MWP

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

Ros an Mhíl Deep Water Quay

Chapter 3: Consideration of Need and Reasonable Alternatives

Department of Agriculture, Food and the Marine

November 2025

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MWP, Engineering and Environmental Consultants
Address: Reen Point, Blennerville, Tralee, Co. Kerry, V92 X2TK, Ireland

www.mwp.ie

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3. Consideration of Need and Reasonable Alternatives

3.1 Introduction

This chapter provides an analysis of the alternatives (in terms of location, design and construction methods) which have been considered as part of the design of the proposed deep water quay. In addition, the chapter profiles the need and objectives of the project. This chapter also examines the need and objectives of the proposed deep water quay to ensure the continued sustainable operation of Ros an Mhíl Harbour and associated local fisheries businesses that are at risk due to the lack of sufficient and deep water quay infrastructure.

The alternatives considered in this chapter include the following:

- Alternative Sites and shapes for the Quay
- Alternative Blasting and Dredging Options
- The Do Nothing Alternative

3.2 Need and Objectives of the Project

The objectives of the deep water quay development are to improve the Ros an Mhíl fisheries harbour infrastructure and to provide a deep water quay that would support the continued sustainable operation of Ros an Mhíl Harbour and associated local businesses that are at risk without the addition the new quay infrastructure. This includes providing facilities for larger vessels and more space and facilities for fisheries onshore operational activities. Figure 3-1 provides a photograph of the existing over-subscribed fisheries harbour facilities at Ros an Mhíl during the peak fishing season.

The 2025 Fisheries Harbour Centre and Coastal Infrastructure Development Programme presents the Government's €27.5 million investment in capital projects in Ireland's publicly owned harbours. This investment proposes to modernise and enhance six state-owned Fishery Harbour Centres and includes funding for local authorities through a marine infrastructure sub-scheme. The Fishery Harbour Centres are located at Killybegs, Ros an Mhíl, An Daingean, Castletownbere, Dunmore East and Howth.

The economic surveys for the fisheries sector in Ros an Mhíl undertaken by Bord Iascaigh Mhara (BIM) in 2016 and 2024 indicate that Ros an Mhíl has an exceptionally high dependency on the fishing sector of over 90% for total turnover and 86% of full-time employment in the community. It notes that while the Ros an Mhíl fishing fleet has remained relatively stable over the years the total number of vessels landing into the port has declined and this decline is mainly in the larger vessel categories (>18m). The report also identifies opportunities to develop the infrastructure of the harbour with the need for a deep water quay identified by local stakeholders as important elements - "the lack of a deepwater landing facility was cited as a major constraint to [Ros an Mhíl] making it impossible for larger vessels to land into the harbour".

The 2016 report continued by stating that this was a constraint on the economic activities of the harbour and cited the example of it:

"Missing out on species such as blue whiting with its related processing opportunities [...] If blue whiting was landed into [Ros an Mhíl] the processing season would be extended by approximately two months."

It is thus evident that the harbour and associated fish processing business would gain from the development of the deep water quay as larger deep sea fishing vessels could be accommodated at any time of year, thus broadening the scope for sustained and expanded local employment and output.

Figure 3-1: Photograph of the limited space in the existing Ros an Mhíl Fisheries harbour during the peak fishing season.

3.3 Alternative Deep Water Quay Sites and Shapes

As discussed in Chapter 1, the Ros an Mhíl deep water quay has been the subject of the following previous planning applications:

- 2002 granted planning permission by Galway County Council with a subsequent amendment also granted planning permission by the Council in 2006 (and extension to the duration of that permission granted in 2011); and
- 2018 granted planning permission by Galway County Council, which expired in July 2023 and efforts to extend the planning permission were legally challenged and denied in October 2024.

The most detailed consideration of site and design alternatives was undertaken in advance of the 2002 application. These are outlined and assessed in Section 3.3.1. The 2017 application proposed the preferred 2002 site option but did away with the inside quay proposed in 2002. This application also proposed a deeper quay – not surprising due to the shipping technology developments and growth in size of vessels over time. An assessment of this alternative is provided in Section 3.3.2. The current application (2025) is proposing largely the same deep water quay design and location as in 2017 but will a slightly shallower depth and narrower turning circle. This option is assessed in Section 3.3.3.

3.3.1 2002 Planning Application Alternatives Analysis

3.3.1.1 Site Selection

In advance of the 2002 planning application, Mott MacDonald carried out an engineering review of potential sights and designs for a deep water quay close to the existing Ros an Mhíl Harbour with a length of 200m and a minimum 8m berthing depth and an inside berthing face.

<u>In-Shore Option</u>

Brief consideration was given to the feasibility of developing an "inshore" deep water quay option, with the berthing line set well inshore, approximately between the 0m and 3m depth contours. An inshore berth location would offer the following two principal advantages over an offshore location:

- Less impact on the existing hydraulic regime in Cashla Bay; and
- Less marine construction work to provide a breakwater structure behind which the new berths could be placed.

