

# DUBLIN PORT COMPANY

## Dublin Harbour Capital Dredging Project

### Volume 1 EIAR Non-Technical Summary



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# 1 INTRODUCTION

## 1.1 Purpose of the Non Technical Summary

This document is the Non Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Dublin Harbour Capital Dredging Project on the environment. The NTS aims to provide the reader with a concise summary of the content of the EIAR presented without technical jargon, hence understandable to anybody without a background in the environment or the project.

The EIAR has been prepared by RPS on behalf of Dublin Port Company (DPC) for the Dublin Harbour Capital Dredging Project for which development consent is sought. The EIAR will be used to support the relevant assessments to be carried out by the respective competent authorities on all relevant applications for development consent.

The primary objective of the EIAR is to identify the baseline environmental context of the proposed development, predict potential beneficial and/or adverse effects of the development and propose appropriate mitigation measures where necessary.

The EIAR has been prepared in accordance with the requirements of EU Directives and Irish law regarding Environmental Impact Assessment (including the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018) and European Commission Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Commission, 2017).

## 1.2 The Applicant

Dublin Port Company (DPC) is a State-owned commercial company responsible for operating and developing Dublin Port. Dublin Port is the largest freight and passenger port in Ireland, with all cargo handling activities being carried out by private sector companies operating in intensely competitive markets within the port.

Dublin Port has been identified as a Core Port of international significance in the Trans European Network (TEN-T) Guidelines and it forms part of the European Union's Core Transportation Network, and it is also designated a Tier 1 Port of national importance in the National Ports Policy 2013.

Dublin Port's large share of national port volumes, particularly in the Roll-On Roll-Off (Ro-Ro) and Load-On Load Off (Lo-Lo) modes, arises due to a combination of two factors; location and depth of water. Dublin Port is a key part of the national port system and DPC seeks to ensure that it plays its role in providing national port capacity. For all of Ireland's major national ports, it is essential that capacity constraints do not emerge which could lead to supply chain inefficiencies. The Dublin Port Masterplan 2040, reviewed 2018, seeks to ensure that no capacity constraints emerge in Dublin Port between now and 2040.

The Dublin Harbour Capital Dredging Project is now being brought forward for consent from the Dublin Port Masterplan 2040.

## 1.3 Project Summary

The Dublin Harbour Capital Dredging Project at Dublin Port is being proposed for consent in accordance with the Dublin Port Masterplan, reviewed 2018. Figure 3 in the Masterplan identifies the land uses and infrastructure projects on port lands which will allow the port to increase its capacity to 77.2 million gross tonnes by 2040. The Masterplan identifies that this is the ultimate capacity of Dublin Port.

The Dublin Port Masterplan 2040 envisages that the development of Dublin Port to this ultimate capacity will be achieved by a number of significant infrastructure projects:

1. the Alexandra Basin Redevelopment (ABR) Project (29N.PA0034), which is under construction;
2. the construction of the Dublin Inland Port, located 14 km from Dublin Port, which has also commenced,
3. the MP2 Project, which received planning permission on 1 July 2020 (ABP-304888-19); and
4. a project on the Poolbeg Peninsula (as shown in Figure 1-2 including development of land areas K, L, M, N and O) and possibly also including the development of the Southern Port Access Route (SPAR) to provide connectivity between the Dublin Port Tunnel and the south port lands as envisaged in NTA's Transport Strategy for the Greater Dublin Area 2016 to 2035.

Figure 5 in the Masterplan provides an indicative layout of the navigation channel, basins and berthing pockets at Dublin Port at 2040. The Dublin Harbour Capital Dredging Project brings forward for consent key elements of the capital dredging works required to create the required depth of the navigation channel, basins and berthing pockets.

The works proposed in the Dublin Harbour Capital Dredging Project are shown in Figure 1-1 and comprise a number of elements:

- Deepening the navigation channel between North Wall Quay Extension and the Western Oil Jetty, including riverside Berth 35;
- Deepening of Alexandra Basin East and deepening/widening of berths;
- Deepening of the Oil Basin and widening of berths;
- Deepening of the Ferryport Basin;
- Deepening of riverside Berth 52;
- Widening the South Port (Berths 42 - 47) berths, and
- Removal of ridge between the navigation channel and the Poolbeg Oil Jetty (Berth 48).

The proposed capital dredging works will be restricted to the winter period (October – March). Maintenance dredging will be restricted to the summer period (April – September). This separation provides the clarity required by the EPA to enforce proposed separate capital and maintenance dredging Dumping at Sea Permits.

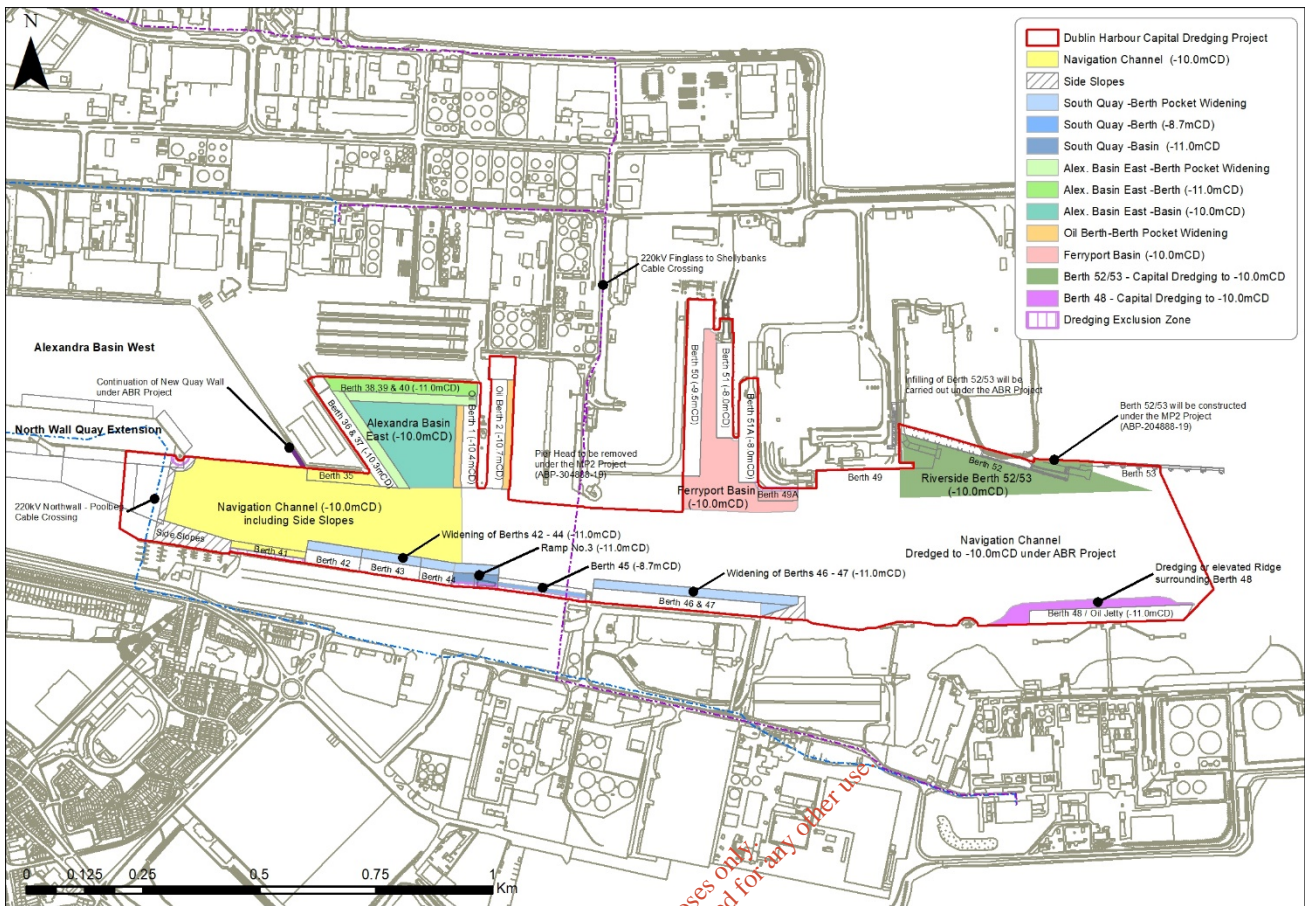


Figure 1-1 Main elements of the Dublin Harbour Capital Dredging Project

## 1.4 Technical Difficulties or Lack of Data

The compilation of the information necessary for the EIAR did not present any significant difficulties. In addition to published datasets, the preparation of the EIAR has drawn on the environmental monitoring programme which is currently in place for the construction of the Alexandra Basin Redevelopment (ABR) Project, the first Strategic Infrastructure Development brought forward to planning from the Dublin Port Masterplan 2040, and which is currently at the construction stage of development. The monitoring programme comprises:

- continuous noise and dust monitoring at two locations;
- periodic vibration monitoring;
- continuous water quality monitoring within the inner Liffey channel at four locations (turbidity, dissolved oxygen, temperature, salinity);
- continuous water quality monitoring within Dublin Bay at four locations (turbidity at three depths). This is complemented by continuous wave climate and tidal current measurements.
- Passive Acoustic Monitoring (PAM) for Harbour Porpoise detection at two locations within Dublin Bay;
- Static Acoustic Monitoring (SAM) for Harbour Porpoise detection at four locations within Dublin Bay;
- records of marine mammal sightings by MMOs during dredging and piling operations;
- benthic surveys of the licenced dumping at sea site at the entrance to Dublin Bay;
- monthly seal surveys at Bull Island;
- lamprey surveys within the Liffey;

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- wintering waterbird surveys within the South Dublin Bay & River Tolka Estuary SPA;
- tern colony surveys;
- black guillemot surveys; and
- underwater noise surveys during piling and dredging activities to validate models used to assess the impact on migratory fish and marine mammals.

The site-specific scientific data collected to date was used to support the preparation of the EIAR for the Dublin Harbour Capital Dredging Project and serves to illustrate the depth of understanding of the environment in and around Dublin Port, including the inner Liffey channel (Dublin Harbour) and Dublin Bay.

The preparation of the EIAR was further assisted by the extensive environmental datasets collated during the preparation of the Strategic Environmental Assessment (SEA), for the purposes of the review of the Dublin Port Masterplan during 2017 and 2018.

Additional survey work has been undertaken in order to provide up-to-date baseline information on which to undertake the environmental assessments, in addition to the site-specific information from the existing databases from official sources.

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## 2 NEED FOR THE PROJECT

Dublin Port is the largest and most important port in the country. The combination of reasonable depth of water, proximity to the largest concentration of population on the island and excellent access to the national road and rail networks gives Dublin Port its importance in both the EU TEN-T network and in the national port system.

In common with other important parts of national infrastructure, there has been significant underinvestment in Dublin Port for many decades. For example, for 31 years from 1979 to 2010 Dublin Port & Docks Board and latterly Dublin Port Company (DPC) sought permission to expand the port by infill into Dublin Bay opposite Clontarf rather than optimising existing quays and lands.

A new direction for the development of the Port was established by the Dublin Port Masterplan 2012-2040 published in February 2012.

The Masterplan was reviewed and updated and the current version is the Dublin Port Masterplan 2040 Reviewed 2018, published in June 2018.

Between the publication of the original Masterplan in 2012 and the updated version in 2018, the challenges facing the Port changed significantly due to a number of factors:

- Rapid economic recovery after the 2008 recession led to large growth in cargo volumes from 28.1m gross tonnes in 2011 to 38.0m gross tonnes in 2018, an increase of 35.2%.
- The country's population increased by 6.2% from 4.6m in 2011 to 4.9m in 2018.
- Following the referendum in the UK concerning Brexit in June 2016 and the UK's decision to leave the EU in January 2020, the patterns of trade have already begun to change with increased growth on services between Dublin and ports in Continental Europe such as Rotterdam, Zeebrugge and Cherbourg.

The Dublin Port Masterplan approach of redeveloping existing brownfield sites which are already in operation, to deliver strategic infrastructure projects such as the ABR Project and MP2 Project is not straightforward. The areas where much needed infrastructural improvements is required are in daily use and throughput volumes are expected to grow to 77.2 million tonnes by 2040.

DPC is currently constructing the ABR Project by way of discrete work packages designed to allow existing customers' growing businesses to continue with minimum disruption. The same approach will be necessary for the already consented MP2 Project.

The Dublin Harbour Capital Dredging Project supports these significant infrastructure developments by providing sufficient water depth within Dublin Harbour's navigation channel, basins and berths for the safe movement of vessels to and from the port. The same constraints are applicable whereby the project will need to be delivered through a series of discrete work packages to minimise disruption to existing port activities.

The experience of recent years suggests that there can be unforeseen circumstances which impact on the timing of planned project works in Dublin Port. In such circumstances, it is very difficult to predict when individual works packages within the Dublin Harbour Capital Dredging Project should commence.

Because of such uncertainties, DPC requires an 8 year Foreshore Licence and associated Dumping at Sea Permit to provide the required flexibility to deliver the capital dredging project at the optimum times within that timeframe.

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DPC estimates that the total cost of implementing the Dublin Port Masterplan 2040 will be in the order of €1.7 billion (2020 prices). In the shorter term, DPC has a €1 billion ten year capital expenditure programme from 2019 to 2028. By any standards, the scale of the infrastructural development challenge in Dublin Port is enormous.

In this dynamic environment, the construction timescales for individual projects within the overall Masterplan development programme are liable to change in response to circumstances. This is an inevitable consequence of DPC's preferred sustainable approach to the brownfield development of the existing Dublin Port estate rather than the less sustainable greenfield development at another location where construction timelines could be far shorter and more certain. DPC's choice of the brownfield approach rather than a greenfield approach is founded on DPC's commitment to the principles of proper planning and sustainable development.

The framework of the Dublin Port Masterplan (including the 2018 review) and the related Strategic Environmental Assessment (SEA) and Natura Impact Statement (NIS) in conjunction with the Environmental Impact Assessment Report (EIAR) and the NIS at the project level of the Dublin Harbour Capital Dredging Project provide a robust basis for DHLGH and the EPA to complete all relevant environmental assessments to facilitate consents of 8 years duration.

The environmental appraisals presented in this EIAR have taken into account the environmental implications of an 8-year consent and conclude that there is no environmental impediment to the granting of an 8-year consent. A summary is presented below:

- The environmental appraisals have been undertaken within the context of the Strategic Environmental Assessment (SEA) prepared for the Dublin Port Masterplan which is based on an assessment of incremental time periods from 2018 to 2040.
- The footprint of the Dublin Harbour Capital Dredging Project lies entirely within Dublin Harbour (no capital dredging is proposed within Dublin Bay). There are no benthic habitats, flora & fauna of conservation value within the application boundary of the site. Prolonged capital dredging activities over an 8-year period will therefore have no impact on biodiversity, flora & fauna as no natural changes are expected within that period of time.
- The Dublin Harbour Capital Dredging Project has been engineered to ensure that any potential impact on the surrounding Natura 2000 sites is at a *de minimis* level. The capital dredging period of 8-years has been assessed in the biodiversity, flora & fauna appraisals.
- No prolonged nuisance to the local communities is expected as a result of an 8-year capital dredging period because of the relatively low noise emissions generated by the dredging operations and the distance separation from the dredging operations and the nearest noise sensitive receptors
- It is however accepted that marine sediments not dredged within the first 5 years of the consent would need be subject to further sediment chemistry sampling and analysis, and eco-toxicological testing, if required, in accordance with OSPAR Guidelines. DPC accept that this should be conditioned by the Foreshore Licence and Dumping at Sea Permit.

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The ABR Project and MP2 Project are two of a series of Dublin Port Masterplan projects required to provide capacity for this growth. The Dublin Harbour Capital Dredging Project supports these significant infrastructure developments by providing sufficient water depth within Dublin Harbour's navigation channel, basins and berths for the safe movement of vessels to and from the port and whilst at berth.

A review of EU, national, regional and local land use and transport planning and development policy has shown the Dublin Harbour Capital Dredging Project to be consistent with the policies guiding and regulating the development of Dublin Port.

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## 3 PROJECT DESCRIPTION

The Dublin Harbour Capital Dredging Project is being proposed against a background where capital dredging has been recently completed within the ABR Project (March 2021) to deepen Dublin Port's navigation channel to -10.0m CD, from the Western Oil Jetty in Dublin Harbour to the -10.0m CD contour in Dublin Bay. Moreover, the Dublin Port Masterplan 2040 has confirmed that -10.0m CD will be the final depth of the navigation channel at Dublin Port.

### 3.1 Site Location

Dublin Port is the largest Port in Ireland, situated in Dublin on Ireland's Eastern Coastline. The Northern Lands and Southern Lands of Dublin Port (Dublin Port Estate) comprise an area of 265 ha of land entirely within the ownership of Dublin Port Company. The entire Port Estate comprises 309 ha, including the lands at the Dublin Inland Port. The main road transportation route between the Dublin Port Estate and the national road network is via the Dublin Port Tunnel. The site is also connected to the national rail network.

The proposed Dublin Harbour Capital Dredging Project comprises capital dredging works within the Dublin Harbour area of Dublin Port. The proposed area to be dredged lies entirely within the Foreshore of the inner Liffey Channel between the Northern Lands of Dublin Port and the Southern Lands of Dublin Port. It is proposed to dispose of the dredge spoil at a licenced offshore disposal site located to the west of the Burford Bank at the approaches to Dublin Bay.

### 3.2 Development Area

The proposed capital dredge area for which Foreshore and Dumping at Sea consents are sought, and in respect of which this EIAR has been prepared, is defined by the 'red line' application boundary as illustrated on the application drawings. The project application boundary, overlain on the existing Port layout is presented previously in Figure 1-1. The application site area is 27 ha (excluding the area of the licenced offshore disposal site).

The Dublin Harbour Capital Dredging Project is designed to provide:

- Deepening of the navigation channel from -7.8m CD to -10.0m CD between the North Wall Quay Extension and the Western Oil Jetty, including deepening of riverside Berth 35 (Ocean Pier) to -10.0m CD and widened to 50m.
- Deepening of Alexandra Basin East from -7.8m CD to -10.0m CD with Berths 36 and 37 widened to 50m and Berths 38, 39 and 40 deepened to -11.0m CD and widened to 50m.
- Deepening of the Oil Basin from -7.8m CD to -10.7m CD with Berths OB1 and OB2 widened to 50m.
- Deepening of the Ferryport Basin from -7.8m CD to -10.0m CD.
- Deepening of riverside Berth 52 to -10.0m CD following construction of the new Berth 52 quay under the MP2 Project (ABP-304888-19).
- Widening of South Port Berths 42, 43, 44, 45, 46 and 47 to 50m.
- Removal of ridge between the navigation channel and the Poolbeg Oil Jetty (Berth 48) to -10.0mCD.

Each of the elements of the proposed Dublin Harbour Capital Dredging Project is described below:

**Navigation Channel:** Capital dredging is required within the main navigation channel between the North Wall Quay Extension and the Western Oil Jetty to deepen the channel from -7.8m CD to a standard depth of -10.0m CD. This element of dredging will complete the dredging of the navigation channel envisaged by the Alexandra Basin Redevelopment (ABR) Project, originally permitted under Foreshore Licence MB/2016/01725 but which only remains valid to 20<sup>th</sup> June 2022.

The dredging of the navigation channel will terminate 15m downstream of an existing 220 kV cable crossing of the River Liffey which is located between Poolbeg Marina and the terminus of the North Wall Quay Extension as shown in Figure 1-1. The cable lies at a depth of circa -10m CD. Terminating the capital dredging 15m downstream of the cable crossing creates a sufficient buffer to ensure it is not affected in any way.

The proposed capital dredging works will also enable the riverside Berth 35 at the southern end of Ocean Pier to operate at a standard depth of -10.0m CD. Berth 35 is designed for multi-purpose use utilising mobile cranes to transfer the cargo from ship to shore.

**Alexandra Basin East:** Capital Dredging is required to deepen the Alexandra Basin East Basin from -7.8m CD to -10.0m CD with Berths 36 and 37 widened to 50m and Berths 38, 39 and 40 deepened to -11.0m CD and widened to 50m.

These works are required to facilitate the following port activities:

### *Lo-Lo (Lift-On Lift-Off) Container Freight Terminal*

There is one major Lo-Lo Container Freight Terminal within Alexandra Basin East utilising Berth 38, Berth 39 and Berth 40 along its northern perimeter. There are two main groups of cargo handling equipment used for containers: primary handling equipment and secondary handling equipment.

Primary handling equipment refers to cranes of different types used to load and unload containers on and off the ship. There are two main types of crane in use in Dublin Port, rail mounted gantry cranes and dock mobile cranes. Containers are moved between the stacks and the quay side cranes by special heavy duty truck and trailer combinations or by reach stackers. Secondary handling equipment refers to the equipment (usually gantry cranes of one type or another) used to store containers in back areas in large stacks.

In Dublin, there are rubber-tyred gantries (RTGs) and rail mounted gantries. The largest RTGs can store containers in stacks up to six containers high and seven wide. These stacks occupy large areas of port land and DPC has a utilisation target of 40,000 TEU (twenty-foot equivalent units) per hectare per annum for the port's container freight terminals.

### *Ro-Ro (Roll-On Roll-Off) Freight Terminal*

There is one major Ro-Ro Freight Terminal within Alexandra Basin East utilising Berth 36 and Berth 37 along its eastern perimeter (Ocean Pier) with a ramp located at the northern end of Berth 36 to off-load and on-load freight. Ro-Ro refers to shipping services and activities where vehicles are driven on and off ferries or other specialised ships (such as car carriers). Some services are freight only; others carry a combination of freight and passengers. The Ro-Ro Terminal in Alexandra Basin East is for freight only.

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Ro-Ro freight is transported either “accompanied” or “unaccompanied”. “Accompanied” refers to trailer units to which the cab is attached at all times and the driver accompanies the vehicle on the Ro-Ro ferry. “Unaccompanied” refers to freight trailers that are delivered and collected from the compound adjacent to the vessel. These trailers are driven on and off ships by dock workers.

The main difference in the two operations is the amount of land needed to service the units. In the case of accompanied freight, the units drive off the vessel and leave the port immediately. Unaccompanied freight requires larger areas of parking.

