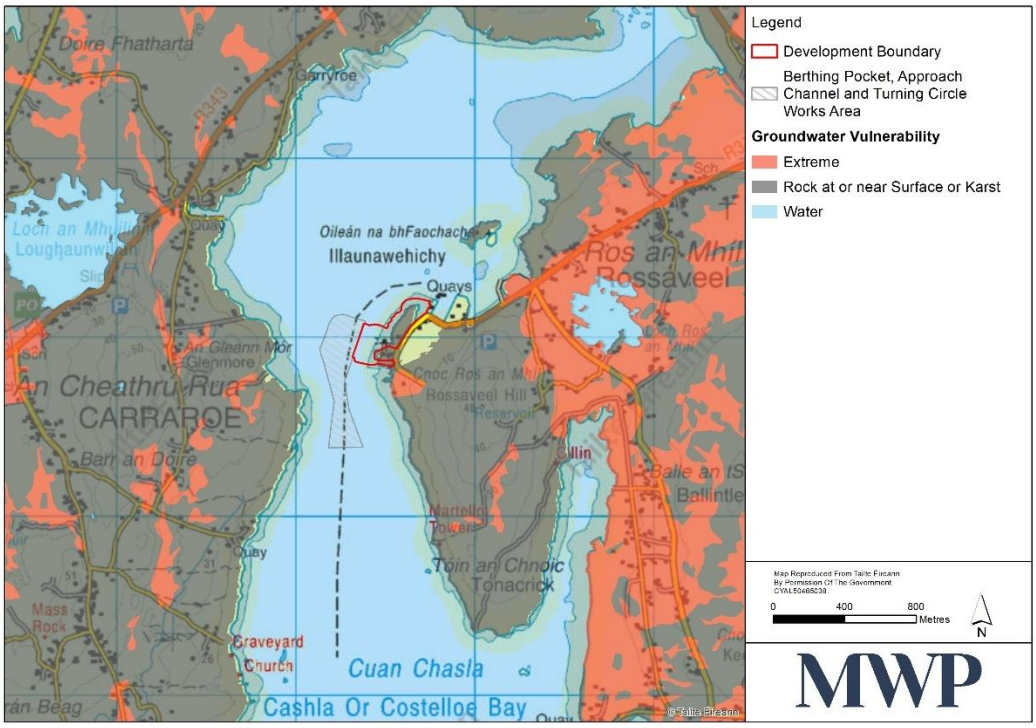

Figure 6-12: Groundwater Vulnerability

6.4.8 Geohazards

Geohazards are in essence, natural Earth processes that pose a risk to human life. They can range from naturally occurring radioactive gases such as radon to geological hazards such as landslides, bog-bursts, coastal erosion or subsidence to hydro-meteorological hazards like floods and high tides.

Radon gas is a naturally occurring radioactive gas, originating from the decay of uranium on rocks and soils. It is a colourless, odourless and tasteless gas and its presence can only be measures using specialist equipment. Radon dissipates readily in open air and is not considered harmful. However, in enclosed spaces, such as a building, radon can accumulate to unacceptably high concentrations.

Radon is measured in Becquerel's per cubic metre of air (Bq/m^3). A Becquerel is a unit of radioactivity and corresponds to one radioactive disintegration per second. A High Radon Area is one where more than 10% of buildings are predicted to have radon levels in excess of 200 Bq/m^3. Information on radon levels around the development site was obtained from the nation radon map illustrated on the website of Radiological Protection Institute of Ireland (www.rpii.ie). This map illustrated 10km x 10km grid squares which show the estimated percentage of homes above the reference level for radon. The radon measurements illustrated on this map for County Galway indicate that the site of the deep water quay is within a High Radon Area, where 1 to 5% of dwellings are predicted to have radon levels greater than 200 Bq/m^3.

A search of the karst database on the GSI website identified a number of faults occurring through the general Cashla Bay area, striking roughly Southeast – Northwest from the inner harbour area. However, none of these faults are within 1.5km of the deep water quay.

6.5 Description of Likely Effects

6.5.1 Construction Activities

A total of 16 months of construction works were completed between January 2023 and the 20th May 2024.