However, a major restriction associated with an inshore deep water berthing line was that it generates significant, in the order of approximately five times greater, dredging quantities and the cost and environmental implications of the larger dredging volumes associated with inshore schemes was considered to heavily outweigh the advantages outlined above. This option was therefore dismissed and off-shore options became the focus of the assessment and design process.

<u>Off-Shore Options</u>

The most suitable deep water site identified was in the navigation channel about 380m west south-west of the existing fisheries harbour (see **Figure 3-6**). The constraints associated with the site included the following:

- The narrow width of available navigation channel;
- The northern limit of deeper water;
- The further west and south the quay is located the more exposed it is to waves and storms;
- Existing onshore facilities, buildings and slipway; and
- The existing shipping navigational directional light.

The principal site opportunities and constraints are also illustrated on **Figure 3-6**. These limited the design options.

Five off-shore options at this site were considered for the location and alignment of the deep water quay as well as its associated vessel approach corridor and turning circle. These were all in the same deep water area but considered different depths, angles of the quay and turning circle options (see **Table 3-2** below).

Two options, DWQ2 and DWQ4, offered savings in dredging quantities but only at the expense of operational restrictions and as such were not considered further.

DWQ1, DWQ3 and DWQ5 were assessed in relation to the relative exposure of the berths and vessel manoeuvring area, ease of navigation for arrival and departure of vessels, required dredge quantity, and the potential ease for future expansion. Ultimately, DWQ5 was selected as the preferred option because it was located close to the 5m contour and this would provide for a smooth vessel departure and, with refinement, dredging quantities could be expected to be reduced slightly. No significant negative features were identified with this option.