### *Multi-purpose Use of Berths*

The Berths in Alexandra Basin East are designed to be multi-purpose. In particular Berth 37 is used for a wide range of cargo which utilises mobile cranes to transfer the cargo from ship to shore.

**Oil Basin and Berths:** Capital Dredging is required to deepen the Oil Basin from -7.8m CD to -10.7m CD with Berths OB1 and OB2 widened to 50m.

Dublin Port handles many different bulk liquid products including petrol, diesel and kerosene, but also non-petroleum liquids such as molasses. 65% of oil imported into Ireland comes through Dublin Port.

The liquid petroleum products are discharged from tanker ships at four dedicated berths within the Dublin Port Estate and then pumped through a pipeline system, shared by different operators, to their storage tanks within the Port. Storage capacity in excess of 300,000 tonnes of oil products is available within the Port. Oil products are delivered by road from the Port to distribution centres and filling stations outside the Port.

There are two Oil Jetties in operation within the Dublin Port Estate supporting a range of above ground pipework. The Western Oil Jetty has two berths (Oil Berth 1 and Oil Berth 2). These berths facilitate the majority of petroleum product imports at Dublin Port. In 2017 Oil Berth 1 had 181 ship arrivals and Oil Berth 2 had 190 ship arrivals. The Western Oil Jetty forms the boundary between Alexandra Basin East and the Oil Basin. The Dublin Harbour Capital Dredging Project includes dredging Oil Berth 1, Oil Berth 2 and the Oil Basin. The Eastern Oil Jetty also has two berths (Oil Berth 3 and Oil Berth 4). These berths facilitate the majority of bitumen products and all of the Liquid Petroleum Gas (LPG) imports at Dublin Port. In 2017 Oil Berth 3 had 59 ship arrivals: Oil Berth 4 is rarely used and had only 5 ship arrivals.

The works associated with the MP2 Project will include the infilling of the basin east of the now virtually redundant Oil Berth 4 on the Eastern Oil Jetty. As part of the infilling of Oil Berth 4, it is proposed to redevelop Oil Berth 3 as a future deep-water container berth (standard depth of -13.0m CD) for the Container Freight Terminal. This will facilitate the change of use of the berth from petroleum importation to container handling when the throughput of petroleum products through Dublin Port declines as a result of national policies to decarbonise the economy. The Dublin Harbour Capital Dredging Project excludes Oil Berth 3 which will be subject to capital dredging under the MP2 Project.

**Ferryport Basin:** Capital Dredging is required to deepen the Ferryport Basin from -7.8m CD to -10.0m CD.

There are currently three Berths within the Ferryport Basin with ramps for Ro-Ro freight and passengers, Berth 49A, Berth 51 and Berth 51A. These berths are served by two ferry terminal buildings. Terminal 2 is used by Stena Line and Terminal 1 is used by Irish Ferries, with seasonal use by Isle of Man Steam Packet Company. Terminal 2 will be demolished as part of the MP2 Project with the existing Terminal 1 Building being used as a

unified terminal building thereafter. The eastern perimeter of the Ferryport Basin (Berth 50) forms part of a major Lo-Lo Container Freight Terminal.

**Riverside Berths 52/53:** Capital Dredging is required to deepen riverside Berth 52 to -10.0m CD following construction of the new Berth 52 quay under the MP2 Project (ABP-304888-19).

Berths 52 / 53 are currently located within a basin at the eastern end of the Port, on the northern side of the River Liffey. Both Berths 52 and 53 are fitted with Ro-Ro ramps and are currently used by Seatruck for their Ro-Ro services to the UK. In 2014, the Alexandra Basin Redevelopment Project was granted permission by An Bord Pleanála (ABP Ref. PL29N.PA0034). The permissions included for: the dismantling and removal of the existing Berth 52/53 infrastructure; the construction of a new quay wall (Riverside Berth 52); Infilling of existing Berth 52 / 53 with treated dredged material raising of existing surface levels by approx. 1.4m and the installation of a Ro-Ro ramp. In July 2020, An Bord Pleanála granted Planning Permission for the MP2 Project (ABP Ref. ABP 304888-19) which included the construction of a new Ro-Ro Jetty (Berth 53) and re-orientating the already consented Berth 52. The new riverside berths (Berth 52 and Berth 53) will be used predominantly used for the berthing of Ro-Ro ferries. The new berthing infrastructure will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 240m in length.

**South Port Berths:** Capital Dredging is required to widen the South Port Berths 42, 43, 44, 45, 46 and 47 to 50m.

The South Port Berths 42 – 47 are located on the River Liffey adjoining the Poolbeg Peninsula. The berths are currently used to support a major Lo-Lo Container Freight Terminal and Bulk Cargo operations. The Bulk Cargo operations utilise a number of yards, warehouses and silos for the temporary storage of the cargo.

**Poolbeg Oil Jetty (Berth 48):** Capital Dredging is required to remove a ridge between the navigation channel and the Poolbeg Oil Jetty (Berth 48) to -10.0m CD.

The Poolbeg Oil Jetty (Berth 48) is located north of the ESB Generating Station on the Poolbeg Peninsula. It is used to transfer petroleum products to and from the nearby oil tanks operated by the National Oil Reserves Agency (NORA) and ESB.

### 3.3 Capital Dredging Design Considerations

The following design elements have been considered when carrying out the design of the capital dredging works:

- Maximise the potential of the existing port property in the context of the Dublin Port Masterplan 2040, reviewed 2018;
- Provide sufficient water depth within the navigation channel, basins and berths for the design vessels proposed;
- Minimise the impact of capital dredging on the operation of existing berths;
- Provide a sufficiently wide channel to accommodate the manoeuvring and piloting of vessels;
- Take full cognisance of environmental constraints and where feasible provide mitigation through engineering design.

### 3.4 Capital Dredging Volumes

The volume of capital dredging required for each element of the works, as described above, has been calculated from hydrographic surveys undertaken by Hydromaster in Q3 2020. The total estimated dredge volume is estimated to be 500,000m<sup>3</sup> and includes a siltation tolerance/ contingency to account for material which has settled in Dublin Harbour in the period between successive maintenance dredging campaigns and the commencement of the capital dredging campaign (Table 3-1).

The material to be dredged comprises clays, silts, sands and gravels with occasional cobbles. No dredging of rock is required. A summary of the sediment chemistry and eco-toxicological properties of the dredged material is presented in Section 8 of this Non Technical Summary.

Table 3-1 Capital Dredging Volumes

Dredge Zone	Estimated Dredge Volume above design (m <sup>3</sup> )
Zone 1 – Navigation Channel	121,008
Zone 2 – South Port Berths	26,146
Zone 3 – Alexandra Basin East	47,020
Zone 4 – Oil Basin	7,842
Zone 5 – Ferryport Basin	27,970
Zone 6 – Riverside Berth 52	127,515
Zone 7 –Poolbeg Oil Jetty (Berth 48)	<u>11,296</u>
Dredge Volume (m <sup>3</sup> )	368,797 m <sup>3</sup>
Siltation / Tolerance / Contingency (m <sup>3</sup> )	131,203 m <sup>3</sup>
<b>Total Dredge Volume (m<sup>3</sup>)</b>	<b>500,000 m<sup>3</sup></b>

Note:

- Volumes include for all Berths to be widened to 50m (the existing Berths range from 24m to 35m wide).

### 3.5 Loading Operations

The capital dredging works will be carried out using a trailing suction hopper dredger (TSHD) and/or a backhoe dredger. A typical TSHD which has previously undertaken capital dredging works at Dublin Port is shown in Plate 3-1. The TSHD operates by lowering its trailing arm until the dredging head makes contact with the seabed. The sediments on the seabed are then sucked up through the trailing arm into a hopper located within the hull of the vessel (similar in many ways to a giant vacuum cleaner). When the allowed capacity of the hopper has been reached, the TSHD lifts the trailing arm back into its resting position and sets sail to the licenced offshore disposal site to dispose of the dredged material. Computer controlled equipment on board the TSHD accurately sets the depth and track of the dredge head and monitors the quantity of material being dredged. The tracks of the TSHD for each loading and disposal trip are also recorded.

No overspill of the hopper will be permitted during the loading operations to minimise the amount of suspended solids within the River Liffey channel during the loading operations. When working within the navigation channel, the TSHD will also work in the direction of flow to avoid any potential of creating elevated levels of suspended

solids across the River Liffey. All capital dredging operations will take place within the period October to March inclusive.



Plate 3-1 Typical Trailing Suction Hopper Dredger Freeway

There will also be a requirement for a back-hoe dredger mounted on a barge on site to carry out small scale elements of the dredging works, notably for areas where the TSHD cannot reach or where the material is too stiff to be removed by the TSHD. This material is either pulled into the track of the TSHD for collection or loaded into a separate hopper barge which is taken directly to licenced offshore sea disposal site to dispose of the dredged material.

Alternatively, the dredging contractor may select a back-hoe dredger mounted on a barge, supported by hopper barges, to be the primary means of undertaking the capital dredging works. Other ancillary equipment will include a bed-leveller to remove peaks and troughs created by the dredger and a survey vessel.

### 3.6 Disposal Operations

It is proposed to dispose of the dredged material at the licenced disposal site at the entrance to Dublin Bay located to the west of the Burford Bank, presented in Figure 3-1. A summary of alternative options considered to disposal at sea are presented in Section 4 of this Non Technical Summary. The disposal operations are undertaken by the TSHD, or equivalent hopper barge, within the confines of the disposal site. The TSHD has doors at the bottom of the hull which are opened whilst the vessel moves at low speed allowing the dredged material within the hopper to be released. The disposal operation typically takes 10-15 minutes to empty the hopper. The hopper is then washed down with seawater whilst remaining within the confines of the disposal site before returning to the loading area. Each loading / dumping trip typically takes 2-4 hours.

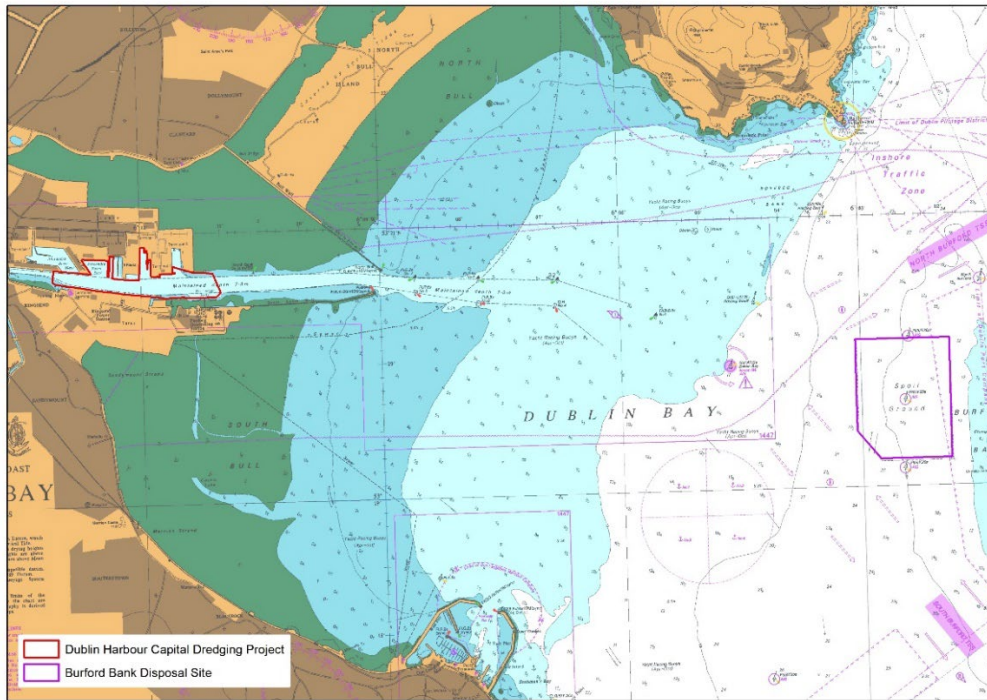


Figure 3-1 Location of licensed offshore disposal site

### 3.7 Environmental Management of the Dredging Operations

This section sets out typical management procedures undertaken by DPC for all dredging operations within Dublin Port.

Details of the planned dredging campaign are circulated in advance to all stakeholders and the public using a range of media platforms including the DPC website, newspaper advertisements and Notice to Mariners and through direct communication with users of the Inner Liffey Channel such as the Poolbeg Yacht, Boat Club and Marina, Stella Maris Rowing Club, Bull Wall Swimmers Group, ESB Generating Station, Synergen Power Station, Covanta Waste to Energy Plant and Dublin Port operators.

The Port Engineer manages operations during the dredging campaign and chairs a Dredging Working Group comprising representatives from the Harbour Master's Office, the Dredging Contractor, Environmental Facilities Manager, Marine Mammal Observers and Marine Archaeology Observers.

The Dredging Working Group convenes in advance of commencement, and at frequent regular intervals throughout the dredging campaign. In advance of commencement, the Dredging Working Group confirms that all consents and permits are in place and that all monitoring and mitigation measures are operational. The Dredging Working Group also confirms that the contractor understands the dredging information to be recorded and the required reporting frequency. The Dredging Working Group also ensures that appropriate Health and Safety arrangements are in place.

A bathymetric survey is completed within one week of commencement of the dredging campaign. A schedule of operations is agreed by the Port Engineer and the Dredging Working Group which takes account of Port Operations and vessel movements within the port.

Progress meetings of the Dredging Working Group are convened at an appropriate frequency determined by operations and conditions and may be daily.

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At the end of the dredging campaign a final bathymetric survey is undertaken within one week of completion. This is reviewed at a close-out meeting of the Working Group along with summary dredging documents prepared by the contractor. There may also be a requirement for additional post-dredge monitoring surveys.

The Port Engineer collates and files all data relating to the dredging campaign. All monitoring activities and results are reported in a yearly Environmental Report prepared for DPC by its environmental consultants.

This information is presented within an Annual Environmental Report (AER) submitted to the Office of Environmental Enforcement, EPA who review the information and make it publically available on the EPA Website. The information is also kept on file within Dublin Port and is available to view by any interested party including members of the general public.

### Working Hours

The proposed Dublin Harbour Capital Dredging Project is not expected to cause a nuisance to the local community. It is therefore proposed that the capital dredging operations will be carried out on a 24 hour basis, 7 days a week (24/7 basis). The impact of noise at the nearest noise sensitive receptors including Pigeon House Road is summarised in Section 11 of this Non Technical Summary. Noise monitoring will be put in place and adjustments made to the working hours, if required, to ensure compliance with Dublin City Council's standard construction noise limits for day time and night time working.

### Site Compound

A secure site compound within the grounds of existing DPC facilities (Maintenance and Supply Building) will be made available to the dredging contractor for the duration of each dredging campaign within the project. The facilities will comprise a Portable Office for management, engineering and drafting staff and an area for staff car parking.

Quayside berths will also be made available, as required, to enable the dredging vessels to undertake the following activities:

- Crew Transfers
- Fuel bunkering
- Collection of objects of potential archaeology interest discovered and retained during dredging operations
- Occasional removal of skips storing debris picked up during the dredging operations such as pieces of discarded cabling, fendering etc by a licenced waste operator.

### Traffic

The Dublin Harbour Capital Dredging Project will be undertaken by specialist dredging vessels, described previously, arriving by sea and departing by sea. Occasional service vehicles are required for bunkering and removal of skips. Private car use will be limited to circa 10 dredging contractor staff. Consequently, there will be no perceptible traffic impact on the national road network.

## 4 EXAMINATION OF ALTERNATIVES

Assessment of reasonable alternatives is mandatory under the EIA Directive. The process allows for adjustment to minimise environmental impact thus minimising project significant effects on the environment.

Alternatives are different ways of carrying out the Project in order to meet its agreed objective and there are a range of types of alternatives in relation to a Project: Design; Technology; Location; Size; and Scale.

The assessment of alternatives for the Dublin Harbour Capital Dredging Project has been undertaken in accordance with the following guidance documents:

- The EU Commission's Environmental Impact Assessment of Projects Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014 /52/EU)
- The EPA's Advice notes on Current Practice (in the preparation of Environmental Impact Statements) and The Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIARs) (EPA, 2017)
- The Department of Housing, Planning and Local Government Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018.

### 4.1 Examination of Strategic Alternative Options

At strategic level, the Masterplan identified that the Dublin Harbour Capital Dredging Project is a key element of its implementation, underpinning the Masterplan's fundamental approach of providing capacity in Dublin Port for the 77.2m gross tonnes projected by 2040 by maximising the utilisation of Dublin Port's brownfield lands. The assessment process in support of the Masterplan identified that the development in this area of the Port is the most sustainable approach and the desired approach from a strategic point of view.

The Dublin Harbour Capital Dredging Project is concluded to be an essential step in achieving the Port's ambitious throughput objective.

### 4.2 Examination of Project Level Alternative Options

At detailed design level the evolution of the proposed capital dredging works was considered to achieve the Dublin Harbour Capital Dredging Project's objective of loading and disposing of 500,000m<sup>3</sup> of marine sediments.

#### 4.2.1 Loading Alternatives

A number of alternative loading options were examined including the use of a range of mechanical and hydraulic dredgers. The preferred option identified was the use of a backhoe dredger and/or a Trailing Suction Hopper Dredger. No over-spill will be permitted whilst loading within the inner Liffey channel (Dublin Harbour). The quantity of dredged material entering the water column as a sediment plume is therefore expected to be similar for both types of dredger. Monitoring undertaken during the ABR Project has shown that loading operations within Dublin Harbour has had no significant impact on water quality.

#### 4.2.2 Disposal and Re-use Alternatives

The following disposal and re-use alternatives for the dredged marine sediments were considered:

- Do-Nothing Scenario;
- Beneficial Re-use;
- Disposal on Land;
- Incineration;
- Disposal at Sea.

### Do-Nothing Scenario

The proposed capital dredging is required to achieve the required charted depth of water within the navigation channel, basins and berths as set out in the Dublin Port Masterplan 2040, reviewed 2018.

In the absence of the capital dredging works, port investment would fail to deliver the required increase in usage identified by the Masterplan.

The deepening of the navigation channel and basins is required for the safe passage of vessels entering and leaving the port, accommodating large vessels into the future.

The berthing pockets are required to provide sufficient depth of water at all stages of the tide, to vessels berthed at the Port. This is also essential for the safe and effective operation of the proposed port facilities. Should the pockets not be dredged to the required depths then this would result in the limited capacity of these berths to accommodate large vessels into the future.

The overall consequence of this is the port would fail to provide for future anticipated growth. This would have a critical impact upon national and regional economies, particularly by way of trade, employment and associated taxes for societal benefit. This in turn, will undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

Additionally, the absence of the proposed capital dredging works would result in limits to future port investment resulting from a loss of predicted revenue following capacity constraints. This would inhibit the attainment of objectives specified within the Masterplan; including the integration of the port with the city, by way of the promotion of sustainable linkages, and the amelioration of the visual impact of the port upon its landward surroundings. It would further hinder the growth of the port's existing vessel operators and prohibit any potential for new operators from residing at the port as well.

The do-nothing scenario, in the absence of these elements, is largely representative of existing activities already taking place within this location. Therefore this scenario will not impact upon the environmental factors such as biodiversity, flora and fauna, air and water quality etc at the site.

In the event that Burford Bank is not used to deposit sediment from Dublin Port as part of the Dublin Harbour Capital Dredging Project, then there will be no significant environmental, social or economic consequences. Dredge disposal activities currently undertaken at Burford Bank, in relation to Dublin Port, will continue to take place in compliance with existing Foreshore Licences and Dumping at Sea Permits. The environmental, social and economic consequences of this will continue as they presently exist.

However, the absence of the Dublin Harbour Capital Dredging Project would have a critical economic impact thus undermining the Port's ability to attain the objectives specified within the Masterplan.

## Beneficial Re-use

The options for beneficial uses of the mainly sandy CLAY marine sediments to be dredged are limited. The potential uses for the dredged marine sediments are:

- Engineering Uses
  - Using the dredged material as construction material
  - Beach Nourishment
  - Land Creation/Reclamation/Capping as part of port development
  - Flood and coast protection (above the level of mean high water springs)
- Environmental Enhancement
  - Wetland Habitat Creation/Enhancement
  - Sediment Cell Maintenance
- Agricultural Uses
  - Improve land of poor agricultural quality.

**Engineering Use - Construction Material:** The physical characteristics of the sandy CLAY which makes up the dredged marine sediments renders them unsuitable for forms of engineering works, other than for reclamation purposes which is discussed later.

**Engineering Use - Beach Nourishment:** Beneficial re-use of the dredged marine sediments was considered for beach re-nourishment, particularly at sites along the northern shoreline of Dublin Bay where erosion is taking place. However, the grading of the marine sediments to be dredged is too fine to be suitable for this type of use.

**Engineering Use - Land Creation/Reclamation:** Dublin Port Company is focussed on the redevelopment of brown-field sites within the Dublin Port Estate. Consequently, there is no further requirement for fill material within the Dublin Port Estate.

**Engineering Use – Flood/Coastal Protection Works:** Again, the physical characteristics of the sandy CLAY which makes up the dredged material makes them unsuitable for coastal protection works.

**Environmental Enhancement - Wetland Habitat Creation/Enhancement:** Fine dredge material can be used for habitat creation and re-nourishment projects such as mudflat recharge or salt marsh restoration. These types of projects however, typically require small quantities of sediment (e.g. 1,000m<sup>3</sup> - 5,000m<sup>3</sup>) (UKMSAC, 2001). A search of the greater Dublin area did not identify any suitable sites for this type of beneficial re-use.

**Environmental Enhancement - Sediment Cell Maintenance:** The Dublin Harbour Capital Dredging Project has been designed to ensure that the sand and gravel fractions of the marine sediments to be dredged are not lost from the natural Dublin Bay sediment cell. The offshore disposal site to the west of the Burford Bank has been selected to keep the sands and gravels deposited at the site within the natural Dublin Bay sediment cell. Over time, the fine sand fraction will migrate from the site, particularly as a result of storm action, and will remain part of the natural coastal processes regime of Dublin Bay. The site is also dispersive with respect to silts and

clays. Silts and clays deposited at the offshore disposal site will be dispersed in a north-south direction to the wider Irish Sea.