The previous development works included:

- Mobilisation and development of the construction compound and facilities;
- Reclamation works – Rock fill material was imported to reclaim land from the sea and raise the ground level to the high-water mark (+5mCD). This reclaimed land was then used as a construction surface;
- Sequential construction and movement of the 20 drilling and blasting platforms over the quay wall and berthing pocket using imported quarry rock;
- Dredging works to remove the blasted seabed and construct the protective berm around the quay wall trench;
- Installation of 75m of rock armour revetments on the northern and southern ends of the reclamation area;
- Installation of the on-site concrete batching plant;
- Offsite manufacture and delivery of precast concrete caissons. 358 were manufactured and 92 were delivered to site;
- Offsite manufacture of the L-shaped blocks for wall and foundation beams;
- Installation of 48m of quay wall foundations.

Upon confirmation that the planning permission had expired and would not be extended, all construction materials, equipment and facilities were dismantled and removed from the site.

6.5.2 Mitigation Measures for Construction Works

Below is a list of mitigation measures that were applied to mitigate the expected land and soils effects associated with the construction phase during the previous works.

- In order to minimise disruption a Construction Environmental Management Plan (CEMP) was developed and implemented during the construction phase of the development. The CEMP was reviewed regularly and revised as necessary to ensure that the measures implemented were effective;
- Temporary storage of any spoil was carefully managed in such a way as to prevent any potential negative impact on the receiving environment, and the material was stored away from the sea;
- Excavated spoil was stockpiled at appropriate heights and slope angles;
- Bunds for the storage of chemicals and hydrocarbons were lined or constructed of materials resistant to damage by the materials stored therein. In addition, the capacity of such bunds were a minimum of 110% of the volume of the largest container stored therein. Bunds were designed in accordance with EPA guidance in relation to the storage of potentially polluting liquids ('IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities', 2004);
- Where refuelling was to take place on site, fuel was transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs were stored in this area. All relevant personnel were fully trained in the use of this equipment. Guidelines such as 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA C532, 2001) were referred to;
- Drip trays were used where hydrocarbons were being used for vehicle maintenance/refuelling;
- Toilets were provided at the contractor's compound for the duration of the works and all waste material was stored in a concrete holding tank and periodically removed from site and disposed of to an appropriately licensed facility;
- All plant was inspected at the beginning and end of each shift and if leaks were evident they were repaired immediately or removed from site and replaced; and
- Explosive materials and detonators were stored, transported, handled and used in the manner recommended by the manufacturer and in accordance with all statutory requirements or otherwise as advised by the Firearms and Explosives Unit of the Department of Justice and Equality (DOJE) and the Garda Síochána. It should be noted that these requirements were set out in a Method Statement which was agreed with the DOJE and the Garda Síochána in advance of the commencement of drilling and blasting works.

6.5.3 Construction Phase Effects

6.5.3.1 Change of Land Use

Land use is the term to describe the human activities which take place within a given area of space. All new development proposals have the potential to affect the character of a local area and human environment by introducing new land use activities which could result in physical disruption, severance or exclusion of the user's ability to continue existing activities, or the sterilisation of lands that adversely affect future land use potential.

The development site is located along the seashore in an area that forms part of the Ros an Mhíl harbour. The whole harbour area is classified as '123 - Artificial Surfaces with Industrial, Commercial and transport units' and is described as 'seaports'. The development did not result in any change in land use within the harbour area. There

were some existing parking areas that were temporarily used for the construction compound and concrete batching plant during the construction period. However, the rest of the area where the development works were undertaken were located on existing unused land within the harbour area and on the land reclaimed from the sea. Other harbour facilities and activities continued and were not displaced by the development works.

During the period since the suspension of the construction works, the reclaimed area has been fenced off and remained unused.

During the construction phase of the development works, rock material was imported, and the sea rocks in the quay wall trench and berthing pocket area were blasted, dredged, moved and both materials were used as fill to reclaim land from the sea, construct the protective berm and create the quay wall trench.

In this respect, land use associated with the required development footprint changed over the course of the construction phase from an undeveloped coastal landscape to an area of constructed man-made infrastructure.

The surrounding land uses outside the harbour area have remained in agricultural areas and forest and semi-natural areas.

During construction, the development undertaken has resulted in a neutral, not significant, local, permanent, direct effect on the land use.

Table 6-1: Construction Effect 1: Change of Land Use

Construction Effect 1: Change of Land Use					
	Quality of Effect	Post-Mitigation Significance	Spatial Extent	Duration	Other Relevant Criteria
Post-Mitigation	Neutral	Not Significant	Local	Permanent	Direct

6.5.3.2 Effects on Soils and Geology from Drilling, Blasting, Dredging and Reclamation

The construction activities that would affect soil and geology are the drilling, blasting, dredging and reclamation works. These construction activities are described in **Volume II, Chapter 2** Project Description of this rEIAR. These activities affected the sea shore area and access roads. The effects on the marine environment are assessed in **Volume II, Chapter 8** Marine of this rEIAR.