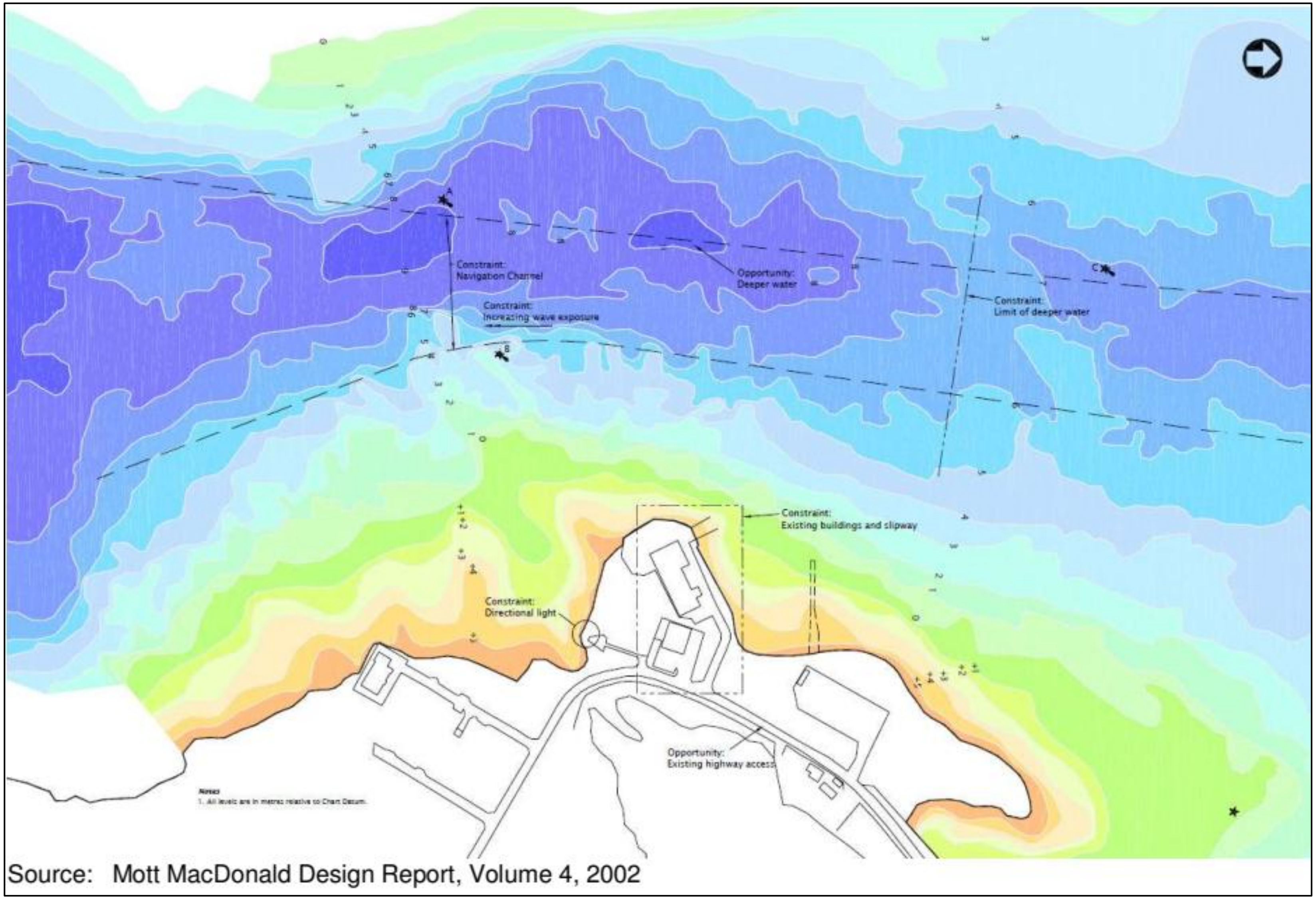
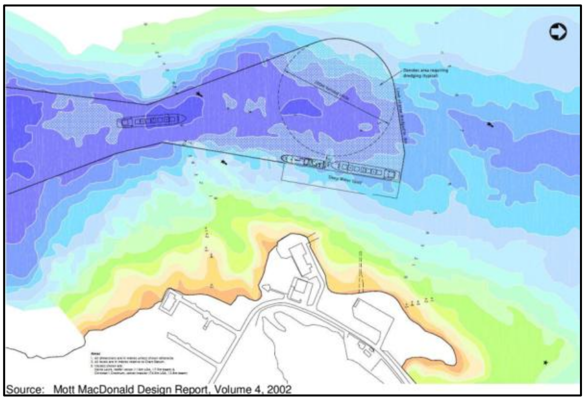
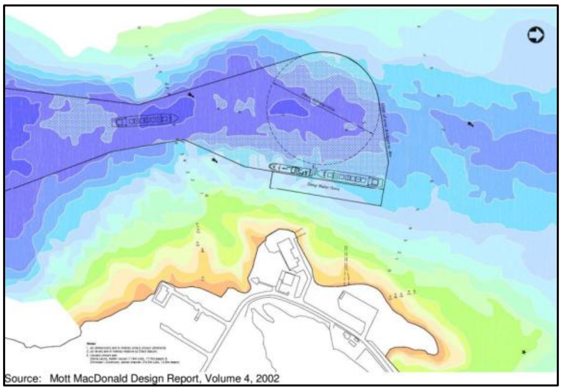
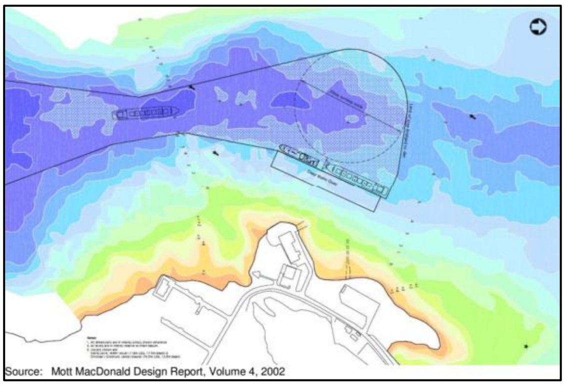
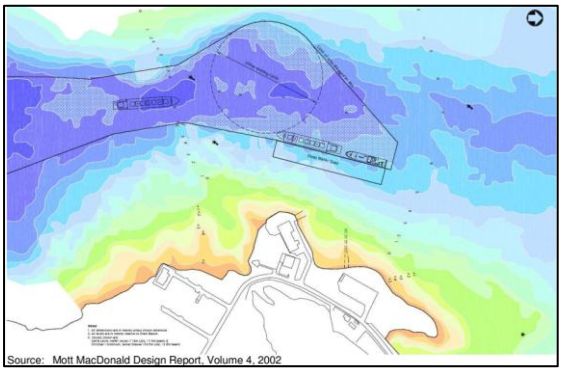
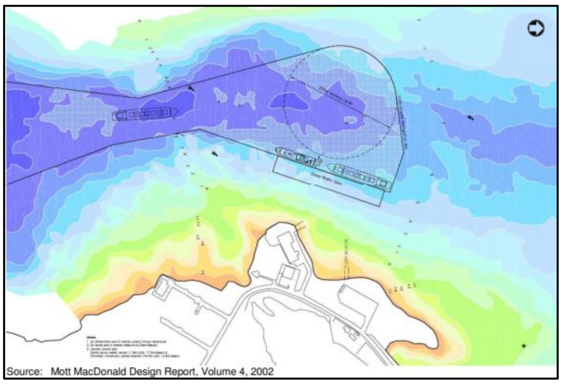


Figure 3-2: Constraints and Opportunities Analysis

Table 3-1: Summary the Off-Shore Deep Water Quay and Turning Circle Options Considered

<u>Option 1</u> Considered along with options 3, 4 and 5. 	<u>Option 2</u> Savings in dredging quantities but more operational restrictions. Not considered further. 
<u>Option 3</u> Considered along with options 1, 4 and 5. 	<u>Option 4</u> Savings in dredging quantities but more operational restrictions. Not considered further. 
<u>Option 5 =></u> Considered along with options 1,3 and 4. Was selected as the **preferred option** as it was close to the 5m contour which would provide for a smooth vessel departure and, with refinement, dredging quantities could be reduced slightly. There were also no significant negative features identified with this option.	