The use of this site to dispose of sand and gravel fractions as part of the Dublin Harbour Capital Dredging Project would result in no environmental impacts given its current use for this purpose under the ABR project. Whilst, the extent to which sand and gravel fraction are deposited within Burford Bank would be greater, this would have no discernible environmental impact within Dublin Bay or on the qualifying interests of the Rockabill to Dalkey Island SAC.

This has been identified as a feasible re-use option for the coarser portion of the dredged materials, as these will remain within the cell to replenish its coastal processes. It is a partial technology alternative as it is not suitable for the finer materials.

**Agricultural Use - Improve land of poor agricultural quality:** Again, the physical characteristics of the sandy CLAY which makes up the dredged material makes them unsuitable for agricultural use.

Beneficial re-use forms a partial technology suitable for the coarser portions of the dredged materials through Environmental Enhancement - Sediment Cell Maintenance technology.

### Disposal on Land

This disposal option would require the dredger to bring the dredge spoil ashore, either by barge or by pumping. The material would then be temporarily stored in a designated hard standing or lagoon area to allow for dewatering/drying before subsequent transfer by road to a landfill site.

Even following a period of settlement, the dredged sediment would be likely to be considered a wet material for the purposes of land-filling. Landfill space is in very short supply and it is often the case that landfill sites are only licensed to receive relatively small volumes of wet waste (e.g. 500m<sup>3</sup>) per week. Due to the large quantity

### Incineration

There are no suitable incineration facilities in Ireland capable of accepting the proposed type or quantity of dredge spoil. The dredge spoil would therefore need to be transported to mainland Europe. This option is considered to be unreasonable and has been ruled out due to prohibitive cost and having regard to the proximity principle.

### Disposal at Sea

A chemical sediment and eco-toxicological sampling and analysis programme, described in Chapter 8, confirmed that the marine sediments can be classified as Class 1 (uncontaminated, no biological effects likely) in accordance to the Guidelines for the Assessment of Dredge Material for Disposal at Sea (Marine Institute, 2006). The dredged marine sediments are therefore suitable for disposal at sea.

The closest licenced offshore disposal site is located at the approaches to Dublin Bay to the west of the Burford Bank as presented previously in Figure 3-1. The site lies within the Rockabill to Dalkey Island SAC for which the qualifying interests are Harbour Porpoise and Reefs.

This site is currently being used to dispose of dredge spoil arising from the ABR Project under Dumping at Sea Permit S0024-01 as granted by the EPA in September 2016. The site is also used by DPC for the disposal of

dredge spoil arising from maintenance dredging. The site is similarly used for the disposal of dredged spoil from Dun Laoghaire and Howth Harbours.

As discussed under the technology of Environmental Enhancement - Sediment Cell Maintenance, the use of this site to dispose of sand and gravel fractions as part of the Dublin Harbour Capital Dredging Project would result in no environmental impacts given its current use for this purpose under the ABR project. Whilst, the extent to which sand and gravel fraction are deposited within Burford Bank would be greater, this would have no discernible environmental impact within Dublin Bay or on the qualifying interests of the Rockabill to Dalkey Island SAC.

Extensive environmental monitoring has been undertaken with respect to the dumping of dredged spoil from the ABR Project. The results of the monitoring undertaken during 2017-2020 are presented in the Annual Environmental Reports (AERs) which are available for download on the EPAs Website. During this period capital dredging took place within the inner Liffey channel and Dublin Bay and maintenance dredging took place within the inner Liffey channel including the Dublin Harbour Capital Dredging Project area.

The AERs concluded that measured turbidity results demonstrated that both the maintenance dredging campaigns and the ABR Project capital dredging campaign did not cause any discernible increase in turbidity above recorded background levels (see Chapter 9 Water Quality).

The environmental impact of dredging and the disposal activities is described in detail within the EIAR (see Chapter 7 Biodiversity, Flora and Fauna, Chapter 9 Water Quality, Chapter 12 Underwater Noise, Chapter 13 Coastal Processes and Chapter 14 Cultural Heritage). The assessments have concluded that disposal of the dredged marine sediments will have no discernible environmental impact within Dublin Bay or on the qualifying interests of the Rockabill to Dalkey Island cSAC.

The licenced offshore disposal site has been proven to be suitable for the safe disposal of dredge spoil arising from the Dublin Harbour Capital Dredging Project. The site also has the advantage that it is dispersive for clays and silts but sands and gravel are retained within the natural Dublin Bay sediment cell (see section on Environmental Enhancement - Sediment Cell Maintenance above).

There are no other licenced offshore disposal sites within the Greater Dublin Bay Area. The opening of a new disposal site further offshore would have no additional environmental benefit. On the contrary, it would lead to unnecessary increases in energy usage to transfer the dredged marine sediments from the dredging area to the disposal site; it would lose sands and gravels from the natural Dublin Bay sediment cell and it may have a greater impact on fisheries interests.

### Disposal Final Design

The Disposal at Sea method, in combination with Environmental Enhancement - Sediment Cell Maintenance technology, has been selected as the disposal final design with no environmentally better alternative.

## 4.3 Summary of Consideration of Alternative Options

At strategic level, the Masterplan identified that the Dublin Harbour Capital Dredging Project is a key element of its implementation, underpinning the Masterplan's fundamental approach of providing capacity in Dublin Port for the 77.2m gross tonnes projected by 2040 by maximising the utilisation of Dublin Port's brownfield lands.

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The assessment process in support of the Masterplan identified that the development in this area of the Port is the most sustainable approach and the desired approach from a strategic point of view.

The Dublin Harbour Capital Dredging Project is concluded to be an essential step in achieving the Port's ambitious throughput objective.

At detailed design level the evolution of the proposed capital dredging works was considered to achieve the Dublin Harbour Capital Dredging Project's objective of loading and disposing of 500,000m<sup>3</sup> of marine sediments.

A number of alternative loading options were examined including the use of a range of mechanical and hydraulic dredgers. The preferred option identified was the use of a backhoe dredger and/or a Trailing Suction Hopper Dredger. No over-spill will be permitted whilst loading within the inner Liffey channel (Dublin Harbour). The quantity of dredged material entering the water column as a sediment plume is therefore expected to be similar for both types of dredger. Monitoring undertaken during the ABR Project has shown that loading operations within Dublin Harbour has had no significant impact on water quality.

A number of disposal options were also examined including: do-nothing; beneficial re-use; disposal on land; incineration and disposal at sea. The preferred option identified was a combination of disposal at sea and re-use with computational modelling undertaken to determine appropriate method, rate, timing and location of these activities. A sediment chemistry and eco-toxicological sampling and analysis programme confirmed the sediments had no biological effect and thereby suitable for the safe disposal at sea. No significant environmental impacts of this design choice were identified.

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## 5 SCOPING & CONSULTATION

The evolution of the Dublin Harbour Capital Dredging Project to its current form reflects the extensive consultation processes undertaken, initially in the preparation of the Masterplan, and more directly in the context of this specific project. The process of consultation has enabled Dublin Port Company (DPC) to solicit opinions on general development options for the port and facilitated differing perspectives to be taken into account in the initial stages of the project.

The Environmental Impact Assessment (EIA) Directive provides for a mandatory scoping process where requested by a developer, however, DPC did not request a “formal” scoping opinion from any competent authority in relation to the Dublin Harbour Capital Dredging Project, rather, and in accordance with good practice, DPC “informally” or voluntarily scoped the contents of an Environmental Impact Assessment Report (EIAR) by engaging in consultations with statutory bodies and stakeholders and through public consultation. The informal scoping was undertaken in accordance with the European Commission’s 2017 “Environmental Impact Assessment of Projects Guidance on Scoping”, which states:

*“It is good practice to carry out Scoping even if it is not required by legislation: Developers should endeavour to include a Scoping stage in their work programme for EIA, so that all of the concerns can be identified and addressed during the Scoping stage.”*

The purpose of the EIAR scoping process is to identify the issues which are likely to be important during the environmental impact assessment and to eliminate those that are not relevant. The scoping process identifies the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the EIAR. The primary focus of scoping is to define the most appropriate assessment of significant effects related to the proposed development.

In relation to consultation, the EIA Directive, Irish implementing legislation and recent guidance documentation make clear that there are specific requirements regarding the use of the EIAR, both as a tool to inform concerned stakeholders and the public, as well as to make decisions regarding development consent for projects. Accordingly, this EIAR provides evidence of effective consultations which have already taken place and provides the basis for effective consultations to come.

The scoping and consultation process has resulted in an iterative design procedure, such that the project has been modified to address the issues raised by statutory consultees, stakeholders and the public.

### 5.1 Consultation

#### Consultation and the Masterplan Review

In 2017, DPC commenced a review of the Dublin Port Masterplan 2012 – 2040 (the Masterplan). When adopted in 2012, the Masterplan made provision for periodic reviews to take account of changes in the demand for the use of port facilities and developments in port operations.

This first review of the Masterplan has involved a detailed public consultation process aimed at securing views from relevant stakeholders whose perspectives on the port are important.

The consultation process took two distinct stages:

### Stage 1: 2017 Masterplan Review Consultation Process

The 2017 Masterplan Review consultation process ran from January 2017 to March 2017 and involved the following elements:

- The publication of a detailed Masterplan Review 2017 Consultation Paper, outlining the issues that were being taken into consideration in the context of the review of the Masterplan.
- The initiation of a formal consultation process to secure submissions on the Masterplan Review.
- Extensive face to face briefings with key stakeholders prior to the launch of the Masterplan Review 2017 Consultation Paper.
- Presentations to the Central and South East Local Area Committees of Dublin City Council on the review of the Masterplan.
- A comprehensive media campaign surrounding the Masterplan Review designed to generate interest and encourage participation in the master planning process.
- A public information campaign including advertisements, door to door leaflet drops and an information briefing published for local residents and stakeholders.
- Briefings with DPC staff on the review of the Masterplan and an information display for the duration of the consultation period at the offices of DPC with all materials available for staff and visitors to inspect.
- Social media campaign to raise awareness, engagement and attendance across Facebook and Twitter channels.
- A Street Team active over two days in areas directly adjacent to Dublin Port distributing 6,000 flyers, placing 300 posters and visiting over 260 individual commercial premises.
- A series of events including:
  - local community briefings at Clontarf, East Wall and Ringsend  
[Clontarf Public Information Day held at Scoil Uí Chonaill GAA Club, 13<sup>th</sup> February 2017];  
[East Wall Public Information Day held at Sean O’Casey Community Centre, 15<sup>th</sup> February 2017];  
[Ringsend Public Information Day held at Clanna Gael Fontenoy GAA, 16<sup>th</sup> February 2017];
  - direct briefings with a selection of community and environmental groups.
- The publication of a Masterplan Review 2017 Environmental Report Consultation Paper by RPS Consultants in January 2017.

The 2017 consultation process led to a high level of participation from stakeholders with 130 people attending community briefings. There were 67 formal written responses received from a broad range of respondents including individuals, Resident’s Groups, commercial interests, statutory bodies and environmental entities.

Following the 2017 consultation process a detailed report outlining the responses to the consultation process was prepared. This Report can be accessed on the Dublin Port website ([www.dublinport.ie](http://www.dublinport.ie)).

As a consequence of the 2017 consultation process a number of specific issues and observations emerged from the submissions and responses received which fed into the Masterplan Review Process in the following ways:

DPC decided to initiate a Strategic Environmental Assessment (SEA) and an Appropriate Assessment (AA) of the proposals to revise the Masterplan. RPS was commissioned by DPC to carry out these assessments.

- I. The first stage of the SEA process was Screening, to determine if the Masterplan Review required an SEA. The initial output of the first stage was the SEA Screening Report, which was circulated in May

2017 to the statutory consultees for SEA in Ireland, being the Environmental Protection Agency (EPA), Department of Housing, Planning and Local Government (DHPLG), Department of Communications, Climate Action & Environment (DCCA), Department of Agriculture, Food and Marine (DAFM), and Department of Culture, Heritage and the Gaeltacht (DCHG). The SEA Screening Report introduced the potential for development of port lands on the north and south side of the River Liffey as part of the overall Masterplan.

- II. The second stage of the SEA process was Scoping, which was to provide sufficient information on the Masterplan 2040 to enable the consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the SEA Environmental Report. This SEA Scoping Report was circulated to the statutory consultees for SEA in Ireland in August 2017 as well as the appropriate authorities in the UK to illicit their view on any potential transboundary environmental effects. A scoping workshop was held in September 2017 to allow for statutory consultees to participate in the scoping phase of the Masterplan 2040. A revised scoping report was developed to incorporate comments received from this workshop as well as those received during the statutory consultation period. Non-statutory stakeholders were provided with the revised Scoping Report on 24<sup>th</sup> November 2017 and all information was made publicly available on the DPC website. Non-statutory stakeholders who were provided with the SEA Scoping Report for comment were the Department of Transport, Tourism and Sport (DTTAS), Dublin City Council (DCC), Office of Public Works (OPW) including the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Project, Electricity Supply Board (ESB), National Transport Authority (NTA), Inland Fisheries Ireland (IFI), Transport Infrastructure Ireland (TII), Bird Watch Ireland, Local Residents Associations, Local Amenity Groups, Dublin Port Tenants, The Heritage Council, An Taisce; and the Irish Nautical Trust. The SEA Scoping Report again introduced the potential for development of port lands on the north and south side of the River Liffey as part of the overall Masterplan and introduced the concept of the phasing of developments that would be proposed by the Masterplan.
- III. A strategic Transportation Study was commissioned to determine how enhanced connectivity between the North and South Port areas could be provided and explore connectivity for different transport modes within the Port Estate in a context that is compatible with existing transportation strategies.
- IV. The existing Soft Values Programme of DPC was reviewed to determine opportunities for enhanced accessibility and integration between the port and the city.
- V. The approach of DPC to protecting and promoting cultural heritage and leisure aspects relevant to the port was assessed to determine how best to facilitate both elements in the context of future developments at the port.
- VI. Additional meetings were arranged between DPC and a number of stakeholders who raised specific issues during the consultation process, including ESB, Birdwatch Ireland, TII, Poolbeg Yacht, Boat Club and Marina and Stella Maris Rowing Club.
- VII. The draft text of the Masterplan was reviewed and amended to reflect inputs and feedback by stakeholders to the consultation process.

### Stage 2: 2018 Masterplan Review Consultation Process

In 2018, DPC undertook a further consultation process concerning the Masterplan which involved:

- Publication of a Strategic Environmental Assessment (SEA) Environmental Report and a Natura Impact Statement (NIS) on the draft Dublin Port Masterplan 2040, reviewed 2018. These environmental assessments compared the original Masterplan proposals published in 2012 to revised proposals that would enable Dublin Port to meet the anticipated throughput of 77 million tonnes per annum by 2040. The revised proposals comprised two significant Strategic Infrastructure Development Projects within the North Port Estate; the Alexandra Basin Redevelopment (ABR) Project, already at construction phase, and the MP2 Project in combination with improvements to the internal road network and the development of a Dublin Inland Port. The strategic environmental assessments found these revised development proposals to have significantly less environmental impacts compared to the Dublin Gateway Project which was proposed within the original Masterplan. This is because the Dublin Port Masterplan 2040, reviewed 2018, focusses on the redevelopment of existing port infrastructure on brownfield sites already in operation within Dublin Port, rather than expanding into the Tolka estuary.

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- The draft Dublin Port Masterplan 2040, reviewed 2018, along with the associated SEA Environmental Report and NIS were completed and circulated in April 2018 to the Irish and UK statutory consultees for SEA. A public notice was placed in the National Press and on the DPC's website to notify the public about the draft Dublin Port Masterplan 2040, SEA Environmental Report and NIS, and to welcome comments. The consultation phase was open to responses from 17<sup>th</sup> April 2018 to 25<sup>th</sup> May 2018.
- A national and local media campaign in July 2018 formally announcing the publication of the final Dublin Port Masterplan 2040, reviewed 2018, with a social media campaign running in tandem.

The 2018 Masterplan Review consultation process drew 12 responses from a range of stakeholders, including Resident's Groups, statutory authorities, individuals and commercial organisations.

The key observations which emerged from the 2018 Consultation responses include the following:

- The importance of cycling and pedestrian access to and through the Port Estate.
- The need to factor the impact of the proposed Masterplan development projects in the Port Estate on current commercial users operating from sites that are strategically important to their businesses.
- Welcome for the decision not to infill any additional land in the Tolka Estuary.
- Support for the greater integration of Dublin Port with Dublin City and its people.
- The need to ensure that the operation of the port takes account of residential amenity, particularly at night time.
- Requests for continued and ongoing engagement and communication between DPC and surrounding communities and statutory bodies on future projects.
- The importance of maintaining the current height limits and looking to improve the visual impact of port operations on surrounding communities.
- The consistency of the Masterplan with the proposals relating to port development in the National Planning Framework 2040.
- The absence of transboundary effects arising from the Masterplan.
- The absence of recognition in the Masterplan of the potential for a film studio on DPC owned lands in Poolbeg West Strategic Development Zone (SDZ).
- The need for the Masterplan to take account of the objectives of the planning scheme for Poolbeg West SDZ.
- Support for the MP2 Project Community Gain proposal for an urban farm in East Wall.
- The need for the Masterplan to take account of the draft Water Animation Framework for the River Liffey and the Local Environmental Improvement Plan for Ringsend.
- The importance of improving public transport links between the port and the city and effective mobility management within the port to encourage a shift to more sustainable forms of travel for port users, including staff.
- The need to ensure that the Masterplan road proposals are consistent with the strategic road transport plans of Dublin City Council (DCC), Transport Infrastructure Ireland (TII) and the National Transport Authority (NTA).
- The importance of managing impacts on structures of heritage value and maintaining the amenity value of Pigeon House Harbour in the context of future port development projects arising from the Masterplan.
- The importance of maintaining the existing amenity value of swimming areas off the North Bull Wall.
- Improving rail connectivity with Dublin Port and limiting the impact of the existing rail lines on road traffic.
- The importance of the Masterplan remaining consistent with national and regional and environmental plans.

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- The integration of SEA and AA findings and mitigation measures in the Masterplan.
- A more frequent and fixed timeframe for reviewing the Masterplan should be considered.
- The need to give further consideration to climate change in the Masterplan and the SEA through the inclusion of a commitment in the Masterplan to reduce the port's carbon footprint and promote low carbon alternatives through the supply chain.
- The importance of demonstrating the rationale behind the selection of alternatives in the context of the possible development options selected in the Masterplan.
- A commitment to prepare an integrated Environmental Management Plan should be contained in the Masterplan.

The final Masterplan 2040, reviewed 2018, was adopted by the DPC Board and published in July 2018. It was accompanied by a SEA Statement which provided a description of the consultation process and how the issues raised during the 2017 and 2018 consultation processes have been integrated with the Masterplan with the objective making a robust, sustainable Masterplan.

Section 5 of the Final Masterplan 2040, reviewed 2018, discusses the infrastructure proposals, including reference to the berths and channel in Dublin Port envisaged by 2040.

Section 10 of the Final Masterplan 2040, reviewed 2018, sets out the principle environmental mitigation and monitoring measures to be undertaken for capital dredging operations.

### Consultation and the Dublin Harbour Capital Dredging Project

Building on the consultation carried out during the process to review the Dublin Port Masterplan 2040, DPC and their consultants, RPS, carried out further extensive consultation on the Dublin Harbour Capital Dredging Project in the course of developing the current proposal.

#### Pre-application Consultation with Statutory and Non-Statutory Bodies

A letter and information pack on the Dublin Harbour Capital Dredging Project was issued to 33 statutory and non-statutory bodies listed in Table 5-1 in September 2020. The consultees were invited to make a submission on the proposed development and outline any issues which they would like to see addressed in the EIAR.

Table 5-1 Statutory and Non-Statutory Bodies consulted as part of the EIA Process

Consultee List		
Dept. of Housing, Planning and Local Government	Dept. of Communications, Climate Action & Environment	Dept. of Agriculture, Food and the Marine
Environmental Protection Agency	Office of Public Works	Dublin City Council
Office of Radiological Protection, EPA	Development Applications Unit, Department of Culture, Heritage and the Gaeltacht	Eastern and Midland Regional Assembly
Dept. of Transport, Tourism and Sport	Inland Fisheries Ireland	Health and Safety Authority
Commissioners of Irish Lights	RNLI	Arts Council
Heritage Council	Failte Ireland	An Taisce
Waterways Ireland	Bord Iascaigh Mhara	Sea Fisheries Protection Authority
Marine Survey Office	Marine Institute	Geological Survey of Ireland
Birdwatch Ireland	Irish Whale and Dolphin Group	Irish Seal Sanctuary

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Consultee List		
Irish Water	Department of Business, Enterprise and Innovation	Electricity Supply Board (ESB)
Dept. of Foreign Affairs & Trade	Department of Health	Health Service Executive

Responses were received from twelve of the Statutory and Non-Statutory Bodies consulted as part of the EIA Process. A summary of the responses received from the consultees is set out in Table 5-2.