The construction activities have resulted in some structural changes to the rocks and soils along the shoreline on the development site. This included blasting and removing rock from the seabed at the site of the quay wall trench, and the berthing pocket on the western side of the trench. Thereafter the dredged/excavated rock was used to construct the temporary protective berm around the quay wall trench. In addition, imported clean rock from local quarries was imported to reclaim the land behind the quay wall trench and to build the three initial blasting platforms. These activities resulted in the re-profiling of the existing seabed on the development site.

The use of clean imported rock from local quarries for the reclamation area and the three initial blasting platforms, and the use of dredged rock to make the protective berm and the new reclaimed land resulted in no contamination of the existing seabed or of the made land.

The effect on the existing soils and geology from the development construction works is rated as neutral, not significant, local, permanent and direct.

Table 6-2: Construction Effect 2: Rating of Effects on Soils and Geology from Drilling, Blasting, Dredging and Reclamation

	Quality of Effect	Post-Mitigation Significance	Spatial Extent	Duration	Other Relevant Criteria
Post-Mitigation	Neutral	Not Significant	Local	Permanent	Direct

6.5.3.3 Deep Water Quay Foundations

Only 48m of the 200m quay wall foundations were installed during the previous works period for the development. These foundations consist of precast reinforced concrete ground beams (12m long x 0.35m wide x 0.5m high) placed along the front and rear lines of the quay wall. The pre-cast concrete beams for the quay wall were constructed off-site and delivered. The foundation beams were lowered into the quay wall trench using land-based cranes and a levelling frame designed specially to lower the beams into position. This frame had four adjustable hydraulic legs, which, once lowered into the trench and sitting on the bed. These legs were adjusted to ensure the correct level and position the beams was obtained. The top of the foundation beams needed to be at a level of minus 10m Chart Datum on 200m long front wall of quay and at minus 4.74mcd on return walls of the quay. Once correctly positioned, divers directed liquid concrete delivered via a Tremie Pipe to surround the concrete beams and hold them in position, and ensure their stability and proper bearing. Once cemented into position, the frame operator releases the beams and the next set of beams are installed.

The concrete used to lay the foundations was restricted to the bottom of the quay wall trench.

This construction work and concrete would have had no significant effect on the underlying seabed rock or geology. The effect is rated to be neutral, not significant, local, permanent and direct.

Table 6-3: Rating of Effects on Soils and Geology due to the Deep Water Quay Foundations

	Quality of Effect	Post-Mitigation Significance	Spatial Extent	Duration	Other Relevant Criteria
Post-Mitigation	Neutral	Not Significant	Local	Permanent	Direct

6.5.4 Effects associated with the current status of the site

There has been no operational phase for the development as works were suspended before the construction of the Ros an Mhíl Deep Water Quay was completed. After works were suspended all construction materials, equipment and facilities were removed from the site and the site was fenced off. Consequently, there are no current effects on land and soils.

6.6 Residual Effects

There were no significant effects on land use, soils and geology. There is no remedial mitigation measures required.

Table 6-4: Residual Land and Soils Effects.

Impact/Activity/Receptor	Quality of Effect	Post-Mitigation Significance Rating	Remedial Mitigation Measures	Residual Significance Rating
CONSTRUCTION EFFECTS				
Land use change	Neutral	Not Significant	None	Not Significant
Drilling, Blasting, Dredging and Reclamation	Neutral	Not Significant	None	Not Significant
Deep Water Quay Foundations	Neutral	Not Significant	None	Not Significant

6.7 Cumulative Effects

A review of the planning applications in the locality (see Section 1.4.3. of Volume II, Chapter 1 Introduction of this rEIAR) found no other significant developments that had a cumulative effect together with the development.

Based on the finding of the assessment of effects on land and soils arising from previous works as well as other developments in the area, the potential for cumulative effects associated with the quay wall development was considered to be negligible. No specific measures to mitigate against cumulative effects were considered necessary.

6.8 Conclusion

In conclusion, no significant effects on the land, soil and geology have occurred due to the development works due to correct procedures and outlined mitigation measures being implemented.

The assessment also confirms that there were no significant cumulative effects on the land, soil and geology environment as a result of the development and other projects.

There are no effects on the land, soils and geology from the Project that require remedial measures or monitoring.

6.9 References

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