There would be no significant difference in visual, traffic, material assets, water quality, flood, land and soils, cultural heritage, and population and human health effects between these different site options. The main environmental effects of concern would be related to the loss of marine habitat and disturbance or fatalities to marine species and water quality effects. There are unlikely to be any significant differences in these effects from the 5 No. site options considered. Ultimately, the choice of site and design was based on need and practical, financial and operational constraints.

3.3.1.2 Quay Shape Alternatives

There were a number of reclamation and quay shapes that were considered. A full reclamation with one deep water quay was one option considered, but there was other partial reclamation options associated with different quay wall shapes were also considered.

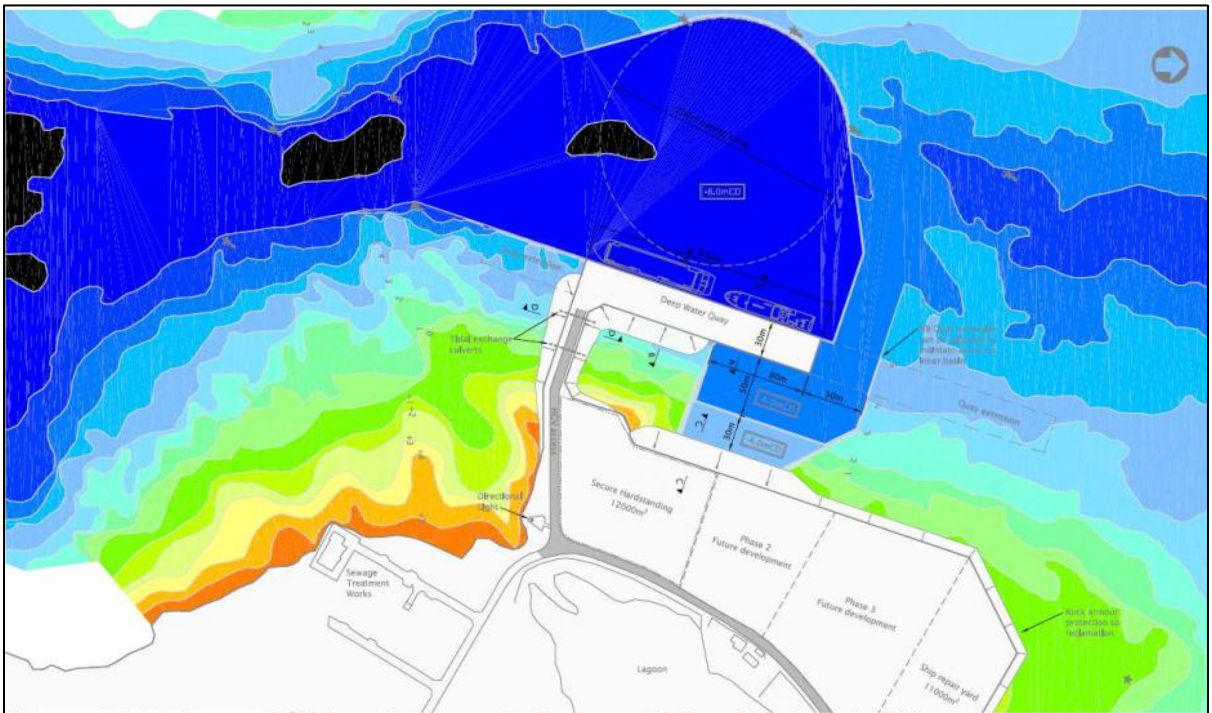
The advantages of the L and T quay shapes are that they would provide more berths of different depths and reduce the reclamation required. This would potentially reduce the loss of existing marine habitat although these areas would still be temporarily affected during the construction phase.

A full reclamation with one deep water quay would reduce the number of berths but would provide more onshore space for quayside fishing operations. From an environmental perspective, this option would lead to a greater loss of shallow coastal marine habitat compared to partial reclamation alternatives.

There was not expected to be any significant difference in visual, traffic, material assets, water quality, flood, land and soils, cultural heritage, and population and human health effects between these different shape options.

3.3.1.3 2002 Proposed Option

The selected layout for the 2002 planning application, which was approved by Galway County Council in 2002 had an 'L' shape configuration as illustrated in Figure 3-3.