Table 5-2 Summary of Written Responses from Consultees

Organisation	Date Consultation Issued/Format	Response Received/Format	Summary of Response/Further Action Carried out or Required
Development Applications Unit	28/9/2020 Email	04/02/2021	<ul style="list-style-type: none"> <li>Acknowledgement of receipt of consultation material</li> </ul>
Office of Public Works	29/9/2020 Email	29/9/2020/ Email	<ul style="list-style-type: none"> <li>Automated email acknowledgment received.</li> <li>Email states that OPW aims to respond within 20 days and if no response is received in this time then re-issue email again.</li> </ul> <p>Nothing further was received from OPW.</p>
Eastern and Midland Regional Assembly	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Automated email acknowledgment received with advice that staff are currently working from home due to Covid 19 to contact EMRA director for further assistance. Email address for EMRA Director was provided.</li> </ul>
	30/9/2020		<ul style="list-style-type: none"> <li>Issued Consultation Pack to EMRA Director</li> </ul>
		30/9/2020	<ul style="list-style-type: none"> <li>Acknowledgement of receipt of Consultation Pack from Jim Conway, EMRA Director</li> </ul>
Commissioners of Irish Lights	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Email from Captain Catriona Dowling – she provided the following advice:</li> </ul> <p><i>Thank you for your email below. Irish Lights would not have any comment to make regarding the following :</i></p> <ul style="list-style-type: none"> <li><i>Foreshore Licence issued by the Department of Housing, Planning and Local Government</i></li> <li><i>Dumping at Sea Permit issued by the EPA</i></li> </ul> <p><i>These works would however require the temporary movement of a number of Aid to Navigation and a temporary statutory sanction would be required for each of these moves. A program for these moves would need to be drawn up and advanced notification and application made to Irish Lights for these temporary statutory sanctions approvals. Additionally if you require the temporary placement of buoys with turbidity monitoring these would be subject to additional temporary statutory sanction applications. These temporary statutory sanction application would be made to Irish lights from the Local Light House authority in this case Dublin Port and they are familiar with the process.</i></p>

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Organisation	Date Consultation Issued/Format	Response Received/Format	Summary of Response/Further Action Carried out or Required
			<i>We await more information regarding the above from Dublin Port.</i>
Bord Iascaigh Mhara	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Automated email acknowledgment received</li> <li>BIM endeavour to respond to emails within 5 working days.</li> </ul> <p>Nothing further was received from BIM.</p>
Marine Survey Office	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Email from Captain Alan Quinn. He provided the following advice:</li> </ul> <p><i>Post review of the information submitted I have no comment on behalf of the MSO regarding the capital dredging project.</i></p> <p><i>For your information any ship which will be engaged in the capital dredging project is required to comply with our national legislation whilst operating domestically, thus an application for survey should be made via the Mercantile Marine Office for each vessel to ensure compliance.</i></p>
Geological Survey of Ireland	29/9/2020 Email	1/10/2020 Email	<ul style="list-style-type: none"> <li>Email from Sean Cullen of GSI</li> </ul> <p><i>“Regarding the Dredging in Dublin Port the GSI has no specific data to assist in those operations directly. We understand that the statutory licences have been applied for and could only request that the hydrographic survey data might be forwarded on to our INFOMAR programme (<a href="http://www.infomar.ie">www.infomar.ie</a>) on completion.</i></p> <p><i>Regarding the dumping of material our own concern would be that the original dumping ground was licenced as a spoil area for maintenance dredging and that the volumes envisaged by the capital works would possibly be much larger than what the area was originally licenced to receive. These volumes of spoil will be constrained by the Burford Bank which in turn could hold sediment within the bay with possible impacts to Dun Laoghaire Harbour and even possibly Howth Harbour. It is our understanding that DHPLG must regulate for the foreshore licence in this case along with the EPA. If a review of the dumping area is required the GSI will assist with any hydrographic data required to look at the ‘before’ scenario and if necessary expand the area of a post dumping survey carried out by the contractor.”</i></p>
Birdwatch Ireland	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Acknowledgment of email from Michelle Kavanagh</li> <li>Ms. Kavanagh stated that the consultation pack was forwarded to their policy officer for comment.</li> </ul>
Irish Seal Sanctuary	29/9/2020 Hard Copy	3/10/2020 Email	<ul style="list-style-type: none"> <li>Thank you for information on the Dublin Port proposal. Attached is 1st and most recent census of seals in the Bay and Biosphere, to date their population and use of Bay is little known (see earlier submissions to Dublin</li> </ul>

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Organisation	Date Consultation Issued/Format	Response Received/Format	Summary of Response/Further Action Carried out or Required
			Gateway/ ABP). Irish Seal Sanctuary (ISS) would recommend closer and more protective regime and the role of MMO, in place for cetaceans be extended to seals. and same mitigation measures to apply when in area of dredging and disposal zones. Please also provide ISS with cumulative data for all dredging operations, disposal and impact about Burford Bank?
		3/10/2020 Email	<ul style="list-style-type: none"> <li>Attachment to email with the following report, "DublinBaySealCensus2018_ISS"</li> </ul>
	5/10/2020 Email		<ul style="list-style-type: none"> <li>Email from RPS to ISS with an attachment (IWDG Seal Monitoring Report for ABR Project with results from 2016-2020)</li> </ul>
Electricity Supply Board	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Automated email acknowledgment received</li> <li>ESB endeavour to respond to queries as soon as possible</li> </ul>
		30/9/202 Email	Acknowledgement email from customer services to say that email has been sent to the relevant department in ESB.
Department of Jobs, Enterprise and Innovation	29/9/2020 Email	29/9/2020 Email	<ul style="list-style-type: none"> <li>Acknowledgment email from Monica Kenny</li> <li>Ms Kenny stated that she forwarded the consultation pack to a colleague in IDA.</li> </ul>
Health Service Executive (Dr. Kevin Kelleher)	29/9/2020 Hard Copy	5/10/2020 Email	<ul style="list-style-type: none"> <li>I wish to acknowledge receipt of your letter to Dr. Kevin Kelleher, in relation to the above. He has forwarded this on to his colleague, Dr. Mairin Boland, Public Health Specialist in the Public Health Dept. East, based in Dr. Steeven's Hospital, Dublin 8 who looks after this area.</li> </ul>

### Public Consultation

As well as consulting the main statutory and non-statutory organisations about the proposed Dublin Harbour Capital Dredging Scheme, DPC also consulted with relevant stakeholders such as community groups and sporting clubs. DPC has a dedicated community liaison officer acts as the point of contact between DPC and the local communities in the vicinity of the Dublin Port. The following organisations/groups were issued with the consultation pack containing information about the proposed Dublin Harbour Capital Dredging Project:

#### South Port

- Stella Maris Rowing Club
- St. Patrick's Rowing Club
- Irish Nautical Trust
- Half Moon Swimming Club

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- Poolbeg Yacht & Boat Club
- 1<sup>st</sup> Port Sea Scouts
- Ringsend Registered Fishermen & Private Boat Owners Association
- South Bank Combined Boat Clubs Development Committee
- Sea Safari
- Dublin Bay Old Gaffers Association
- Diving Groups and individual divers who responded to the Dublin Port Masterplan consultation phase.
- Poolbeg Training CLG (Rinn Voyager)
- Raytown Angling
- Liffey City Currach Regatta

### North Port

- Clontarf Yacht & Boat Club
- Bull Wall Swimmers
- 5<sup>th</sup> Port Sea Scouts
- East Wall Water Sport
- Irish Underwater Search & Recovery Unit
- Clontarf Residents Association

### General

- Irish Underwater Council (trading as Diving Ireland)
- City Kayaking
- Sail Training Ireland

### Issues raised during the public consultation exercise

There was no response from any of the above groups as a result of this consultation effort.

## Conclusions

The development proposals advanced in the Dublin Harbour Capital Dredging Project reflect the significant levels of consultation that have taken place since 2017 on the future of Dublin Port.

The various submissions and comments made in relation to the Dublin Harbour Capital Dredging Project have been fully considered by the consultants in the preparation of the EIAR and by the applicants in the design of the scheme. Every effort has been made to address all concerns raised and, where possible, mitigation measures have been proposed to minimise the environmental impact of the Dublin Harbour Capital Dredging Project.

## 5.2 Scoping

### Scoping Approach

Detailed scoping has been undertaken in respect to the Dublin Harbour Capital Dredging Project. As stated above, DPC “informally” or voluntarily scoped the contents of an EIAR by engaging in consultations with prescribed and other authorities, bodies and stakeholders and through public consultation, in accordance with

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the European Commission's 2017 "Environmental Impact Assessment of Projects Guidance on Scoping" and the EPA's Environmental Impact Assessment Reports, Draft Guidelines (August 2017), which state:

*"Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is defined in the EC guidance<sup>45</sup> as:*

*'determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'*

*Scoping is best carried out by personnel having appropriate expertise and relevant prior experience of the factors involved. Knowledge of the characteristics of the project type and of the sensitivities likely to be present in the receiving environment are particularly useful for scoping.*

*[...]*

*Scoping is carried out on a case-by-case basis because the significant issues, for different projects are unlikely to ever be identical. However, there are standard issues that a developer should consider for each project to establish whether they apply in specific cases. The Advice Notes<sup>47</sup> contain guidance on relevant environmental factors for principal project types.*

*The potential for likely significant effects throughout different phases of the proposed project, are considered as far as possible at scoping stage – whether they would individually require consent or not. These include, as relevant, site investigations, construction, commissioning and operation to eventual decommissioning. Scoping also considers the range of alternatives to be considered in an EIAR.*

In conducting the scoping process, and in preparing this EIAR, consideration has been given to publications including the Advice Notes and various other documents.

The scoping of the Dublin Harbour Capital Dredging Project has greatly benefitted from the environmental monitoring programme which is currently in place for the construction of the ABR Project.

The monitoring programme comprises:

- Continuous noise and dust monitoring at two locations
- Periodic vibration monitoring
- Continuous Water Quality monitoring within the inner Liffey channel at four locations (turbidity, dissolved oxygen, temperature, salinity)
- Continuous Water Quality monitoring within Dublin Bay at four locations (turbidity at three depths at each location). This is complemented by continuous wave climate and tidal current measurements.
- Passive Acoustic Monitoring (PAM) for Harbour Porpoise detection at two locations within Dublin Bay
- Static Acoustic Monitoring (SAM) for Harbour Porpoise detection at four locations within Dublin Bay
- Records of marine mammal sightings by MMOs during dredging and piling operations
- Benthic surveys of the licenced dumping at sea site at the entrance to Dublin Bay
- Monthly seal surveys at Bull Island
- Lamprey surveys within the Liffey

- Wintering waterbird surveys within the South Dublin Bay & River Tolka Estuary SPA
- Tern colony surveys
- Black Guillemot surveys
- Underwater surveys during piling and dredging activities to validate models used to assess the impact on migratory fish and marine mammals.

The site-specific scientific data collected to date has been used to support the preparation of the EIAR and NIS for the Dublin Harbour Capital Dredging Project and facilitates a depth of understanding of the environment in and around Dublin Port including the inner Liffey channel and Dublin Bay. The scope of the Dublin Harbour Capital Dredging Project was further considered in the context of the extensive environmental datasets collated during the preparation of the Strategic Environmental Assessment (SEA) which complemented the review of the Dublin Port Masterplan during 2017 and 2018.

Above all, the extensive consultation process undertaken during both the review of the Dublin Port Masterplan and specifically for the Dublin Harbour Capital Dredging Project, described in Sections 5.2 and 5.3 above, provided a sound basis for confirming the key issues to be addressed, the extent of the environmental appraisals required, and the level to which these issues needed to be addressed.

The scope of the EIAR, conducted in respect of the Dublin Harbour Capital Dredging Project, has had due regard to the following statutory and guidance documents:

- Statutory requirements of the Planning and Development Act 2000 – 2017 and the Planning and Development Regulations 2001 – 2018.
- European Commission Environmental Impact Assessment of Projects Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU), (2017)
- Guidelines on the information to be contained in Environmental Impact Statements and Advice Notes on Current Practice in the preparation of an EIS both published by the EPA 2003.
- Advice Notes for preparing Environmental Impact Statements (Draft) EPA 2015
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) EPA 2017
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018
- The requirements of Dublin City Council as detailed in the Dublin City Development Plan 2016 – 2022.

### Extent of Environmental Appraisals

Following the scoping process, the following environmental topics have been comprehensively addressed within the EIAR including:

- Examination of Alternatives
- Risk of Major Accidents
- Biodiversity, Flora and Fauna
- Land, Soils, Geology and Hydrogeology
- Water Quality
- Noise & Vibration
- Material Assets – Coastal Processes

- Archaeology and Cultural Heritage
- Population and Human Health
- Cumulative Effects

Once the key issues were identified, baseline studies/surveys were carried out. The studies enable the prediction of the likely environmental impacts arising from the Dublin Harbour Capital Dredging Project. These impacts are evaluated in terms of their significance, nature and magnitude.

Through the scoping process which has been carried out in the preparation of this EIAR, the issues which are likely to be important during the environmental impact assessment have been identified. The scoping process has identified the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected, and has defined the appropriate level of detail for the information to be provided in the EIAR.

The following potential issues have been screened out as a result of the scoping process:

- Biodiversity, Flora and Fauna – Terrestrial Biodiversity
- Material Assets – Services;
- Water Quality – Discharges from vessels.
- Flood Risk
- Material Assets – Traffic and Transportation;
- Landscape and Visual Impacts; and
- Waste

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## 6 RISK OF MAJOR ACCIDENTS

In light of the nature of the activities that will take place, and the nature of the surrounding environment, the most significant risks of major accidents and disasters are associated with the COMAH establishments. The development is within the vicinity of a number of establishments that fall within the scope of the *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2015* (the COMAH Regulations), both on the northern and southern parts of the Port Estate.

This chapter contains a COMAH land use planning assessment of the Dublin Harbour Capital Dredging Project conducted by Byrne Ó Cléirigh. The purpose of this assessment is to examine the development in the context of the Health and Safety Authority’s COMAH land use planning guidance. It describes the assessment of the development and conclusions as to the individual and societal risk presented to the development from the COMAH establishments.

### 6.1 COMAH Establishments

#### North of River Liffey

The COMAH establishments within Dublin Port (on the north side of the River Liffey) are listed in Table 6-1 and shown on the Figure 6-1. Most of these establishments store petroleum products (eight of the ten establishments). Of the remaining two, one stores and distributes LPG (Calor), and the other (Indaver) operates a hazardous waste facility.

Table 6-1 COMAH Establishments North of the River Liffey

Establishment	Location	Tier	Activity	Consultation Distance
Calor Teoranta	Tolka Quay Road, Dublin 1	Upper	LPG storage & distribution	600 m
Fareplay Energy Ltd. (under the Topaz Energy Group)	Tankfarm 1, Alexandra Road, Dublin Port, Dublin 1 Tankfarm 2, Tolka Quay Road, Dublin Port, Dublin 1	Upper	Oil storage & distribution	400 m
Indaver Ireland Ltd.	Tolka Quay Road, Dublin Port, Dublin	Upper	Hazardous waste	700 m
Tedcastles Oil Products	Yard 1, Promenade Road, Parish of St. Thomas, Dublin Port, Dublin 1	Upper	Oil storage & distribution	400 m
Tedcastles Oil Products	Yard 2, Tolka Quay Road, Parish of St. Thomas, Dublin Port, Dublin 1	Upper	Oil storage	400 m
Valero Energy Ireland Ltd.	Alexandra Road, Dublin Port, Dublin 1	Upper	Oil storage & distribution	400 m
Electricity Supply Board	North Wall Generating Station, Alexandra Road, Dublin 1	Lower	Oil storage	300 m

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Establishment	Location	Tier	Activity	Consultation Distance
Iarnród Éireann	Alexandra Road, North Wall, Dublin 1	Lower	Oil storage	300 m
Circle K Ireland Energy Ltd	Terminal 1, Alexandra Road, Dublin Port, Dublin 1	Lower	Oil storage & distribution	400 m
Circle K Ireland Energy Ltd	Yard 3, Alexandra Road, Dublin Port, Dublin 1	Lower	Oil storage	300 m

- The Calor establishment comprises 17 no. aboveground and 4 no. semi-mounded LPG tanks and a road tanker loading facility, and a storage area for containerised LNG.
- Indaver operates a hazardous waste facility for blending and transhipment of solvent wastes, and for receipt, storage and transfer of packaged wastes to other waste facilities. The facility comprises a solvent blending tank farm to the northeast of the site, and several warehouses for the storage of packaged wastes to the west of the site.
- The oil storage sites, other than ESB and Iarnród Éireann, store classes I, II and III petroleum products, and distribute them via road tanker. ESB has the capacity to store class III petroleum as a backup fuel for the North Wall Generating Station, while Iarnród Éireann stores class III petroleum for distribution to its regional depots via road tanker.

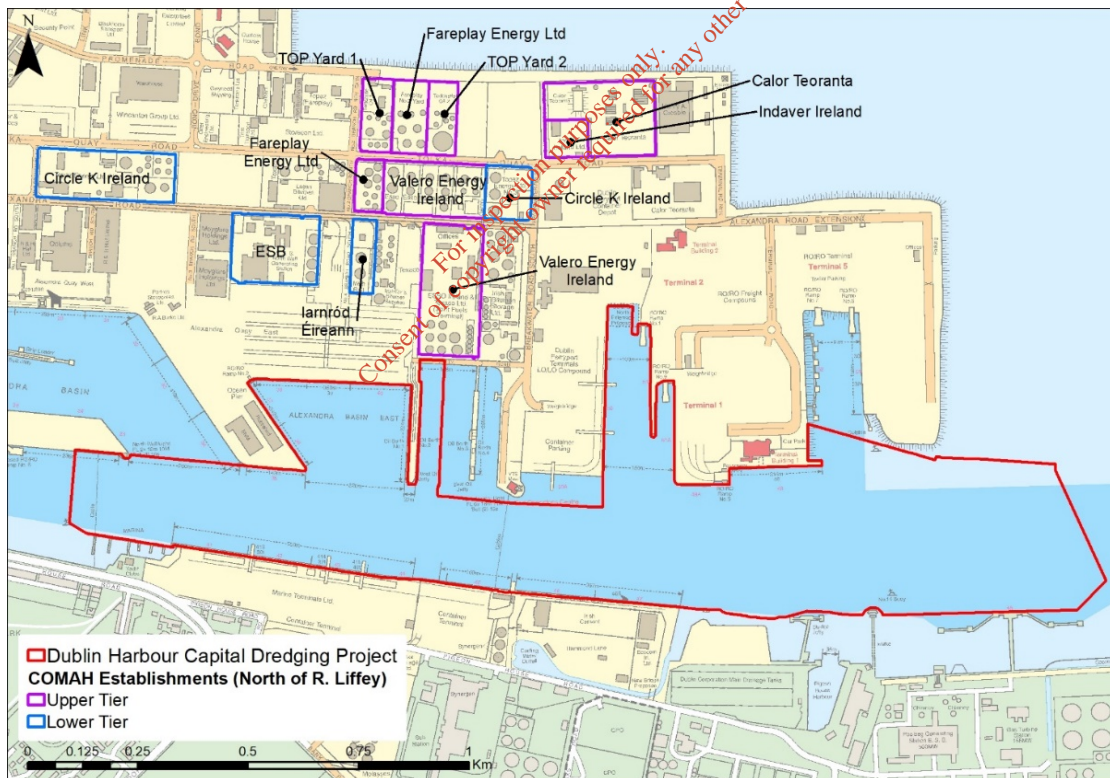


Figure 6-1 COMAH Establishments (North of the River Liffey)

**South of River Liffey**

The COMAH establishment within the port, south of the River Liffey, are listed in Table 6-2 and illustrated on Figure 6-3. The three establishments store and / or distribute petroleum products.

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Table 6-2 COMAH Establishments South of the River Liffey

Establishment	Location	Tier	Activity	Consultation Distance
Synergen Power Ltd t/a ESB Dublin Bay Power	Pigeon House Road, Ringsend, Dublin 4	Lower	Oil storage (power generation)	300 m
The National Oil Reserves Agency.	Shellybanks Road, Ringsend Dublin 4	Upper	Oil storage	300 m
The National Oil Reserves Agency	Pigeon House Road, Ringsend, Dublin 4	Upper	Oil storage	300 m

- Synergen Power stores class III petroleum as a back-up fuel for its natural gas fired powerplant; natural gas is supplied to the site via an above ground installation at the southeast corner of the site.
- The National Oil Reserves Agency’s (NORA) facility on Shellybanks Road (NORA Ringsend), stores class III petroleum, while NORA’s facility on Pigeon House Road (NORA Poolbeg), stores class II in a single tank and class III petroleum in the remaining tanks.
- The ESB Poolbeg combined-cycle gas turbine power station is located to the west of NORA Poolbeg. It does not form part of a COMAH establishment; however, it is supplied by a natural gas pipeline and as it is immediately adjacent to a COMAH establishment we have included the aboveground pipeline in this assessment in line with the HSA’s guidance.



Figure 6-2 COMAH Establishments (South of the River Liffey)

The COMAH land use planning assessment concluded that it is appropriate to classify the area of the works as development sensitivity level 1 as the dredging project constitutes a work activity. Developments of sensitivity level 1 may be permitted in any of the four individual risk zones, and therefore while a small proportion of the project boundary lies within the middle and outer zones, it satisfies the HSA’s societal risk criteria, with the societal risk index (SRI) falling within the broadly acceptable range.

## 6.2 Risk of Collision – Dublin Bay Marine Traffic Management

Dublin Bay is very busy with marine leisure events and small craft movements. Agreement was reached with all the sailing and motor clubs how best to co-exist. To that end the commercial shipping channels, access routes and anchorage areas are well defined and kept clear. The organised leisure industry operates within the confines of the areas agreed for their events. Individual craft must operate within the international maritime legislation governing all vessels big and small.

Marine activity will be able to operate with little or no disruption as the dredging operation will be subservient to the demands of commercial movements. The leisure craft are not normally allowed to operate within the confines of the main approach channel. As the dredging is confined to the navigation channel, basins and berths channel there should be no effect. When small craft are entering or leaving the Port they must do so under the control of VTS. Therefore they will be well informed and aware of any dredging operations and of their requirements to stay clear. Again this is in compliance with International Legislation.

Dublin Bay, the approaches to the Port and the shipping channel are monitored at all times by Vessel Traffic Services (VTS). All vessels are advised regarding works, developments or issues that are ongoing in the Dublin Port area of jurisdiction. Prior to any dredging a DPC “Notice to Mariners” is sent out to all shipping informing them about the planned work and dates. During the dredging operation the vessel traffic is supervised and controlled.

## 6.3 Emergency Response Management

Dublin Port Company has developed a comprehensive emergency management plan that caters for the range of accident and emergency events that may occur within its estate (or that may occur outside the estate and that have a direct, knock-on effect), and this plan is provided to the other relevant stakeholders, including An Garda Síochána, Dublin City Council, Transport Infrastructure Ireland, and the Principal Response Agencies. In the event of an incident at a COMAH establishment that could impact on people at other facilities in the Port, or on road traffic entering or exiting the Port, DPC will activate its Emergency Management Plan, in which case people would be directed away from the source of the hazard. As it is not possible to model the different combinations of major accidents, and the corresponding emergency response actions within the societal risk assessments, the estimated societal risk is concluded to be conservative.