Source: DAFM, Rossaveel Harbour Development - Environmental Impact Statement, 2002.

Figure 3-3: Deep Water Quay – 2002 Layout (Consented by Galway County Council)

3.3.2 2017 Planning Application

In the second planning application in 2017, the preferred development option for the deep water quay was modified. The proposed -8mCD dredge depth in the channel and vessel manoeuvring area was maintained, but the alongside depth at the quay was increased to -12mCD to provide for the tidal arrival and departure of deeper draught vessels. The inside berthing face was also removed so that a larger open back-up hard standing area could be provided landward of the berthing face to better support quayside fishing operations. In addition to providing greater flexibility for quay side operations, removing the inside berthing face also reduced the capital cost of the development. This proposed full reclamation option with one 200m deep water quay was also more similar to the quays available at the Killybegs and Foynes harbours.

The berthing head is based on caisson construction (see **Section 3.4.3**) to provide the berthing frontage for vessels berthing directly alongside, although double banking of vessels is foreseen, with the option for using the northern face of the quay for service vessels or trawlers to berthed either directly alongside or in a "Mediterranean moor" arrangement.

The 2017 proposed layout for the Ros an Mhíl deep water quay is illustrated in **Figure 3-4**.

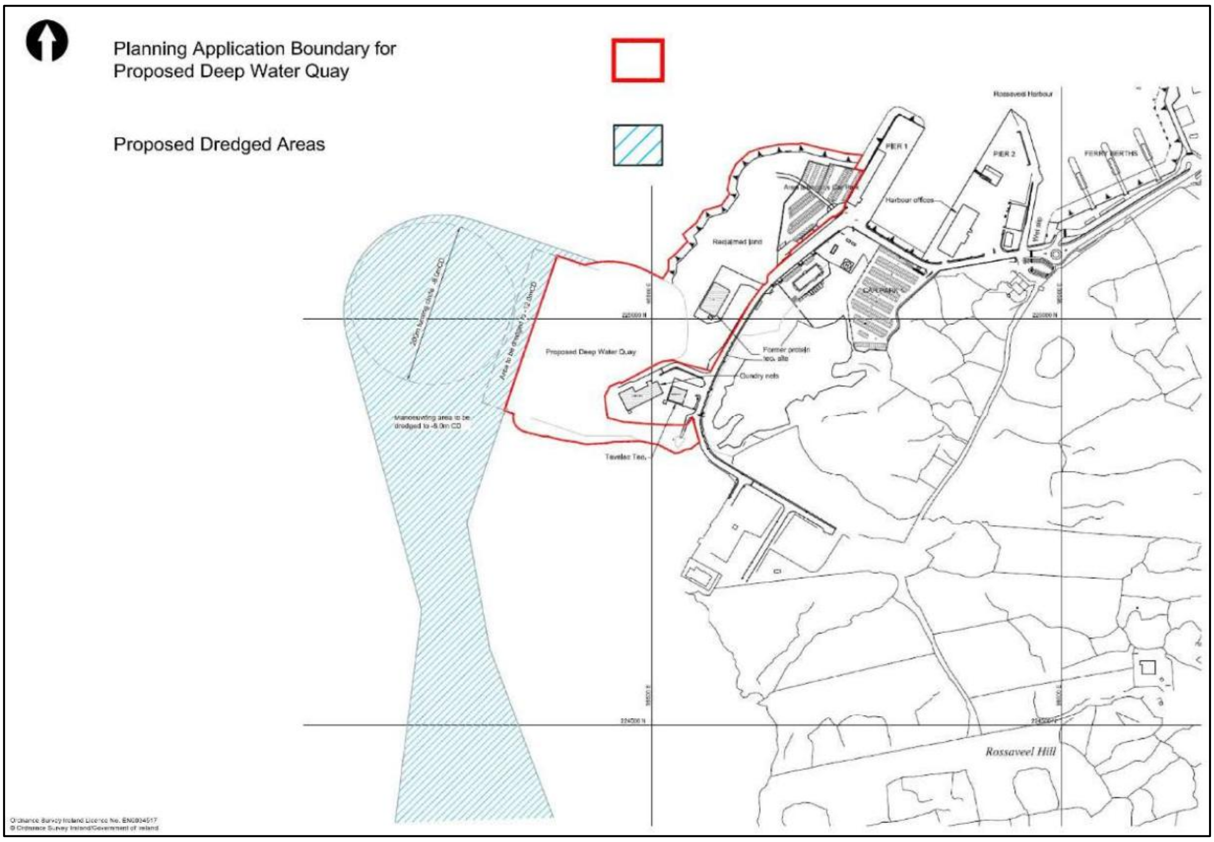


Figure 3-4: 2017 Planning Application Layout for the Ros an Mhíl Deep Water Quay

3.3.3 2025 Planning Application

The design of the proposed development assessed in this EIAR is very similar to the permitted 2018 development.

The 2025 planning application differs from the 2017 application in the following ways:

1. Some of the Údaras lands included in the 2017 planning boundary have been excluded.

2. The berthing pocket and quay wall trench will be blasted and dredged to -10mCD (previously permitted to -12.0m CD)
3. Dredging for turning circle of 150m diameter (previously permitted at 200m diameter)
4. Excavation by dredging and rock blasting (if required) of the navigation channel to provide for a fully dredged navigation channel of -7m CD and minimum width of 100m (previously permitted to -8.0m CD and minimum width of 74m)
5. A new on-site substation is proposed, with a right of way to the existing neighbouring substation on the Údaras land.
6. An extension of the foul water connection pipeline along the road to the nearest pump station close to the existing Wastewater Treatment Plant (WWTP).

The current application boundary is compared to the 2017 planning application boundary in **Figure 3-5**.

The changes to the depths of dredging would significantly reduce the volume of rock to be blasted and dredged in the berthing pocket and quay wall trench. It also reduces the amount of dredging in the channel and turning circle. This would reduce the magnitude and duration of the dredging effects on the marine environment.

The other changes make no significant material difference in the environmental effects of the proposed development.

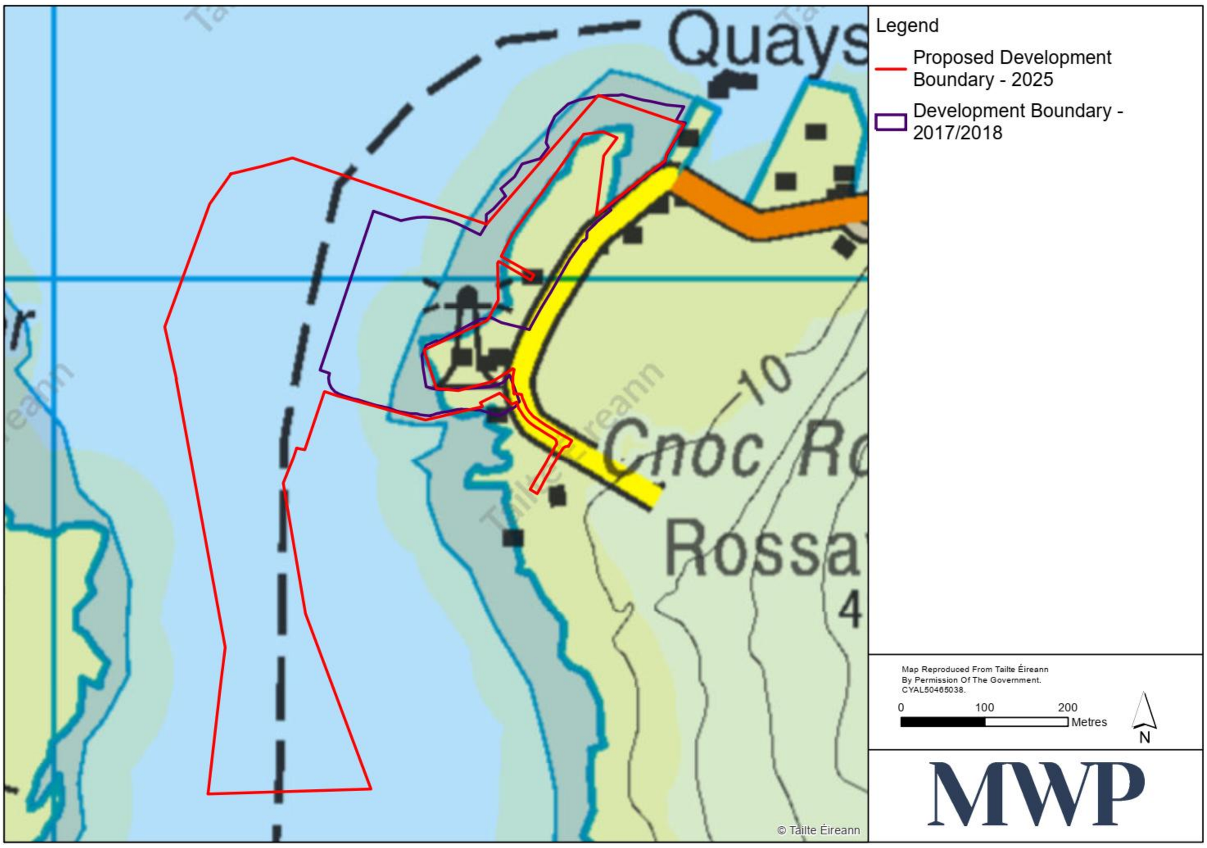


Figure 3-5: Comparison of 2017 Planning Boundary (purple) with current Proposed Planning Boundary

Figure 3-6: Photomontage of Proposed Ros an Mhíl Deep Water Quay Layout 2025

3.4 Alternative Deep Water Quay Construction Methodologies (2023-2024)

Various quay wall construction methods were considered in the preparation of the 2017 EIS. These included the following:

1. A Suspended Deck Option;
2. A Sheet-piled Wall Option; and
3. A Caisson Wall Construction.

The proposed construction method proposed in 2017 was the Caisson Wall. The current application is proposing the same quay wall construction method.