## 6.4 Conclusion

It is concluded that, from a COMAH perspective, the potential direct and indirect major accident and disaster risks arising from the Dublin Harbour Capital Dredging Project satisfy the Health and Safety Authority’s COMAH land use planning guidance. It is also concluded that other, non-COMAH direct and indirect major accident and disaster risks arising from the Dublin Harbour Capital Dredging Project are not significantly different from the current risks.

## 7 BIODIVERSITY

A biodiversity appraisal of the direct and indirect significant effects of construction and operation of the MP2 Project on biodiversity has been completed. It comprises a number of ecological assessments on different specialist subject areas of ecology, and has been written by a number of experts. It contains assessments of:

- Benthic Biodiversity and Fisheries
- Marine Mammals
- Avian Biodiversity

A Habitats Directive appraisal has been prepared separately, containing Stage 1 screening and Stage 2 appropriate assessment appraisals required under Article 6(3) of the Habitats Directive. They are contained within a Natura Impact Statement (NIS), submitted to the competent authorities under separate cover.

### 7.1 Benthic Biodiversity and Fisheries

A total of 8 sub-tidal grab samples were collected within the basins and shipping channel within Dublin Harbour. All samples were collected on the 7<sup>th</sup> July 2020 and were sampled using a 0.1m<sup>2</sup> stainless steel Van-Veen Grab for benthic faunal analysis. Drop-down video was also collected at 11 locations within the survey area. Video data was collected at each of the grab sample locations, as well as at an additional 2 locations along the shipping channel. Grab samples were sieved through a 1mm mesh sieves on board and preserved in 4% formalin. In the laboratory, samples were sorted by eye using a binocular microscope and fauna identified to the lowest taxonomic level possible using standard keys to north-west European fauna by specialist taxonomists from Thomson Ecology.

The fisheries component of this study comprised a desktop examination of published Inland Fisheries Ireland (IFI) surveys of the lower Liffey Estuary as background to the resident and migratory marine/estuarine component of the fish community in the general port area. This was combined with records from traps (eel & lamprey) and counters (salmon) at Islandbridge weir in the lower freshwater reaches of the Liffey supplied by the Marine Institute, as a means of assessing trends in Annex II migratory species and eels. Six beam trawl tows were also undertaken: two (C\_T1 and C\_T2) on the dump site, and four (CT\_3 – CT\_6) in the inner port area. The length of the disposal site trawl tows (C\_T1 & C\_T2) ranged in length from 1.0-1.2km, while those in the inner port area ranged from 0.2-0.46km. Towing speeds ranged from 2-3.5knots. The beam trawl was 2m wide and fitted with 3 tickler chains. The survey was undertaken on 08<sup>th</sup> July 2020.

#### Potential Impacts on Benthos

Impacts associated with Dublin Harbour Capital Dredging Project on the benthos include:

- Habitat disturbance as a result of dredge loading operations
- Habitat smothering and associated effects due to spoil disposal

#### Habitat disturbance associated with Dredging

The area of the inner port which will be dredged amounts to 26.51 ha in total. However, over half of this area has already been dredged to shallower depths since February 2020 as part of the ABR capital dredging programme and as part of the existing maintenance dredging campaign. This means that the surface layers of the areas in question i.e., the surface to about 20cm of sediment where most of the benthic fauna reside will

already have been removed at least once before the works begin. At least 'once' in this context means that by the time some of these areas will have been capital dredged, they will likely already have been maintenance dredged on at least one occasion. When this is further combined with the daily disturbance caused by propeller wash during berthing and manoeuvring of large vessels it serves to demonstrate the generally unstable nature of the benthic sediments and the associated stress caused to benthic communities present in a busy commercial port like Dublin.

A previous survey undertaken in 2013 recorded a single biotope in the Inner Liffey Channel area and a single biotope in the Dublin Bay area. Analysis of the data, which compared sites across the inner and outer areas which had been dredged within the previous 12 months to sites which had not been dredged in that time, found no discernible differences between the sites, indicating the rapid recovery of the benthos in these areas following dredging. Results from the present survey mirror findings of previous surveys in 2013, with faunal communities identified in the Inner Liffey Channel consisting of taxa which are highly opportunistic and expected to rapidly recover after disturbance associated with dredging. It is expected that this dredging-associated habitat disturbance will be a temporary, minor, negative impact. The nature of the biotopes identified, and the opportunistic species which pre-dominate in the area, indicate that these faunal communities are expected to recover rapidly (<12 months) following cessation of dredging.

### Dredge Spoil Disposal

The proposed capital dredging programme will result in the disposal of 500,000m<sup>3</sup> of mixed sediment from the dredge areas over an 8-year period. This sediment will consist of sandy muds to muddy sands from the Inner Liffey Channel basins and berths. The proposed maximum volume to be disposed in any single October and March window is expected to be circa 164,058 m<sup>3</sup> with the minimum amounting to just 10,632m<sup>3</sup>

The approved dump site is located approximately 7km east of Poolbeg and 3km south of Howth Peninsula, immediately west of the Burford Bank. The dump site covers an area of 2.27 km<sup>2</sup> and is currently used by Dublin Port to dispose of dredge spoil from licenced capital and maintenance dredging works. The dump site has been in regular use since 1996 having been moved from its previous location nearby.

Ecological impacts associated with dredge spoil disposal are considered site specific with factors such as volume of disposal, frequency and timing of the disposal, type & quality of the dredge spoil, hydrodynamic regime of the receiving environment and the habitat type of the receiving environment all playing important roles in the recovery of the benthos.

At soft sediment sites, recovery would be expected to follow a typical pattern. If the sediment to be disposed is similar in nature to the receiving environment, then the impacts will be less, with recovery proceeding more rapidly than would be the case if the sediment was different compared to that in the receiving environment. This feature of recovery has been noted in several studies reported in the literature (Smith & Rule, 2001; Ware *et al.*, 2010; Bolam *et al.*, 2006). Immediately after spoil deposition, macroinvertebrate species diversity, abundance and biomass will be temporarily reduced. If the sediment deposited on the site is similar in nature to the native sediment, and the layer of deposition is thin (<15cm) then vertical migration through the sediment of existing fauna may occur (Wilbur *et al.*, 2007; Fredette & French, 2004, Maurer *et al.*, 1981 (a), Maurer *et al.*, 1981 (b), Maurer *et al.*, 1982). This will be complemented by lateral migration of mobile fauna from adjacent areas and through larval settlement from the plankton.

Where the dredge spoil contains different sediment than the native sediment, recovery occurs in several stages depending on a range of factors. In highly hydrodynamic areas, such as the Dublin Bay dump site, the silt fraction initially settles with the sand fraction. Vertical migration through predominantly mud sediments would be reduced and recolonisation of these sediments would be through lateral migration of mobile species and larval settlement from the plankton. Initial colonisation will be by small, fast-growing, opportunistic species, especially small polychaete and oligochaete worms. Due to the dynamic nature of the site, the finer material will disperse away from the site rapidly and the benthic community will gradually revert, through the process of recolonisation, to a community more closely resembling that which occurred before disposal, i.e. typical of the dominant substrate and the prevailing hydrodynamic regime.

The Burford Bank disposal area is considered a dispersive site, with maximum tidal current speeds of between 0.8 and 0.9 metres per second during mid-flood (RPS 2020, ABR Capital Dredging Annual Environmental Report, 2019). Coastal modelling from the ABR Project (RPS 2014, ABR Project EIS) indicates that sands and gravels will stay largely within the footprint of the disposal site under normal tidal conditions. It is expected that the silt fraction will gradually disperse from the site under the same conditions. Although the model predicts some minor, far-field sediment deposition beyond the dump site boundary, no significant impact on any of the qualifying interests in the Rockabill to Dalkey Island Special Area of Conservation is anticipated.

Disposal of a maximum of circa 164,058m<sup>3</sup> of mixed sands and muds at the dump site is expected to have a minor, negative, and temporary to short-term impact on the benthos within the dump site. Recovery is expected to begin once disposal activities cease on-site, with full recovery anticipated to be achieved within 12 – 24 months.

### Potential Impacts on Fisheries

The potential impacts on fish arise from spoil loading, and spoil dumping at the licenced dump site during the proposed dredging operations in Dublin Harbour. The main mechanisms of impact will be associated with increased suspended solids in the water column generated during dredging and disposal, deposited solids at the dump site, and those associated with entrainment of fish by the dredger during loading.

### Suspended Solids

Undoubtedly, local spikes in turbidity can be expected to occur during dredging, especially close to the dredger. However, the impact of elevated suspended solids is a product not just of concentration but also duration of exposure and dredging by its nature involves a mobile operation so that at any fixed point the suspended solids levels are likely to vary continuously as the dredger moves closer or farther from that point. This will also be influenced by the direction and strength of the tidal current and the degree of riverine discharge at the time. Moreover, dredging is not a continuous process. The dredger sails to the dumping site to empty the hopper every few hours during which interval the dredging plume will dilute and dissipate, thereby reducing suspended solids concentration.

Furthermore, fish are highly mobile and can avoid inimical turbidity levels. Therefore, they are unlikely to experience very elevated concentrations in expansive estuarine waters except for very short periods. Nevertheless, the possible effect of repeated exposures will depend on a fish's sensitivity, which may also be a feature of its development stage and size. For example, the literature points to some eggs and larvae being more sensitive than juveniles, and juveniles being somewhat more sensitive than adults (Wilber and Clarke,

2001), so that for a given turbidity level, earlier development stages may be more likely to succumb or suffer more ill effects than later developmental stages. In this regard dredging near a site of intense spawning of a rare or commercially important species could prove detrimental to that species, especially if that spawning takes place on the bottom substrates being dredged and if spawning locations were also very concentrated and of limited distribution in the wider area. These conditions however do not arise in the case of Dublin Port in that most of the common species (e.g., flatfish, gadoids, sprat, grey mullet etc) spawn in the marine environment and migrate into estuaries, while rare or protected species spawn either in freshwater (salmon and lamprey) or in the ocean (eel).

Research on the sensitivity of fish to elevated turbidity has concentrated on valuable freshwater species, in particular salmonids, and much of the work on non-salmonids has been done on North American species. Data on the impact of suspended solids on many non-salmonid marine and estuarine species is limited. However, a trend that has been noted in several reviews on the subject is that species that generally live on or close to the seabed tend to be more tolerant of suspended solids, often much more so, than those species that normally live in clear waters higher in the water column. This is another reason why most of the species commonly found in estuaries are less at risk from elevated suspended solids levels. Overall, the modest levels of suspended solids/turbidity measured during both dredging and non-dredging periods since 2017 indicate that elevated suspended solids are likely to be having at most a very slight adverse impact on the resident and migrant species by virtue of either natural tolerance or limited duration of exposure.

### Entrainment

Trailer suction hopper dredgers are known to entrain fish during dredging operations. The species most likely to be entrained are the bottom or near bottom dwelling species recorded from the area, which in Dublin Bay will include plaice, flounder, gobies, pogge, butterfish, dragonet, eel, pipefish etc. Fish moving higher in the water column such as mullet, sprat and bass, or species more associated with marginal hard substrate areas e.g., pollack and wrasse, may be less at risk. Clearly, all mobile or attached bottom-associated invertebrates, especially crabs and shrimps will be susceptible to entrainment. Essentially, the degree of entrainment will be determined by local density of occurrence, combined with proximity to the bottom and susceptibility to entrainment. Susceptibility may be increased by poor hearing e.g., all flatfish have poor hearing, so noise from the dredger is unlikely reduce their susceptibility to capture. At the other end of the scale clupeids such as sprat and herring are hearing specialists and likely to have early warning of the approach of the dredger. Cod and bass also have a degree of auditory sensitivity which could assist them, while other species are likely to be less sensitive. Certain behavioural traits such as burying in bottom sediment (sand eel) or a tendency to freeze or bury when startled (flounder and sole) will increase the risk of entrainment, as would slow burst speeds e.g., dogfish.

The greatest potential for impact due to entrainment would be if fish were concentrated into a narrow channel during dredging operations. In the current project, a group of high value or protected species (e.g., Annex II fish) including salmon smolts, but also adult salmon, lamprey, glass eels and silver eel, migrate through the Liffey channel. Some life-stages of these species will be at lower risk as the dredging period is limited to October-March and outside the peak of their migration.

### Mitigation Measures

The following key mitigation measures apply to the Capital Dredging Scheme to minimise the impact of the proposed works on marine ecology:

- No over-spilling at the surface of the dredger for all dredging activities within the inner Liffey Channel will be permitted;
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey;
- The dredging of sediments within the navigation channel will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations;
- A trailer suction head dredger (TSHD) or Back-hoe dredger will be used for the capital dredging works. When operating in the River Liffey Channel, the TSHD pumps will be switched off when the drag head is being lifted and returned from the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment;
- A maximum of 4,100m<sup>3</sup> of sediment and entrained water will be loaded into the dredger's hopper for each loading/dumping cycle, equivalent to approximately of 2,030 tonnes (wet weight).
- Dredge spoil will be disposed at the site in as even a distribution as possible, maintaining a maximum disposal layer of 10-15cm per disposal event. Disposal events should be spread evenly across the site to minimise the build-up of large amounts of sediment in certain areas.
- It is important that every effort be made to maintain the eel trap and salmon counter at Islandbridge in operation all year around, as the data being provided from these is extremely valuable in providing trend information on these valuable migratory species (i.e. eel, salmon and lamprey).

### Conclusion

The proposed Dublin Harbour Capital Dredging Project is expected to have only a temporary and minor adverse impact in the benthos within the footprint of the dredging works. Areas of the bottom earmarked to be dredged will have their benthos temporarily removed, but due to the nature of the benthos present, recovery is expected to occur rapidly following cessation of dredging activities. The area is subjected to regular maintenance dredging, and the benthos that has developed there is typical of muddy areas subject to episodic stress events. The benthos within the footprint of the Burford Bank disposal is expected to undergo a cycle of temporary impact (during disposal) followed by partial recovery before the next disposal event until the completion of the capital dredging programme, followed by complete recovery expected to occur within 2 years of the cessation of the project. Overall, these impacts can be classified as temporary to short-term, minor and adverse.

The proposed capital dredging is expected to have only a negligible impact on salmon (adults or smolts) in the Liffey, mainly due to the minor seasonal overlap between migration of the species and the dredging activity. Eel, mainly outward migrating silver could potentially be exposed to entrainment by the dredging but that will not impact future recruitment of the species into the Liffey and the entrainment of glass eel is expected to have a negligible impact on the Liffey population. The potential for entrainment of river lamprey during the project is probably highest of the migratory high conservation species. However, aspects of its biology and migratory strategy are likely to result in the impact at worst being minor, adverse and short-term, with minimal effect at the population level in the Liffey. Impacts on the general non-conservation migratory and resident fish populations in the study area are expected to be at worst minor, adverse and temporary. The impact of dredge spoil disposal at the dump site is not expected to have any adverse impact on the protected porpoise population in the

Rockabill to Lambay Island SAC by virtue of the tiny proportion of the SAC constituted by the dump site and the fact that fish will still feed at the site during or immediately after disposal events so that there will effectively be no dredging related diminution in the porpoises' fish diet as a result.

## 7.2 Marine Mammals

The potential impacts on marine mammals was explored and mitigation measures recommended. Dublin Bay is recognised as an internationally important site for marine mammals. Grey and common (harbour) seals occur within the site and one of only three protected sites in Ireland for harbour porpoise occur immediately to the east of Dublin Port. Knowledge of the marine mammal community in Dublin Port and adjacent waters was greatly enhanced by data collected during Dublin Port's ABR Project. Sightings data was collected by dedicated MMOs during ABR Project dredging campaigns and during mitigation, as well as an extensive acoustic database from four monitoring sites at the dredge spoil ground and at a control site to assess the use of the area by harbour porpoise. Monthly seal counts at a haul out site on Bull Island have also been carried out during the ABR Project which were also used in this assessment.

### Harbour porpoise

There were 77 sightings (26% of total marine mammal sightings) of harbour porpoise during the first season of the ABR Project capital dredging campaign (2017-2018) and one sighting of a single bottlenose dolphin. All sightings were outside Dublin Harbour with sightings increasing further east and on the spoil ground. Between October 2018 and March 2019 during the capital dredging campaign there were 44 sightings of harbour porpoise, which was 33% of all marine mammal sightings. Again all sightings were outside Dublin Harbour with sightings increasing further east and on the spoil ground. During the 2019 - 2020 campaign there were 84 sightings of harbour porpoise with (27% of all marine mammal sightings) with all sightings at the spoil ground and in the channel outside Dublin Harbour. A similar pattern was recorded during maintenance dredging campaigns. A total of 35 sightings of harbour porpoise (32% of all marine mammal sightings) were recorded from 14 to 30 September 2017, 29 (16%) between 9 to 22 April 2018 and 37 sightings (53%) 10 to 27 September 2020)

Four locations were also monitored using C-PODs, during the Static Acoustic Monitoring programme under the ABR Project. The monitoring data allowed for a detailed but preliminary assessment of fine scale use of the survey area during the dredging campaign by harbour porpoise. The results from this visual and acoustic monitoring show that harbour porpoise do not use the immediate port area and are rarely recorded inside the harbour. Thus harbour porpoise in Dublin Bay will only be affected by dumping of spoil and associated shipping and not to dredging activity inside the harbour.

### Grey and Common seals

Only 3 Common seals were observed between the Baily lighthouse, on the north side of Dublin Bay and Knocknagin, Co Meath during a national aerial census in 2003 (Cronin *et al.* 2004) and six in Dublin Bay in 2012 (Duck and Morris 2013). The same surveys recorded 31 and 23 Common seals on Lambay Island. During thermal imaging surveys of seals carried out between 2017 and 2018, 335 Grey seals and 70 Common seals were reported in Area 2 of the East Region (from Skerries to Dalkey Island) (Morris and Duck 2019), which was an increase of around 2 – 2.3 times the number reported in 2011/12 and 1.6-2.1 times the number reported in 2003.

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The ecology and foraging behaviour of Common and Grey seals off Dublin is not known though it is known seals on the east coast range widely. Kiely *et al.* (2000) carried out some photo-identification of Grey seals between Skerries and Ireland's Eye and showed individual seals did show a degree of site faithfulness but some individuals were recorded moving between these sites and sites off southwest Wales. The first satellite telemetry of a seal in Ireland was carried out by the Irish Seal Sanctuary, which tracked a young Grey seal post-release from Co Dublin to Co Wexford, and then north to County Down over a period of 20 days. Common seals off southwest Ireland are considered opportunistic, generalist feeders, and probably consume prey in relation to its availability. Eighteen prey species were identified, with sandeels constituting 55% of the prey items by number. Sole, sandeels and *Trisopterus* species were found to be the most important species by weight (Kavanagh *et al.* 2007).

There were 209 sightings (70% of total marine mammal sightings) of Grey seals during the first season of the ABR Project capital dredging campaign (2017-2018) with only 12 sightings (4%) of common seal. Grey seals were observed within, and at the mouth of, Dublin Harbour, with sightings decreasing further east and on the spoil ground. Common seal followed a similar distribution, but with more sightings at the spoil ground. A similar pattern is apparent during the 2018-19 and 2019-20 capital dredging campaigns.

There were 143 sightings (76% of total marine mammal sightings) of Grey seals during the September 2017 maintenance dredging campaign with 12 sightings (6%) of Common seals, 65 sightings (58% of total marine mammal sightings) of Grey seals during the April 2018 maintenance dredging with 11 sightings (10%) of Common seal and 16 sightings (23%) of Grey seals and 8 sightings (11%) of Common seals during September 2020 with 9 (13%) sightings of seals not identified to species level.

These data suggests that seals will be exposed to both dredging and disposal operations as they occur throughout the harbour, navigation channel and on the spoil grounds.

### Potential Impacts on Marine Mammals

Direct impacts on marine mammals may occur during dredging and dumping operations. The likelihood of impacts are low but the impact could be significant without mitigation. Predicted direct impacts from dredging and dumping may arise if marine mammals are very close to the dredger during start up or during dumping of sediment at the spoil ground leading to injury. The likelihood of impacts are extremely low and the impact also low. Modelling suggests that noise associated with dredging and dumping is unlikely to have a significant effect.

### Mitigation Measures

Proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact to non-significant levels both at the individual and population level. As an additional mitigation measure for harbour porpoises it is proposed to maintain the static acoustic monitoring (SAM) programme established during the ABR Project, to ensure there is no impact on the Conservation Objectives of the Rockabill to Dalkey Islands SAC. Monthly counts of seals hauled out on Bull Island will be continued to ensure there is no long-term impact of construction activities at Dublin Port on this important haul-out site and to contribute to increasing knowledge of seals using this UNESCO World Heritage site. It is also recommended that consideration is given to assessing current levels of noise associated with shipping noise to establish baseline for future reference.

## Conclusion

Dublin Bay and approaches to the port are important for marine mammals including the regular occurrence of Grey and Common (Harbour) seals and Harbour porpoise. Recent dredging associated with the ABR Project and ongoing maintenance dredging has provided an excellent understanding of the marine mammal community exposed to dredging and dumping and the likely effects. IWDG recommend full implementation of the NPWS Guidelines to minimise the acoustic impacts of dredging to enable the dredging campaign to be carried out which will result in no significant impacts to marine mammals or on the conservation objectives of the Rockabill to Dalkey Island SAC.

## 7.3 Avian Biodiversity

The location of the proposed Dublin Harbour Capital Dredging Project lies adjacent to the boundary of the South Dublin Bay and River Tolka Estuary SPA and 1,445m southwest of the nearest boundary of the North Bull Island SPA. The proposed project will involve dredging works within 25m of the SPA, however the majority of proposed dredging locations lie at greater distances from the SPA.

### Wintering Birds

South Dublin Bay, Bull Island and the River Tolka Estuary support large numbers of wintering waders and waterfowl, which form the Special Conservation Interests of both the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA. Data provided to RPS by Birdwatch Ireland for the various sub-sites subject to survey in the winter of 2019 to 2020 has been used to establish the current ornithological baseline in the relevant areas likely to be affected by the proposed capital dredging project. In total the subsites were recorded to support a total of 22,381 birds in the winter period 2019-2020 (adding peak counts). When black-headed gull is discounted the total was 12,599 birds across this period.