These different methods and their effects are assessed in the sub-sections below.

3.4.1 Suspended Deck Option

A suspended deck option would consist of steel piles installed into bedrock in order to support a concrete deck. Due to the strength of the rock, it would not be possible to install the piles by driving. To achieve toe fixity and lateral restraint, the piles would need to be installed and concreted or grouted into sockets drilled into the rock on the seabed floor. Drilling such large diameter holes is specialist work requiring heavy drilling equipment. The process would involve a sizeable jackup barge for the drilling operation which would also be used for installing the pile and bracing it in position during grouting and until the grout has cured.

Reinforced concrete deck construction could be carried out using any conventional method. Concrete pile caps could be precast and be lifted from a delivery barge onto the piles. The precast deck beams could be lifted from a delivery barge onto the pile cap. The deck could be formed by placing precast reinforced concrete planks spanning across the deck beams.

The access causeway would provide access to the south end of the quay and the construction of the in-situ concrete deck would progress from the south. This would provide access on foot or by vehicle and would allow delivery of materials and concrete. A bridging slab would be required at the junction between the causeway and suspended deck to accommodate differential settlement.

The steel piles and any exposed steel fixings would require provision for corrosion protection systems. Protection could involve a combination of cathodic protection, coatings, and providing sacrificial thickness of steel. Corrosion protection would impose additional costs over the life of the quay from initial costs, operating costs or maintenance/replacement costs.

3.4.2 Sheet-piled Wall Option

A sheet-piled wall option would consist of a series of steel sheet piles installed into the seabed floor to form a continuous quay structure. As discussed in relation to the suspended deck option, because of the strength of the granite bedrock, the sheet-piles could not be readily driven into the bed. It is likely that trenches would be drilled and blasted along the line of the quay wall. If very good fragmentation were achieved, it could be possible to drive the sheet-pile into the fractured rock. If driving was not possible, then the trench would need to be mucked out and the sheet-pile installed in the trench before backfilling with tremied concrete. Installation of the sheet-piling would be carried out from a large jackup barge.

Whether the sheet piling could be driven into the fragmented rock is a significant uncertainty in the method and would be likely to require a site trial to reach resolution. The sheet-piles would also require substantial temporary bracing until finally secured in position by the combination of back-fill and tie-rods. If pile-driving could not be done and the trench had to be cleaned out, then a more robust form of holding and bracing the wall until placing the tremied concrete would be needed.

After installing the sheet-piling by marine equipment, access would be created by placing fill from the end of the access causeway using land-based plant. Rock reserved and stockpiled ashore from the dredging would be re-used to provide this fill. An in-situ concrete coping beam would be constructed along the top of the sheet-pile.

The sheet-pile option would make maximum beneficial use of the good quality rock which must be dredged to create the berth. However, the sheet-piled option would involve a considerable amount of marine-based work to install and brace the sheet-piling whether driven into fragmented rock or concreted into an excavated trench.

As for the suspended deck option, the steel sheet-piling, tie rods and any exposed steel fixings would require provision for protection against corrosion. Corrosion protection would impose additional costs over the life of the quay from additional initial costs, operating costs or maintenance/replacement costs.

3.4.3 Caisson Construction

The preferred option was to construct the deep water quay with caissons. The caisson method avoids the crane-lifting operations of pile-placing and installation of precast units in exposed conditions and over water that would be involved in the piled jetty option. The caisson option makes maximum beneficial use of the good quality rock which must be dredged to create the berth. Furthermore, the caisson option avoids the considerable amount of marine-based work required for the sheet-piled option in order to install and brace the sheet-piling into the bed rock.

3.4.4 Preferred Quay Wall Construction Method and Environmental Assessment

The choice of the caisson wall construction method was largely informed by the comparative financial, practical and logistical aspects of the construction. This was the simplest and most cost-effective option. From an environmental point of view the caisson wall construction method would also require less complicated and lengthy marine works. This is the option granted by planning permission in 2018. Construction on this quay wall began during the 2023 and 2024 harbour work. A portion of the foundations for this wall have been constructed, and all the caissons and other components have been manufactured and are in off-site storage.