The findings of wintering bird monitoring surveys undertaken of Dublin Bay and River Tolka Estuary clearly indicate the relative importance of the surveyed areas for wintering waterfowl. The proposed capital dredging works will take place within a small sub-set of the surveyed sub-sites. Dredging work will take place within the Alexandra Basin and Liffey Channel sub-sites, with the dumping to take place offshore and outside of the surveyed areas with vessels travelling via the Liffey Channel sub-site to access the dump site location. The findings of the wintering bird survey 2016/17 to 2019/20 indicates that the Alexandra Basin sub-site supports a relatively limited range of wintering waterbird species in limited numbers. Use of the sub-site by any particular species appears sporadic across the years and this was borne out in the monthly data across the survey seasons in 2019/20. Several species do appear to utilise this sub-site on a consistent basis, those being black-headed gull, herring gull and light-bellied brent goose, of these both black-headed gull and light-bellied brent goose represent special conservation interest species of the nearby South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA.

The Liffey Channel sub-site supports a greater range of species at higher numbers with consistent use by relatively large numbers of black-headed gull, common gull, herring gull, sanderling and teal, in addition to lower numbers of black-tailed godwit, cormorant, great crested grebe, redshank, shag, turnstone and wigeon and sporadic use by other species.

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The Alexandra Basin and Liffey Channel sub-sites both support use by populations of waterbirds associated with nearby European sites and as such may provide some limited function as supporting habitat for these species. Other sub-sites are spatially separated from the proposed capital dredging project and as such the potential for the proposals to give rise to any significant effects on these more distant sites is considered to be relatively minimal given the nature of the proposed works.

### Non-breeding Waterbirds

The area immediately to the north of Berth 53, which lies outside of but within 50m of the proposed capital dredging area, is covered by shallow water at most stages of the tidal cycle. However, intertidal substrate is exposed in this area when the tide falls below about 0.25m OD. At levels in excess of this no intertidal area is exposed. On the lowest spring tides, both a gravel zone and a sandflat area are exposed. The most abundant and regular species here are Black-headed Gull and Herring Gull. Other species occur irregularly or in small numbers. None of the species that were recorded on the site reached a peak number which was above the thresholds for all-Ireland importance (Burke *et al.* 2018).

### Breeding Black Guillemot Population

Black Guillemots are seabirds that nest in crevices within the quays and other structures of Dublin Port between Poolbeg and Butt Bridge on the River Liffey. Most of the nest sites are in either disused drainage pipes or the superstructure beneath ro-ro ramps. These nest locations are required to be well above the highest tide level to be suitable for the birds. The population of Black Guillemots in Dublin Port has been monitored consistently since 2013. The proposed Capital Dredging Project will not involve redevelopment of quays and basins and as such will not affect nest sites of this species. Temporary artificial nest sites have been installed in the Dublin Port Oil Jetty to replace any nest sites which are unavailable during the construction of the previously consented ABR Project.

The total number of breeding Black Guillemot in these areas was estimated at 48 in 2019 (mean 63 over the period 2013-2019). The population of Black Guillemot in Dublin Port has declined over the period 2013-2019. Because the birds move out to the Irish Sea during the non-breeding season the decline is likely to be due to the increased frequency of winter storms which affects survival and recruitment of birds to the population in the following breeding season.

### Breeding Tern Populations

Two species of terns Common Tern (*Sterna hirundo*) and Arctic Tern (*Sterna paradisaea*) breed in Dublin Port. The tern colony currently occupies four separate subsites entirely on artificial structures. A comparison between total number of nests in each of the sub-sites over the seven years 2013-2019 was undertaken. The number of nests in the overall colony had declined in 2016 due to the partial collapse of the ESB Dolphin and possible disturbance on the CDL Dolphin but this was partly buffered by the provision of the two DPC pontoons. The ESB Dolphin was reconstructed on 2017 but the number of nests in the port colony in 2017 was treated as a minimum figure as no census was undertaken on the ESB Dolphin in that year.

### Potential Impacts on Avian Biodiversity

The proposed Dublin Harbour Capital Dredging Project will not have potential to give rise to direct impacts upon nesting birds of any species. This conclusion is drawn in light of the nature of the works which do not comprise any terrestrial elements with potential to result in the loss of any nesting habitat for waterbirds and the timing of

the works, which will take place between October and March inclusive. As such, the works will take place outside of the nesting period for species such as black guillemot, common tern and arctic tern.

The proposed capital dredging project will not have potential to give rise to the loss of any areas of habitat utilised by wintering and non-breeding bird species, such as intertidal mudflats, as dredging works will result in the deepening of existing channels of significant depth within Dublin Port only. Potential effects upon avifauna arising as a result of the proposals are therefore limited to indirect effects

There is a potential for moderate indirect disturbance from dredging activity in the berths and river channel. As discussed above, given the timing of the works, no indirect disturbance to breeding bird species, such as black guillemot, common tern or arctic tern will occur. Potential for indirect disturbance is therefore limited to that of populations of wintering bird species which utilise the areas to be dredged between October and March. A dredging disturbance study in autumn 2019 revealed that waterbirds were not disturbed when roosting within 150m of dredging activities (refer Appendix 7-2 Poolbeg Outfall Dredging Disturbance Study). It is considered that the likelihood of significant effects arising as a result of both noise and visual disturbance during dredging operations is low, in the context of the existing levels of shipping activity and associated noise and visual disturbance which occur within Dublin Port on a daily basis.

It is also considered that there is some limited potential for indirect effects upon non-breeding waterbirds arising as a result of the accidental release of pollutants, such as petrochemicals, from dredge vessels, into the estuarine and marine waters of Dublin Bay. Again the likelihood of such a risk giving rise to a significant effect is considered to be low.

It should be noted that the likely impacts on qualifying interests of the South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are addressed in the Natura Impact Statement submitted with the application for consent.

### Mitigation Measures

The following key mitigation measures apply to the Capital Dredging Scheme to minimise the impact of the proposed works on avian ecology:

- Measures set out to avoid pollution at to water quality leading to habitat deterioration as outlined in the water quality chapter (Chapter 9) will be fully implemented.
- the capital dredging scheme will be confined to the winter months (October – March) when the terns have migrated from the site.

In addition, DPC will also continue to undertake a programme to monitor winter wetland birds in the adjacent European Sites at the South Dublin Bay and River Tolka Estuary Special Protection Area. This monitoring programme will continue throughout the construction phase and for a period of two years after the completion of such works, with monthly surveys from October to March. The results of this monitoring programme will be submitted to Dublin City Council at 12-monthly intervals to maintain a public record.

### Conclusion

Subject to the implementation of standard mitigation measures to ensure that the risks of such an occurrence are minimised it is not envisaged that the proposed project will have potential to give rise to any significant impacts, cumulative or otherwise, upon bird populations which are known to utilise the site and the surrounding locality.

## 8 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

The assessment of Land Soils, geology and hydrogeology was based on a desk study of publicly available information such as geological maps, historical borehole logs and maps, a site walkover survey and an intrusive ground investigation.

**Land:** The Dublin Port Masterplan 2040, reviewed 2018, recognises the finite availability of land for port related activity. Dublin Port lies immediately adjacent to the South Dublin Bay and Tolka Estuary SPA and the Masterplan commits to no further Port expansion within the Tolka Estuary. Instead, the Masterplan focuses on the redevelopment of existing brownfield lands, berthing pockets and navigation channel in order to provide for the 77.2m gross tonnes projected by 2040. The Dublin Harbour Capital Dredging Project supports these significant infrastructure developments by providing sufficient water depth within Dublin Harbour's navigation channel, basins and berths for the safe movement of vessels to and from the port. As the Dublin Harbour Capital Dredging will take place in the marine environment only, the magnitude of the potential impacts to land is considered to be *neutral*. The localised significance of the environmental effect is therefore *neutral* in the absence of mitigation based on the *neutral sensitivity* of the receiving environment.

**Soils:** The soil underlying the Dublin Harbour Capital Dredging Project comprise a mixture of clay, silt, sand, gravel and cobbles. Marine sediments are not, in themselves polluting substances. However, they can be a sink for contaminants that end up in our harbours and ports, mainly from anthropogenic sources such as sewage discharges, marine traffic, industrial wastewater and historically poor environmental management. Contaminants in sediments can act as a source of long-term environmental pollution. Certain substances can bio accumulate in benthic organisms resulting in bio magnification at higher levels in the food chain. Some widespread pollutants such as polychlorinated biphenyls (PCB's) are no longer in use but due to their persistence they can still be detected in marine sediments.

Dublin Port Company (DPC) consulted with the Marine Institute regarding their plans to submit both Foreshore Licence and Dumping at Sea Permit applications for the Dublin Harbour Capital Dredging Project. The Marine Institute issued a Sampling & Analysis Plan (SAP) to DPC on 27<sup>th</sup> March 2020. The Marine Institute's SAP 2020 comprised the following: A total of 31 surface sediment samples for sediment chemistry analysis and Provision was made for additional eco-toxicological testing, depending on the sediment chemistry results. The following observations can be made from the sediment analysis results: The sediments in the inner harbour are dominated by silts; The sediment chemistry results show very low level contamination (above the lower Class 2 guideline) of Arsenic, Cadmium, Copper, Lead, Nickel and Zinc at a number of sample locations within Dublin Harbour which is typical of industrial port sediment. Notably no elevated levels of Mercury were recorded; No TBT / DBT results recorded above the lower guideline limit. Localised, slightly elevated levels of PCBs, PAHs and TEHs were found in two samples with the remaining sample parameters are all below the lower guideline levels and would therefore be categorised as Class 1 (uncontaminated) and none of the 31 samples have any parameters above the upper guideline limit.

The results of all the sediment chemistry analysis carried out in April 2020 were forwarded to the Marine Institute for their interpretation, in combination with other relevant data held by the Marine Institute. The Marine Institute expressed concern over PCBs and PAH levels that are marginally above the lower guideline limit and recommended that further investigative work be undertaken comprising eco-toxicological testing to ensure that the sediments have no biological effect and thereby suitable for disposal at sea.

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DPC commissioned Aquatic Services Unit (ASU), University College Cork under the management of Ger Morgan to undertake the eco-toxicological testing in accordance with the extent and specification set by the Marine Institute.

The eco-toxicological test results have shown that the marine sediments to be dredged have no significant biological effect and can therefore be considered as Class 1 material (Uncontaminated: no biological effects likely) and thereby suitable for disposal at sea. The results of all the eco-toxicological tests carried out in September 2020 were forwarded to the Marine Institute for their interpretation, in combination with other relevant data held by the Marine Institute.

Following their assessment, the Marine Institute confirmed that the sediment sampling programmes in April 2020 for sediment chemistry and in October 2020 for eco-toxicity are adequate for a Dumping at Sea permit application assessment.

**Geology:** The bedrock underlying the Dublin Harbour Capital Dredging Project is not defined. However, as illustrated in the GSI Bedrock Geology of Ireland Map (100K) the bedrock in the greater Dublin region consists of Dinantian Upper Impure Limestone which is part of the Lucan Formation. The formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are also rare, dark, coarser grained, calcarenitic limestones, which are sometimes graded, present. The formation ranges from 300m to 800m in thickness and is Carboniferous. There are no faults mapped in the vicinity of the site. No bedrock outcrops were identified on the site. Ground investigations undertaken as part of the Alexandra Basin Redevelopment Project have shown that the Limestone rock head level in the vicinity of the Dublin Harbour Capital Dredging Project are at circa -35m Chart Datum (CD) which is 25m below the design dredge level of -10m CD. The magnitude of the potential impacts associated with the creating a pathway in which potentially contaminated soils/sediment and/or groundwater can migrate downwards to groundwater is considered to be *neutral*. The localised significance of the environmental effect is therefore *neutral* in the absence of mitigation based on the *neutral sensitivity* of the receiving environment.

**Hydrogeology:** The bedrock aquifers underlying the Dublin Harbour Capital Dredging Project are not defined according to the GSI National Bedrock Aquifer Classification Map based on the manmade nature of Dublin Port. The Bedrock aquifer in the surrounding area have been defined as a LI – locally important bedrock aquifer, described as bedrock which is moderately productive only in local zones. LI aquifers are those in which fissure permeability is generally low due to a poorly connected network of fractures, fissures and joints. Generally, the lack of connection between the limited fissures results relatively poor aquifer storage and flow paths that may only extend a few hundred metres.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts). The GSI does not have data regarding aquifer vulnerability at the Dublin Harbour Capital Dredging Project due to the majority of the Dublin Port being reclaimed from the Liffey Estuary. Aquifer vulnerability in the neighboring area of Dublin Port is classified as 'Low' (L). Based on previous onsite investigations undertaken in Dublin Port, overburden depth to bedrock has been shown to be > 16 mbgl which

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would confirm the GSI site categorization of “Low”. Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply. The Dublin Harbour Capital Dredging Project will take place in the marine environment only, therefore the magnitude of the potential impacts to groundwater is considered to be *neutral*. The localised significance of the environmental effect is therefore *neutral* in the absence of mitigation based on the *neutral sensitivity* of the receiving environment.

### Mitigation Measures/ Conclusion

No mitigation measures to reduce impacts were considered necessary. No residual impacts are predicted during the construction or operational phase of Dublin Harbour Capital Dredging Project.

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## 9 WATER QUALITY

Baseline water quality within the receiving environment has been established through the review of national monitoring data used to establish water quality status in the context of the EU Water Framework Directive (WFD) and supporting environmental standards. Recent high frequency monitoring data collected during the DPC Alexandra Basin Redevelopment (ABR) Project has also been considered. The review of available WFD monitoring information for the water bodies in the immediate vicinity of the proposed capital dredging activity has concluded:

- The Overall WFD Water Quality between 2013-2018 for the Liffey Estuary Lower, Tolka Estuary and Dublin Bay is Good, Moderate and Good respectively;
- The WFD bathing areas within Dublin Bay are located outside Dublin Port. They are Dollymount Strand, Sandymount Strand, Merrion Strand and Seapoint. Most recently (2020), Seapoint and Dollymount have been classified as Excellent; Sandymount was classified as Sufficient and Merrion Strands was classified as Poor. As Merrion Strand was classified as Poor for the last five years (2015-2019), it was declassified as a designated bathing water in 2020. There are also three Non-designated bathing areas within Dublin Harbour that are monitored by Dublin City Council. They are: Shelly Banks, Half Moon and North Bull Wall. Based on the latest published results on the DCC website, the North Bull Wall Causeway on the River Liffey, was classified as being “poor” quality at the beginning of 2020 but has since improved and has generally been classified as being “excellent” quality status between March and September 2020. Similarly, the Half Moon and Shelley Banks bathing areas had varied classifications of poor - good at the beginning of 2020 but has since improved and was classified as “excellent” status between March and September 2020.
- High frequency water quality monitoring as part of the ABR Project at various locations in the port has shown that water quality has been satisfactory during the monitoring period between January 2018 and March 2021.
  - In general, salinity remained relatively high at all sites, between 24.5 and 35.4 PSU. However, on some occasions significant freshwater influences are obvious, such as at East Link during major storm events when riverine freshwater inputs increase.
  - Temperature shows the expected seasonal trend. The temperature at the Poolbeg site is slightly higher compared to the other three sites, the higher temperatures here probably reflecting the influence of the nearby cooling water stream.
  - Dissolved oxygen levels generally range between 7.9 and 9.1 mg/l. The mean dissolved oxygen values clearly indicate that oxygen levels are consistently close to saturation levels and no extended periods of oxygen sag or impacts of any dredging activities are obvious.
  - Turbidity is very variable, particularly at Poolbeg where very high spikes of turbidity are sometimes measured. However, 95% of turbidity measurements are <9.0 NTU at the East Link Monitoring Station and <23.0 NTU at Poolbeg, North Bank and Tolka Estuary. Many of the higher turbidity readings recorded are transient and local and do not represent events of any environmental significance or diagnostic value in assessing potential impacts. As noted, turbidity can be volatile at the Poolbeg Jetty Monitoring Station. This appears to be mainly due to site characteristics and tidal effects particularly during low spring tides. In addition, turbidity at all sites may be elevated during storm conditions. Investigations during elevated turbidity events have confirmed that ABR Project activities are not the cause of these events. Comparisons of mean turbidity during periods of 'dredging' and 'no dredging' activity showed that there is little difference between absolute values and no apparent pattern i.e. no consistent increase in mean turbidity during dredging episodes as reflected in the plots presented in Figures 2-10 to 2-13. Measured turbidity results demonstrate that dredging campaigns in 2018 and 2020 did not cause any discernible increase in turbidity within the Inner Liffey channel.

- Between February 2020 and December 2020, dredging was exclusively confined to the area inside the breakwater walls, i.e. Dublin Harbour and Inner Channel. The sediments in the inner harbour are dominated by silts, by contrast Sediments in the outer channel are predominantly fine sands. Mean daily turbidity data for each monitoring site within remained relatively low throughout the monitoring period with average turbidity <10NTU at all sites
- Monitoring in Dublin Bay between January 2018 and March 2021 has confirmed that water clarity as measured by turbidity levels has been good. Average turbidity is less than 16 NTU for all sensors, and 90% of data was less than 22 NTU. Water clarity has been similar at background and dump site monitoring locations. Data collected during dredging campaigns provides evidence that the loading and disposal of dredge material at the Dublin Bay Spoil Ground had no measurable effect on water clarity at the dump site. Water clarity is strongly influenced by tidal and storm events. Peaks in turbidity may be observed outside of dredging and dumping intervals, and also at the control sites.
- Extensive turbidity data collected as part of a sediment plume monitoring programme was recorded during several dumping events. Analysis of the data has provided evidence that the dumping of the sediment at the licenced dump site had no measurable significant effect on turbidity levels outside the dump site.
- Earth observation data is a powerful adjunct to buoy based monitoring. The large-scale simultaneous views of the bay show elevated turbidity in response to multiple sources and recurring patterns or plumes. Such data confirms the dynamic nature of turbidity in the bay under natural conditions in the absence of any dredging operations. It confirms the pivotal role of currents and circulation patterns in the bay in determining turbidity at specific locations.

### Potential Impacts

Dredging operations will cause temporary suspension and release of sediments at the loading sites. Spoil disposal operations will also give rise to temporary sediment plumes at the licenced dump site at the approaches to Dublin Bay. Dredging loading operations have been designed to minimise the disturbance and escape of material at the seabed and during removal through the water column. Proposed individual loading operations are of relatively short duration and intermittent in nature. It is envisaged that disposal operations occur at the licenced dump site which is naturally dispersive for fine sediments. Nevertheless, significant amounts of dredge material will be removed and deposited at the dump site over a relatively extended period.

### Mitigation Measures

The adoption of appropriate sediment controls during capital dredging is essential to prevent increased suspended sediment concentrations. Dublin Port Company has recently completed the fourth and final winter capital dredging campaign (October 2020 – March 2021) as part of the ABR Project. The four winter dredging campaigns have been fully compliant with the requirements of all the development consents, as confirmed by high resolution environmental monitoring results reported in the Annual Environmental Reports (AERs) 2017, 2018, 2019 and 2020 submitted to the EPA. The monitoring included year-round real-time measurement of water quality parameters within the inner Liffey channel and Dublin Bay at eight monitoring stations and at various water depths. This was supplemented by sediment plume and hydrographic monitoring that validated Plume Dispersal Modelling.

A Dredging Management Plan was developed for the ABR Project and is set out in Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018. The mitigation proposed for dredging operations in the Dublin Harbour Capital Dredging Project has been informed by the ABR Project monitoring and experience working in the same locations. The following key relevant mitigation measures will apply to each dredging campaign:

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- The capital dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- No over-spilling from the dredger will be permitted while the dredging activity is being carried out within the inner Liffey channel (Dublin Harbour).
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control the volume of sediment released at the dumping site.
- Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement
- A documented Emergency Response Procedure will be put in place prior to commencement
- A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.

### Conclusion

Using this robust baseline water quality database, an assessment of the Dublin Harbour Capital Dredging Project loading and dumping activities was conducted to determine the likelihood of significant impacts on water quality using the criteria for rating significance and magnitude as set out in the National Roads Authority (NRA) publication "Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes" (NRA, 2008) and appropriate mitigation measures to reduce impacts were proposed, where necessary.

In circumstances where the appropriate mitigation measures are fully implemented during the Dublin Harbour Capital Dredging Project, the impact on water quality will be imperceptible. The loading and dumping activities are therefore not expected to have a significant effect on the water quality of the receiving waters.

It can therefore be concluded that the Dublin Harbour Capital Dredging Project is compliant with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality standards.

## 10 AIR QUALITY & CLIMATE

The current state of the environment in terms of baseline air quality has been determined from the data from the EPA monitoring Zone A (Dublin) network to determine compliance with relevant ambient air legislation. In addition to the EPA monitoring, DPC carry out a series of ambient air quality monitoring tests within the environs of the port. This monitoring is employed in this assessment to demonstrate the spatial variation in the Port and in the wider Dublin area in conjunction with the data from the EPA network.

Results of the baseline monitoring indicates that recent levels in the Greater Dublin Area are below the statutory limits for the protection of human health and also below the WHO guidelines for the protection of human health. It is noted that monitoring undertaken by DPC within the Port footprint show levels that are higher than the Greater Dublin Area average and, in some cases, levels exceed both the statutory limits and the WHO guidelines.

### Potential Impacts

There are sensitive receptors (houses, commercial operations) located in the area and these receptors vary in distance from the proposed development. There is a potential that receptors may experience a change in air quality and the extent of these changes in air quality is identified in the air quality assessment. The nearest sensitive residential receptors to the proposed dredging are the residential dwellings on Pigeon House Road and Coastguard Cottages circa 140 metres to the south of the nearest point of dredging. The principal pollutants of concern which originate from road developments are the nitrogen oxides (NOx), in terms of impact on sensitive ecosystems. Nitrogen oxides (NOx) may have a positive or negative impact by acting as a fertiliser or a phytotoxicant. Effects are mainly on vegetation growth, photosynthesis, and nitrogen assimilation/metabolism.