All three of these options would require the same amount of reclamation and loss of existing shoreline habitat. The main differences in environmental effects would be related to the duration of the work and associated noise and water quality effects from construction and dredging activities. However, these were not expected to be substantially different. The sheet pile wall would require the use of more imported steel and coatings which would likely make greater contributions to carbon emissions and climate change. However, the use of concrete and steel supports for the precast concrete would also contribute to carbon emissions and climate change.

There would be no significant difference in visual, traffic, material assets, flood, land and soils, cultural heritage, and population and human health effects between these different construction options.

3.5 Alternative Blasting and Dredging Options

The granite bedrock within certain parts of the proposed dredge areas is too strong to be removed economically by any dredger without initial marine pre-treatment works such as blasting to break up the rock prior to removal by a dredger. From previous dredging operations undertaken by the DAFM in Ros an Mhíl Harbour, it is known that there may be certain areas where drilling and blasting operations may prove to be difficult due to the presence of degraded granite, which reduces the effectiveness of the blasting operations.

The 2017 EIS anticipated that the drilling, blasting and dredging would be undertaken by a floating drilling and blasting pontoon. However, during the previous dredging works (in 2023 and 2024 which is the subject of a current substitute consent application) the contractors adopted an alternative method of blasting that involved filling the marine area above each section of the quay wall trench and birthing pocket with rocks up to the high-water level to create a blasting platform. The drilling and blasting of the quay wall trench was undertaken in 20 segments. Each segment to be blasted was first filled with rock to the high-water level and then 51 No. holes were drilled into the fill material and bedrock to 2m below the required depth of the quay wall foundations level. These holes were then filled with casings and explosives and blasted. The dredged rock was then removed with excavators and used to construct the next segment to be blasted.

The Remedial EIAR for the substitute consent application found that the implemented method had no significant adverse environmental effects and was likely to have had less of an impact on the marine environment and species than the previously proposed floating drilling and blasting pontoons (see comparison of the environmental effects of these methods in Table 3-2 below).

The adopted blasting platform method required a much larger volume of rock to be imported from local quarries than the Jack-up pontoon method. This increased the number of construction vehicles entering and leaving the site and increased the traffic effects on local roads. This traffic effect has been assessed in Volume II, Chapter 14 Material Assets – Traffic and Transport of this rEIAR and found to be not significant.

There was no difference in visual, material assets, flood, land and soils, cultural heritage, and population and human health effects between these different blasting and dredging methods.

Table 3-2: Summary of Comparative Environmental Effects from the Two Blasting and Dredging Methods

	Potential Environmental Effects	Drilling and Blasting using jack-up pontoon(s) with mounted hydraulic marine drilling towers	Drilling and Blasting using a sequence of constructed rock platforms
1	Duration of noise.	4 No. months (18 No. weeks).	10 No. months.
2	Effect of Blasting Noise on marine species.	Greater noise effect on marine mammals due to blasting directly in the sea.	Noise effect on mammals would be reduced due to drilling and blasting on made ground.
3	Noise effect for works within the protective berm.	No protective berm to act as sound barrier.	Noise from any works within the protective berm would have had a lower effect on vulnerable marine species due to the berm acting as a sound barrier.
4	Water Quality effects due to protective berm.	No protective berm to contain any water quality effects.	Some water quality effects would have been contained within the protective berm.
5	Traffic Effect.	Less rock imported for reclamation and blasting platforms. Consequently, lower numbers of delivery vehicles and less traffic effects.	Much more rock imported for reclamation and blasting platforms. Consequently, higher numbers of delivery vehicles and more traffic effects. Traffic effects have been assessed to be not significant and were effectively mitigated.

3.6 Do Nothing Scenario

Should the proposed deep water quay not be granted planning permission, this will represent a lost opportunity to contribute to the development and upgrading of Ros an Mhíl fisheries harbour infrastructure to ensure the continued sustainable operation of Ros an Mhíl fishing Harbour and associated local businesses that are at risk without the addition the new deep water quay infrastructure.

3.7 Conclusion

The project design process and reasonable alternatives were completed in compliance with the EIA Directive, EU Guidance Document 2017 and the EPA’s Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

The proposed project has been designed to minimise potential environmental effects and to maximise the benefits of a new deep water quay in Ros an Mhíl.

Alternatives examined included alternative sites, layouts, and quay wall construction. The selected design was based on the project philosophy of mitigation by design.

The final site layout was determined based on multi-discipline inputs and consideration of needs, assessments of topography, biodiversity, land and soils, archaeology, hydrology, landscape and the engineering constraints. The development as proposed is the preferred option as it results in the least effects on resources and receptors while meeting the project objectives of a deep water quay. The proposal, as assessed throughout the EIAR, is considered to be the optimal design which minimises effects on the receiving environment, while providing valuable harbour infrastructure suitable to the future needs of the fishing and local business sector, in line with national harbour infrastructure policy.

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