The nearest sensitive ecological site to the proposed dredging is the South Dublin Bay and River Tolka Estuary SPA (Site Code 004024) which has a number of qualifying interests including wetland and waterbirds. The proposed dredging in Berth 52 will be directly adjacent to the boundary of the SPA, albeit for a temporary basis. An assessment of nitrogen deposition on the SAC has been undertaken and the results indicate that the temporary levels of nitrogen deposition on the SPA are less than 30% of the critical load as set by UNECE and the results of this deposition on biodiversity is considered negligible.

Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors and also to sensitive ecosystems. Given the nature of the port and the distance to sensitive receptors, there are no properties located within the dust risk impact zone and it is concluded that construction dust from the Capital Dredging Project will be negligible for the duration of the works.

The main potential odour from the construction stage relates to the potential for fugitive odours from the dredging operation. Despite the low risk of encountering odours, a series of odour mitigation measures have been presented to minimise the impact of this operation and to prevent any nuisance in the unlikely event that odours are encountered. The residual odour impact of the dredging operations is considered negligible.

There are no predicted direct impacts to air quality and climate associated with the operation phase of the proposed dredging.

### Mitigation Measures

**Vessel Emissions:** A number of EU Directives and the requirements of the Marpol Convention regulate the fuels and emissions employed in the shipping industry. These requirements will remain in practice throughout the operation of the Capital Dredging Project.

**Construction Dust:** The following precautionary measures will be undertaken to minimise the potential nuisance caused by dust at the nearest sensitive receptors and on sensitive ecosystems:

- A dust minimisation plan will be put in place based upon the industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities'.
- Monthly monitoring of dust deposition levels each month for the duration of construction for comparison with the guideline of 350mg/m<sup>2</sup>/day (for non-hazardous dusts). This monitoring will be carried out at a minimum of four locations at sensitive receptors around the proposed works. Where dust levels are measured to be above this guideline, the mitigation measures in the area will be reviewed as part of a Dust Minimisation Plan.

**Construction Phase – Odour:** An Odour Management Plan (OMP) will be put in place based upon the guidance presented in the Environment Agency of England and Wales "Odour Management Guidance" (H4 Guidance, 2011) and the EPA "Odour Impact Assessment Guidance for EPA Licensed Sites" (Guidance Note AG5, 2010). These will include measures designed to:

- Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution;
- Prevent unacceptable odour pollution at all times; and
- Reduce the risk of odour releasing incidents or accidents by anticipating them and planning accordingly.
- The OMP will include a procedure for complaint recording and investigation to ensure that all complaints received at the site are suitably addressed.

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## 11 NOISE & VIBRATION

A detailed baseline noise monitoring survey was completed at a location representative of the nearest properties to determine the noise environment in the vicinity of the proposed redevelopment. This baseline noise monitoring survey was used as a basis for determining the likely noise impact associated with the proposed dredging activities. The Noise and Vibration Assessment was completed with reference to a range of relevant Irish and international noise and vibration guidance documents.

Worst-case dredging noise levels from the proposed development completed at the most sensitive locations and most sensitive times have the potential to exceed the relevant noise threshold limits outlined in the relevant noise guidance documents if the appropriate mitigation measures are not in place. Noise mitigation measures are included in the EIAR to ensure that dredging noise impacts are reduced to the lowest possible levels and within the relevant threshold limits. There will be no significant vibration impact associated with the proposed development on account of the distance between the activities and the nearest sensitive receptors.

Noise surveys will be conducted during the dredging works. It is proposed that continuous noise measurements will be recorded at the existing DPC noise monitoring site adjacent to Poolbeg Marina for the duration of the dredging works. This monitoring programme will ensure that noise from dredging works will be within the noise threshold limits throughout the construction phase. All data will be collected and analysed on a weekly basis and the analysed data will be fed back to DPC and the Contractors on a weekly basis with a view to reviewing the compliance of construction phase activities.

Any noise nuisance issues associated with the dredging works will be immediately assessed and analysed in relation to the recorded noise levels and all correspondence with DPC, the Contractor, Dublin City Council and residents will be conducted with the appropriate level of urgency. This will include the appropriate liaison with DPC and the Contractor to control activities to ensure that the construction phase activities are in line with the consents.

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## 12 UNDERWATER NOISE

Underwater noise levels can be divided into three typical categories:

1. Background noise level (no dominant sound, low noise level);
2. Biological noise level (louder sounds not attributable to anthropogenic sources); and
3. Anthropogenic noise (louder sounds attributable to human activity such as shipping traffic or construction).

Dublin Bay is home to Dublin Port and Dun Laoghaire Harbour along with a number of smaller harbours and marinas. Marine traffic includes: large cargo ships, passenger cruise ships, large ferry vessels, fast ferries, trawlers and leisure traffic. The main shipping channels from the Irish Sea are north and south of the Burford Bank towards the Great South Wall light and into the dredged shipping channel on the eastern approaches to the port up the River Liffey as far as the East-Link/Tom Clarke Bridge.

The central port area from Berth 53 to the Alexandra Basin West is heavily trafficked on a daily basis. This working area in Dublin Port is relatively noisy in comparison to the greater Dublin Bay area. Noise in the port area comes from shipping and a multitude of industrial sources. The port is accessed via the dredged channel which extends some 2.5 km from the Great South Wall light to Berth 53. The channel is approximately 200 m wide and is currently 8-10 m deep. This narrow shallow channel has the effect of confining noise from the port within that area and a short section of the channel and the River Liffey upstream.

All traffic to and from port uses the dredged navigation channel to the eastern end of the Great South Wall and then heads either north or south of the Burford Bank. West of the Great South Wall light in the dredged channel, noise levels are elevated in the navigation channel as a vessel passes but again fade quickly. The outer Dublin Bay area is also a shallow water area (<30 m deep) and underwater sound does not propagate efficiently, resulting in short elevations in noise levels while a vessel is passing by.

The receiving environment during the construction phase is an enclosed section of a busy port. Existing underwater noise levels in the area are elevated in the presence of shipping traffic but noise attenuates quickly due to absorption by the mud on the seabed. From an underwater noise perspective any sources of additional noise will be confined to an area close to the source and attenuate rapidly.

The site is noise sensitive due to the proximity of marine species including fish; Salmon, River Lamprey, Sea Lamprey, Eel, Smelt and Shad, and marine mammals, primarily the resident seal population and Harbour Porpoise associated with the nearby Special Area of Conservation. The outer part of Dublin Bay is a popular recreational diving location, with scenic dives at Scotsman's Bay, Sandycove, Muglins Rock, Dalkey Island and Irelands Eye. Popular wreck sites include the Queen Victoria and other wreck sites further out. The closest of these sites (Scotsman's Bay) is located some 6 km from the end of the Great South Wall, which is in turn 2 km from the nearest dredging activity.

Noise levels from dredging and construction in the port will be contained in the dredged channel close to the source and will not propagate out to the wider bay area. Shipping entering or leaving the port will result in localised increases in noise levels in the outer bay.

With regards to the impacts of the Dublin Harbour Capital Dredging Project on underwater noise, there are two main impacts to be assessed: dredging and spoil dumping:

- **Dredging:** Dredging will be carried out using a Trailing Suction Hopper Dredger (TSHD) and/or a backhoe dredger. Other ancillary equipment will include a survey vessel and bed-leveller to remove peaks and troughs created by the dredger. The most significant underwater noise source will be the TSHD. The TSHD is smaller than many of the vessels using the port but is characterised by the pumping noise and material transport through the suction pipe. The operation comprises of the vessel moving into position and lowering the suction pipe. Material is pumped into the vessel as it transits a specific path, generally finishing in a west to east direction. The suction pipe is hauled on board and the vessel heads off to the spoil ground.
- **Spoil Dumping:** The dredged material is disposed of at the licenced dump site at the entrance to Dublin Bay located to the west of the Burford Bank. The TSHD arrives from the port and carries out a watch for marine mammals or any hazards that might impede the dumping. Once the all-clear is given the doors underneath the vessel open and the material is discharged to the seabed. This is completed in a matter of minutes as the dredge spoil is not consolidated. Once discharged the dredger returns to the port to repeat the process. Dredging continues on around the clock basis subject to weather and other constraints.

The source levels of both activities are not such to cause injury to marine mammals or fish. The underwater noise levels are such that they could cause behavioural effects in marine mammals at a range of 60-90 metres. Such behavioural effects are also likely to occur due to vessel presence at the same range. No injury to a marine mammal or fish species will arise due to underwater noise.

The impact from underwater noise is quite limited, based on the measured underwater noise levels for similar scale works being carried out in 2016 and 2020. The underwater noise levels arising during capital dredging will not result in harm to marine mammals or fish. Specific mitigation measures and compliance with NPWS (2014) guidelines suggest the use of a MMO on board the vessel to keep a watch for marine mammal activity. This should avoid the risk of injury to marine mammals from a vessel strike and ensure that the waters in the immediate vicinity of the vessel are free from marine mammals prior to deposition of the dredged material at the dump site. No specific mitigation for underwater noise is recommended.

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## 13 COASTAL PROCESSES

The impact on coastal processes arising from the dredging and dumping at sea activities associated with the Dublin Port Capital Dredging Project is assessed in relation to dredging and disposal operations. The assessment has been informed by a robust numerical modelling programme and, where applicable, hydrographic survey data and site specific water quality monitoring data made available by Dublin Port Company's Monitoring Programme (ongoing for the ABR Project).

The Dublin Harbour Capital Dredging Project consists of the dredging of the Navigation Channel (inner harbour), berthing pockets and basins. The total estimated dredge volume is estimated to be 500,000m<sup>3</sup> consisting of clays, silts, sands and gravels with occasional cobbles, no dredging of rock is required.

### Potential Impacts

Notwithstanding application of extensive mitigation measures, the process of dredging unavoidably causes disturbance of sediment on the channel bed and dispersal of material in the water column. Disposal of dredge spoil at the licenced dump site at the approaches to Dublin Bay also results in sediment release. These losses in the form of a suspended sediment plume within the water column may have potential impacts on water quality, and marine life (refer to Chapter 7 Biodiversity, Flora and Fauna and Chapter 9 Water Quality). It should also be noted that chemical sediment analysis and eco-toxicological testing has shown that the sediments to be dredged from the Port's navigation channel and basins are suitable for conventional dumping at sea (refer to Chapter 8).

Extensive water quality monitoring using real time turbidity measurements has been undertaken in previous dredging campaigns (as reported in the Annual Environmental Reports for 2017 to 2020 submitted to the EPA under Dumping at Sea Permit S0024-01). This survey data demonstrates that during disposal of dredged fine sands at the licenced dump site, the fine sand falls rapidly to the seabed and any sediment plume is short lived and is not dispersed widely. Sediments to be dredged from Dublin Harbour as part of the capital dredging will be finer containing a significant silt fraction. Therefore, plume modelling was undertaken for the silt fractions with silt losses of 1% at the dredger head being introduced as a sediment source in the bottom layer of the model.

As the Liffey channel in Dublin Port is influenced by several fresh water river inflows and by thermal inputs from three power station cooling water systems, stratification of the water column occurs under certain tidal conditions in the Liffey channel, particularly in the central section of the harbour. Therefore, the plume modelling simulations were undertaken using the MIKE 3 Hydrodynamic model. This model was coupled with the Sediment Transport module and included temperature and salinity effects. The Tolka, Liffey and Dodder river flows were taken as the winter average flows. In line with the current Dredging Management Plan developed for the ABR Project and as set out in *Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018*, no over-spill from the dredger's hopper was included in any of the model simulations.

Output from an extensive numerical modelling programme in conjunction with site specific water quality monitoring data and survey data have been used to assess the Dublin Harbour Capital Dredging Project and determine the likelihood of significant impacts on the coastal processes within the inner Liffey channel and Dublin Bay due to dredging and dumping at sea activities.

The computational modelling study predicts the following levels of Total Suspended Solids (TSS) as a result of sediment plumes arising during the dredging operations within the inner Liffey channel:

- The Peak Total Suspended Solids concentration, outside the immediate vicinity of the dredger, arising from dredging within the navigation channel is expected to be in the range 25-30mg/l above baseline levels.
- The Peak Total Suspended Solids concentration, outside the immediate vicinity of the dredger, arising from dredging within the basins is expected to be circa 35mg/l above baseline levels. This slightly higher TSS level was expected due to the lower tidal currents experienced within the more sheltered basins compared to the main flow within the Liffey itself.
- The overall mean rise in Total Suspended Solids over the duration of the dredging campaign is predicted to be less than 10 ml/g above baseline levels.

The computational modelling study predicted the following levels of Total Suspended Solids (TSS) as a result of sediment plumes arising from the disposal of dredge spoil from capital dredging activity within the inner Liffey channel (predominantly silts):

- The sediment plume outside the area of the dump site is expected to result in a TSS of less than 200mg/l and not to extend further than 750m to the north or south of the dump site.
- The disposal operations associated with capital dredging will not result in any significant increases to the background level of suspended sediments.

### Mitigation Measures

The adoption of appropriate sediment controls during capital dredging is essential to prevent increased suspended sediment concentrations. Dublin Port Company has recently completed the fourth and final winter capital dredging campaign (October 2020 – March 2021) as part of the ABR Project. The four winter dredging campaigns have been fully compliant with the requirements of all the development consents, as confirmed by high resolution environmental monitoring results reported in the Annual Environmental Reports (AERs) 2017, 2018, 2019 and 2020 submitted to the EPA. The monitoring included year-round real-time measurement of water quality parameters within the inner Liffey channel and Dublin Bay at eight monitoring stations and at various water depths. This was supplemented by sediment plume and hydrographic monitoring that validated Plume Dispersal Modelling.

A Dredging Management Plan was developed for the ABR Project and is set out in Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018. The mitigation proposed for dredging operations in the Dublin Harbour Capital Dredging Project has been informed by the ABR Project monitoring and experience working in the same locations. The following key relevant mitigation measures will apply to each dredging campaign:

- The capital dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- No over-spilling from the dredger will be permitted while the dredging activity is being carried out within the inner Liffey channel (Dublin Harbour).
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control the volume of sediment released at the dumping site.
- Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement

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- A documented Emergency Response Procedure will be put in place prior to commencement
- A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.

### Conclusion

On the basis that the recommended mitigations measures are fully implemented during the Dublin Harbour Capital Dredging Project, the operations will not result in any significant impact to either water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition.

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## 14 CULTURAL HERITAGE

Desk-based assessment included a review of existing cartographic sources; the archival records maintained by the National Monuments Service that deal with pre-1750 sources and post-1750 sources; Dublin Port's accessible archives, and ADCO's own records from previous work conducted in the Port area since 2014.

A marine geophysical survey was commissioned separately to include the sea area of the Dublin Harbour Capital Dredging Project footprint where it extends beyond that of the survey completed in 2014 for the Alexandra Basin Redevelopment (ABR) Project and in 2019 for the MP2 Project. The specification required a similar set of comprehensive data acquisition, to maintain consistency between data sets and to ensure similar high standards of outputs, updated to take account of new technologies. Underwater inspections licensed by the National Monuments Service were completed in October 2020 by ADCO. The work focussed on a list of anomalies detected in the marine geophysical survey. The results of these elements are brought together to understand the cultural heritage environment, to appraise the potential impacts and to present appropriate mitigation within the context of the Dublin Harbour Capital Dredging Project.

### Potential Impacts

The capital dredging represents direct and permanent impacts on what appears to be previously un-dredged depths. Much of the area is within existing berth pockets, where the dredging will deepen such locations. The work commissioned to further inform the cultural heritage risk for the Dublin Harbour Capital Dredging Project has conducted a series of comprehensive surveys (marine geophysical survey, and archaeological underwater inspection, as outlined in this chapter), and this work did not identify significant materials of archaeological importance. The proposed dredging provides the opportunity to further examine the potential, and this will be done by archaeological monitoring of the dredging works at construction time, and recording by record any observations made at that point.

It is unlikely that dredging works will encounter archaeological materials since these works will take place on riverbed that has also been dredged albeit to shallower levels than are being proposed.

The dredging works to be carried out will be capital dredging activity that will extend into seabed that has not previously been dredged. The potential for this work to uncover and expose previously unrecorded archaeological material, and principally shipwreck, exists, and the protocols are in place to ensure that any new discoveries will be fully and properly resolved.

### Mitigation Measures

The following archaeological monitoring and management measures will be undertaken:

**Retaining a project archaeologist/s.** An archaeologist experienced in maritime archaeology will be retained by Dublin Port Company for the duration of the relevant works.

**Archaeological licences** will be required to conduct the on-site archaeological works. Licence applications require the inclusion of detailed method statements, which outline the rationale for the works, and the means by which the works will be resolved. Licence applications take a minimum of four weeks to process through the Department, and advance planning is required to ensure that the necessary permits are in place before site works commence. It is anticipated that the following licence types will be required: Excavation, to cover monitoring and investigations works; Detection, to cover the use of metal-detectors; and Dive Survey, to cover

the possibility of having to conduct underwater inspections. Since 2017, Excavation licence applications must be accompanied by a letter from the client on their letterhead 'confirming that sufficient funds and other facilities are available to the archaeologist to complete the archaeological excavation, post-excavation, and preliminary and final reports (including specialist reports)'. Dublin Port Company has confirmed that sufficient funds and other facilities as required will be made available to the project archaeologist to complete all reports required.

**Archaeological monitoring** will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by the Department of Housing, Local Government and Heritage. Archaeological monitoring is conducted during all seabed disturbances associated with the development. The monitoring will be undertaken in a safe working environment that will facilitate archaeological observation and the retrieval of objects that may be observed and that require consideration during the course of the works. The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland.

**The time scale** for the construction phase will be made available to the archaeologist, with information on where and when ground disturbances will take place.

**Discovery of archaeological material.** In the event of archaeologically significant features or material being uncovered during the construction phase, machine work will cease in the immediate area to allow the archaeologist/s to inspect any such material.

**Archaeological material.** Once the presence of archaeologically significant material is established, full archaeological recording of such material will be recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will be a matter for discussion between the client and the licensing authorities.

**Archaeological team.** It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.

**Archaeological dive team.** It is recommended that an archaeological dive team is retained on standby for the duration of any in-water disturbance works on the basis of a twenty-four or forty-eight hour call-out response schedule, to deal with any archaeologically significant/potential material that is identified in the course of the seabed disturbance activities.

**A site office** and facilities will be provided by Dublin Port Company on site for use by archaeologists.

**Secure wet storage** facilities will be provided on site by the Dublin Port Company to facilitate the temporary storage of artefacts that may be recorded during the course of the site work.

**Buoying/fencing** of any such areas of discovery will be necessary if discovered and during excavation.

**Machinery traffic** during construction will be restricted to avoid any identified archaeological site/s and their environs.

**Spoil** will not be dumped on any of the selected sites or their environs.

**Post-construction project report and archive.** It is a condition of archaeological licensing that a detailed project report is lodged with the Department of Housing, Local Government and Heritage within 12 months of completion of site works. The report should be to publication standard and should include a full account, suitably

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illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland.

These measures are subject to the approval of the National Monuments Service at the Department of Housing, Local Government and Heritage. DPC has and will continue to engage with the Department of Housing, Local Government and Heritage.

### Conclusion

The EIAR has identified, recorded and assessed the cultural heritage assets and potential impacts associated with the Dublin Harbour Capital Dredging Project. Existing records and newly-commissioned work present a robust baseline of information above and below the waterline. The principal cultural heritage constraint identified is the potential for new discovery as a result of the dredging work.

Archaeological monitoring of seabed disturbance activities will take place across the Dublin Harbour Capital Dredging Project area, ensuring that a robust record is maintained and that any new archaeological observations are resolved fully.

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## 15 POPULATION & HUMAN HEALTH

The Population and Human Health chapter applies a broad socio-economic model of health that encompasses conventional health impacts such as disease, accidents and risk, along with wider socio-economic health determinants vital to achieving good health and wellbeing.

This chapter draws from and builds upon detailed project information and the wider technical disciplines within the EIAR (most notably, Chapter 10: Air Quality and Climate and Chapter 11: Terrestrial Noise and Vibration) to communicate the potential influence upon human health.

The population within the study area is relatively youthful, where there is a higher proportion of 20 to 39 year olds in comparison to the national average. The proportion of the population who are employed is higher than the Dublin City and national average. Consistent with this, the proportion of the population within the study area who are unemployed is lower than the Dublin City and national average. Income in Dublin has been consistently higher than the national average since 2011 and has been gradually increasing, in line with the national trend.

The majority of the study area population work in the "commerce and trade" industry. This is followed by "professional services" and "transport and communications" industries. There is a higher proportion of those working in "commerce and trade" and "transport and communications" compared to the Dublin City and national averages, but a lower proportion of those working in "professional services" compared to the Dublin City and national averages.

Health and wellbeing circumstance in the study area is generally better or similar to the national average. However, it is noted that this does not exclude the possibility that some individuals would not conform to this overall profile, and pockets of inequality may exist.

### Potential Impacts

**Construction dust:** Human health effects associated with dust emissions relate to nuisance from a reduction in local amenity. Dust generation and deposition relate to moisture content whereby moisture increases the mass of a dust particle meaning particles are less friable and hence, less prone to dust dispersion. On the basis that all dredged material will inherently have high moisture content (circa 50% by weight), the dredging operations and the transport of dredged material are considered very low risk for dust impacts.

**Construction odour:** Human health effects associated with odour emissions relate to nuisance from a reduction in local amenity. There is potential for odour where decayed organic material has the potential to release sulphurous compounds or where solvent contamination is uncovered. As such, the potential community exposure is limited. However, the odour impact is predicted to be negligible in air quality terms on the basis that the low levels of organic solvents predicted in the dredged material, and any vapour released would quickly condense into the liquid phase, either dissolving in the water or forming a residue on the water surface. As such, the potential community exposure is limited.

**Vessel emissions (local impact):** The proposed capital dredging works will be carried out using a trailing suction hopper dredger (TSHD) and/or a backhoe dredger. The dredging will be limited to the winter period (October-March). The dredger will operate 24 hours per day during each dredging campaign within the lifetime of the project, set at eight years. At the closest sensitive receptor (Pigeon House Road), air pollution concentrations

would remain below the relevant EU and WHO objective thresholds set to be protective of the environment and health.

Terrestrial Noise: It is anticipated that noise levels would be either below or significantly below the relevant noise threshold limits for the majority of dredging activities. Noise monitoring data from previous dredging activities at the site (September 2020) substantiate this statement, whereby it was observed that dredging activities did not exceed measured ambient noise levels. It should also be noted that there are no records of complaint at the port related to previous dredging activities undertaken at the port. Overall, changes in noise exposure associated with dredging activities are not anticipated to adversely impact health and wellbeing outcomes at the population level. On this basis, the magnitude of impact on human health would be negligible, and the significance of effect would be minor adverse (not significant).

**Conclusion**

Overall, even when applying worst-case hypothetical scenarios, no adverse human health effects from air quality and noise determinants associated with the proposed development are anticipated.

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## 16 CUMULATIVE EFFECTS & ENVIRONMENTAL INTERACTIONS

The potential cumulative effects of consented schemes nearby the Dublin Harbour Capital Dredging Project were assessed. Relevant projects were selected and the Project team defined significance thresholds and criteria for assessment. These were based on professional judgement, alongside relevant standards and guidelines, to determine whether in-combination effects gives rise to additional levels of significance.

The most significant nearby Project identified was the Dublin Port Maintenance Dredging Programme 2022-2029. The potential cumulative effects with the Dublin Harbour Capital Dredging Project were to Biodiversity and Water Quality. The potential cumulative effects resulting from dredging and disposal operations required the inclusion of mitigation measures to temporarily separate operations. This means that the dredging element of the Dublin Harbour Capital Dredging Project will not overlap with Dublin Port Maintenance Dredging Programme 2022-2029, thus reducing potential impacts to water quality, habitat deterioration, underwater noise and biodiversity.

Another significant interaction is the MP2 Project and the capital dredging operations required to deepen berthing pockets and localised widening of the navigation channel. The capital dredging operations to be undertaken as part of the MP2 Project will occur in the same water body (Liffey Estuary Lower) and the disposal of dredge spoil will use the same licenced dump site at the approaches to Dublin Bay. The potential cumulative effects with the Dublin Harbour Capital Dredging Project were impacts to water quality due to the overlap of dredging operations at the areas immediately adjacent to Berth 52. The potential cumulative required the inclusion of mitigation measures to carry out the dredging sequentially, with no overlap occurring between the dredge works of both projects. The sequential nature of the dredging activities minimises the potential for impacts on water quality within and immediately adjacent to the footprint of the proposed works.

The potential interactions between environmental aspects arising from within the Dublin Harbour Capital Dredging Project were also assessed. Each technical chapter within the EIAR identifies and analyses the potential for other environmental interactions. These chapters also detail environmental baseline information and identify the significant potential and residual construction and operational effects/impacts of the Dublin Harbour Capital Dredging Project. The cumulative assessment identified many potential inter-relationships and inter-actions. Additional mitigation measures were included to minimise and/or off-set the potential for significant effects resulting from such interactions.

For example, an interaction link exists between Water Quality and Human Beings. Dredging operations has the potential to impact on water quality at cooling water intakes. Four power plants within the Dublin Port area abstract water from the Liffey for cooling water. High levels of suspended solids in cooling water has the potential to impact upon the plants cooling system and may result in an increase in operational and maintenance costs. A review of dredging simulation results showed that that the increased levels of suspended sediment concentrations at the power station intakes are generally very small by comparison with background levels in the Liffey Estuary. It is therefore unlikely to have a significant effect on the quality of intake waters at power stations in terms of suspended solids content. Precautionary mitigation measures have been included as an additional safeguard. If dredging is scheduled to take place within a 500m radius of the intakes, the relevant stakeholders are notified so that additional measures can be taken if deemed necessary.

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Mitigation measures resulting from the individual assessments, and the assessment of cumulative effects are summarized in Section 17.1 of this Non Technical Summary. The application of these mitigation measures will ensure no significant environmental impact, either as a standalone project or when considered in combination with other projects proximate to the site.

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# 17 SUMMARY OF MITIGATION MEASURES & CONCLUSIONS

## 17.1 Summary of Mitigation Measures

DPC seeks to achieve the highest possible standards of environmental management during the Dublin Harbour Capital Dredging Project.

The EIAR assesses the likely significant effects of the Dublin Port Capital Dredging Project on the environment arising from the capital dredging operations. Integration of the engineering design team with the consenting and environmental team from an early stage in the project has enabled mitigation by design to be used, causing many likely significant effects to be eliminated or reduced to an acceptable level during the preliminary design stage. Following an examination, analysis and evaluation of the direct and indirect significant effects of the project in relation to the receiving environment, additional mitigation measures and monitoring programmes have been recommended which will be fully implemented during the Dublin Harbour Capital Dredging Project.

Table 17-1 summarises the mitigation measures and monitoring programmes recommended within the EIAR during the Dublin Harbour Capital Dredging Project. All mitigation measures proposed within the NIS have been captured by the EIAR.

Table 17-1 Mitigation measures and monitoring recommended within the EIAR

Potential Impact	Summary of Proposed Mitigation
<b>Chapter 6 RISKS OF MAJOR ACCIDENTS &amp; DISASTERS</b>	
Potential for loss of life or injury to employees, Contractors, visitors and local residents.	<ul style="list-style-type: none"> <li>The design of the Dublin Harbour Capital Dredging Project has been informed by a COMAH land use planning assessment, the purpose of which was to examine the development in the context of the Health and Safety Authority’s COMAH land use planning guidance. Based on this conservative assessment, it is considered that the final design layout of the Dublin Harbour Capital Dredging Project would satisfy the HSA’s criteria under its land use planning guidelines. The Dublin Harbour Capital Dredging Project will therefore not increase the risk of major accidents and disasters.</li> <li>To remain vigilant, DPC has developed a comprehensive Emergency Management Plan that caters for the range of accident and emergency events that may occur within its estate (or that may occur outside of the estate and that are likely to have a direct knock on effect).</li> <li>In the event of an incident, DPC would activate its plan accordingly, in which case people would be directed away from the source of the hazard.</li> <li>DPC’s Emergency Management Plan competencies are continuously enhanced through participation in training and exercises at different levels.</li> <li>In addition, Dublin Bay, the approaches to the Port and the shipping channel are monitored at all times by Vessel Traffic Services (VTS). All vessels are advised regarding works, developments or issues that are</li> </ul>
Potential for damage to the environment.	
Potential for damage to the facilities, plant and equipment of DPC, its commercial partners, tenant companies and neighbours.	

Potential Impact	Summary of Proposed Mitigation
	<p>ongoing in the Dublin Port area of jurisdiction. Prior to any dredging a DPC “Notice to Mariners” is sent out to all shipping informing them about the planned work and dates. During the dredging operation the vessel traffic is supervised and controlled.</p>
<p><b>Chapter 7 BIODIVERSITY, FLORA &amp; FAUNA</b></p>	
<p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine ecology, including fisheries, in the area of operations</p>	<ul style="list-style-type: none"> <li>• The following key mitigation measures apply to the Capital Dredging Scheme to minimise the impact of the proposed works on marine ecology                             <ul style="list-style-type: none"> <li>– No over-spilling at the surface of the dredger for all dredging activities within the inner Liffey Channel will be permitted;</li> <li>– The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey;</li> <li>– The dredging of sediments within the navigation channel will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations;</li> <li>– A trailer suction head dredger (TSHD) or Back-hoe dredger will be used for the capital dredging works. When operating in the River Liffey Channel, the TSHD pumps will be switched off when the drag head is being lifted and returned from the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment;</li> <li>– A maximum of 4,100m<sup>3</sup> of sediment and entrained water will be loaded into the dredger’s hopper for each loading/dumping cycle.</li> <li>– Dredge spoil will be disposed at the dump site in as even a distribution as possible, maintaining a maximum disposal layer of 10-15cm per disposal event. Disposal events should be spread evenly across the site to minimise the build-up of large amounts of sediment in certain areas.</li> <li>– It is important that every effort be made to maintain the elver trap and salmon counter at Islandbridge in operation all year around, as the data being provided from these is extremely valuable in providing trend information on these valuable migratory species (i.e., eel, salmon and lamprey).</li> </ul> </li> </ul>
<p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine mammals in the area of operations</p>	<ul style="list-style-type: none"> <li>• The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine mammals in the area of operations in line with National Parks and Wildlife Service (NPWS) Guidelines (2014)                             <ul style="list-style-type: none"> <li>– A trained and experienced Marine Mammal Observer (MMO) will be put in place during the loading and dumping operations. The</li> </ul> </li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<p>MMO will scan the surrounding area to ensure no marine mammals are in a pre-determined exclusion zone in the 30-minute period prior to operations. The NPWS exclusion zone is 500m for dredging works.</p> <ul style="list-style-type: none"> <li>- Noise-producing activities will only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring is not possible, the sound-producing activities will be postponed until effective visual monitoring is possible. Visual scanning for marine mammals (in particular harbour porpoise) will only be effective during daylight hours and if the sea state is WMO Sea State 4 (≈Beaufort Force 4 conditions) or less.</li> <li>- If there is a break in dredging activity for a period greater than 30 minutes then all pre-activity monitoring measures and ramp-up (where this is possible) will recommence as for start-up.</li> <li>- Once normal operations commence, there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate, nor if marine mammals occur within a radial distance of the sound source that is 500m for dredging activities.</li> <li>- Any approach by marine mammals into the immediate (&lt;50m) works area will be reported to the National Parks and Wildlife Service.</li> </ul> <ul style="list-style-type: none"> <li>• The MMO will keep a record of the monitoring using a 'MMO form location and effort (coastal works)' available from the National Parks and Wildlife Service (NPWS) and submit to the NPWS on completion of the works.</li> <li>• In line with best international practice, a combination of visual and acoustic mitigation techniques will be used to ensure there are no significant impacts on all Annex II marine species, including harbour porpoise, grey seal and harbour seal. Static Acoustic Monitoring (SAM) through the deployment of CPODs will be used. SAM monitoring sites will be established and maintained throughout the project and for two years post-construction. This technique is to complement and not replace visual techniques. The deployment of a SAM system will complement and extend the extensive database currently being collected as part of the ABR Project environmental monitoring programme.</li> <li>• Monthly counts of seals hauled out on Bull Island will be undertaken to ensure there is no long-term impact of capital dredging activities at Dublin Port on this important haul out site and to contribute to increasing knowledge of seals using this UNESCO World Heritage site.</li> </ul>

Potential Impact	Summary of Proposed Mitigation
<p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to birds in the area of capital dredging operations</p>	<ul style="list-style-type: none"> <li>• Measures set out to avoid pollution to water leading to habitat deterioration as outlined in the water quality chapter will be fully implemented.</li> <li>• The following precautionary measures will also be undertaken to minimise the risk of injury or disturbance to nesting and breeding birds in the area of operations                             <ul style="list-style-type: none"> <li>– Breeding Terns – the capital dredging scheme will be confined to the winter months (October – March) when the terns have migrated from the site.</li> </ul> </li> <li>• DPC will also continue to undertake a programme to monitor winter wetland birds in the adjacent European Sites at the South Dublin Bay and River Tolka Estuary Special Protection Area. This monitoring programme will continue throughout the dredging operations and for a period of two years after the completion of such works, with monthly surveys from October to March. The results of this monitoring programme will be submitted to Dublin City Council at 12-monthly intervals to maintain a public record.</li> </ul>
<p><b>Chapter 8 LAND, SOILS, GEOLOGY, HYDROGEOLOGY</b></p>	
<p>No specific mitigation measures with regard to Land, Soils, Geology and Hydrogeology are proposed during Dublin Harbour Capital Dredging Project. Mitigation measures are identified in Chapter 9 with respect to surface water quality.</p>	
<p><b>Chapter 9 WATER QUALITY</b></p>	
<p>Impacts to Water Quality arising from Suspended Sediment and Sedimentation</p>	<p>The mitigation proposed for dredging operations in the Dublin Harbour Capital Dredging Project has been informed by the ABR Project monitoring and experience working in the same locations. The following key relevant mitigation measures will apply to each dredging campaign:</p> <ul style="list-style-type: none"> <li>• The capital dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.</li> <li>• No over-spilling from the dredger will be permitted while the dredging activity is being carried out within the inner Liffey channel (Dublin Harbour).</li> <li>• The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control the volume of sediment released at the dump site.</li> <li>• Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures</li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<p>contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).</p> <ul style="list-style-type: none"> <li>• A documented Accident Prevention Procedure will be put in place prior to commencement</li> <li>• A documented Emergency Response Procedure will be put in place prior to commencement</li> <li>• A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.</li> <li>• Dumping will be carried out through the vessel's hull.</li> <li>• The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.</li> </ul> <p>In addition to the mitigation measures listed above, DPC are committed to maintaining the water quality monitoring system that has been designed to ensure robust protection of the marine environment and for users of the inner Liffey channel during the Dublin Harbour Capital Dredging Project.</p> <ul style="list-style-type: none"> <li>• It is proposed to maintain the four water quality monitoring stations already in position for the ABR Project</li> <li>• The specification is based on state of the art 24/7 real time monitoring with water quality monitoring sensors giving high resolution data with respect to the following parameters             <ul style="list-style-type: none"> <li>– Turbidity</li> <li>– Dissolved Oxygen</li> <li>– Temperature</li> <li>– Salinity</li> </ul> </li> <li>• Water level is also measured at one monitoring station to provide information on tidal state. Turbidity is measured as a surrogate for suspended solids. Site specific tests have previously been undertaken by the ABR Project to define the relationship between Turbidity and suspended solids.</li> <li>• A data acquisition and transfer system is being used to enable the transmission of high resolution data at approximately 15 minute intervals.</li> <li>• The following trigger levels that will prompt investigation are proposed:             <ul style="list-style-type: none"> <li>– Dissolved Oxygen level falling below 6 mg/l.</li> <li>– Peak Suspended Solids level rising more than 100mg/l above background (Based on the Turbidity v Suspended Solids relationship previously established this is equivalent to an Turbidity increase of 40 NTU above background)</li> </ul> </li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> <li>• The Dissolved Oxygen trigger level has been selected to safeguard fish-life.</li> <li>• The monitoring network infrastructure has been in place since 2016 and will continue for the duration of the construction phase of the MP2 Project and during the Dublin Harbour Capital Dredging Project.</li> <li>• This monitoring system has already generated a robust water quality baseline within the inner Liffey channel with the ability to identify water quality trends. The continuation of the monitoring system will serve to further strengthen the knowledge of water quality trends, a key indicator of the health of the marine environment.</li> <li>• The water quality data currently being collected is circulated to Dublin City Council on a monthly basis. It is proposed that this transfer of information continues for the duration of the construction phase of the MP2 Project and during the Dublin Harbour Capital Dredging Project</li> <li>• The data collected is also being shared with research organisations (Dublin City University, Maynooth University and University College Cork)</li> </ul>
<p>Operational phase of the Dublin Harbour Capital Dredging Project on Water Quality.</p>	<p>The operational phase of the Dublin Harbour Capital Dredging Project will be subject to Dublin Port's existing Environmental Management System (EMS) which is accredited to ISO 14001 standard and the Port Environmental Review System (PERS) which has gained Dublin Port designation as an 'Ecoport' at European level.</p> <p>The EMS is supported by a comprehensive suite of Standard Operating Procedures (SOP) providing mitigation of all environmental aspects identified and mechanisms to ensure effective implementation.</p> <p>SOPs have been prepared for oil and chemical spill responses, mineral oil handling, waste handling, monitoring and maintenance of surface water interceptors and handling of drain cleaning waste. Controls are in place for transport, handling and storage of hazardous materials, ship cargo, dry bulk material, surface water runoff, fuelling and bunkering of vessels and ship discharges. Site audits promote best practice and ensure compliance with the EMS requirements.</p>
<p><b>Chapter 10 AIR QUALITY &amp; CLIMATE</b></p>	
<p>Capital dredging works have the potential to result in local impacts through dust nuisance at the nearest sensitive receptors and also to sensitive ecosystems</p>	<ul style="list-style-type: none"> <li>• The following precautionary measures will be undertaken to minimise the potential nuisance caused by dust at the nearest sensitive receptors and on sensitive ecosystems                         <ul style="list-style-type: none"> <li>– A dust minimisation plan will be put in place based upon the industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities'.</li> </ul> </li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> <li>- Monthly monitoring of dust deposition levels will be undertaken for the duration of dredging for comparison with the guideline of 350mg/m<sup>2</sup>/day (for non-hazardous dusts). This monitoring will be carried out at a minimum of four locations at sensitive receptors around the proposed works. Where dust levels are measured to be above this guideline, the mitigation measures in the area will be reviewed as part of a Dust Minimisation Plan.</li> </ul>
<p>The potential exists for odour generation and nuisance to occur during the construction phase.</p>	<ul style="list-style-type: none"> <li>• An Odour Management Plan (OMP) will be put in place based upon the guidance presented in the Environment Agency of England and Wales “Odour Management Guidance” (H4 Guidance, 2011) and the EPA “Odour Impact Assessment Guidance for EPA Licensed Sites” (Guidance Note AG5, 2010). These will includes measures designed to:                             <ul style="list-style-type: none"> <li>- Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution;</li> <li>- Prevent unacceptable odour pollution at all times; and</li> <li>- Reduce the risk of odour releasing incidents or accidents by anticipating them and planning accordingly.</li> <li>- The OMP will include a procedure for complaint recording and investigation to ensure that all complaints received at the site are suitably addressed.</li> </ul> </li> </ul>
<p>Potential impact on future shipping emissions on Air Quality &amp; Climate.</p>	<p>A number of EU Directives and the requirements of the Marpol Convention regulate the fuels and emissions employed in the shipping industry. These requirements will remain in practice throughout the operation of the Dublin Harbour Capital Dredging Project and may be replaced with more stringent emission limits.</p>
<p><b>Chapter 11 NOISE &amp; VIBRATION</b></p>	
<p>There is the potential for noise impacts associated with the construction phase of the proposed development at the nearest noise sensitive receptors.</p>	<ul style="list-style-type: none"> <li>• The following precautionary measures will be undertaken to minimise the potential nuisance caused by terrestrial noise &amp; vibration at the nearest sensitive receptors and on sensitive ecosystems. <i>British Standard BS5228:2009+A1:2014 – Noise and vibration control on construction and open sites: Part 1 - Noise</i> outlines a range of measures that will be used to reduce noise impacts at the nearest noise sensitive receptors. The measures, which will be applied, include:                             <ul style="list-style-type: none"> <li>- Ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order,</li> <li>- Careful selection of quiet plant and machinery to undertake the required work where available,</li> </ul> </li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> <li>- All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use,</li> <li>- Any ancillary pneumatic percussive tools will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use,</li> <li>- Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers,</li> <li>- Machines in intermittent use will be shut down in the intervening periods between work,</li> <li>- Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations, in order to cause minimum noise disturbance,</li> <li>- Handling of all materials will take place in a manner which minimises noise emissions,</li> <li>- Audible warning systems will be switched to the minimum setting required by the Health and Safety Authority,</li> <li>- A complaints procedure will be operated by the Contractor throughout the construction phase and all efforts will be made to address any noise issues at the nearest noise sensitive properties.</li> </ul>
Continued Noise Monitoring	<ul style="list-style-type: none"> <li>• DPC is committed to the continuous monitoring of terrestrial noise for the duration of the construction works in accordance with BS7445: Description and Measurement of Environmental Noise.               <ul style="list-style-type: none"> <li>- All measurements will be made using Type 1 precision digital sound levels meters and associated hardware. The following parameters will be recorded as a minimum: LAeq, LAmx, LAmin, LA10 &amp; LA90.</li> <li>- A permanent secure noise monitoring station has previously been established at the marina adjacent to Pigeon House Road as part of the ABR Project and will be operated continuously during the Dublin Harbour Capital Dredging Project.</li> <li>- All data will be collected and analysed on a weekly basis and the analysed data will be fed back to the Dredging Contractor with a view to reviewing compliance of the dredging activities against the thresholds/requirements included in Table 11-1 and Table 11-2 of Chapter 11 of this EIAR.</li> <li>- Any noise nuisance issues associated with the dredging works will be immediately assessed and analysed in relation to the recorded noise levels and all correspondence with DPC, the Contractor, Dublin City Council and residents will be conducted with the</li> </ul> </li> </ul>

Potential Impact	Summary of Proposed Mitigation
	appropriate level of urgency. This will include the appropriate liaison with DPC and the Contractor to control activities to ensure that the construction phase activities are in line with the consents.

**Chapter 12 UNDERWATER NOISE**

The impact from underwater noise is quite limited, based on the measured underwater noise levels for similar scale works being carried out in 2016 and 2020. The underwater noise levels arising during capital dredging will not result in harm to marine mammals or fish. Specific mitigation measures and compliance with NPWS (2014) guidelines suggest the use of a MMO on board the vessel to keep a watch for marine mammal activity. This should avoid the risk of injury to marine mammals from a vessel strike and ensure that the waters in the immediate vicinity of the vessel are free from marine mammals prior to deposition of the dredged material at the dump site. No specific mitigation for underwater noise is recommended.

**Chapter 13 COASTAL PROCESSES**

Impacts to Water Quality arising from Suspended Sediment and Sedimentation

The mitigation proposed for dredging operations in the Dublin Harbour Capital Dredging Project has been informed by the ABR Project monitoring and experience working in the same locations. The following key relevant mitigation measures will apply to each dredging campaign:

- The capital dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- No over-spilling from the dredger will be permitted while the dredging activity is being carried out within the inner Liffey channel (Dublin Harbour).
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control the volume of sediment released at the dump site.
- Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement
- A documented Emergency Response Procedure will be put in place prior to commencement
- A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.

Potential Impact	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> <li>The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.</li> </ul>
<p><b>Chapter 14 CULTURAL HERITAGE (including Industrial &amp; Archaeological)</b></p>	
<p>Archaeological monitoring and management measures during capital dredging operations.</p>	<ul style="list-style-type: none"> <li>Retaining an Archaeologist: An archaeologist experienced in maritime archaeology will be retained for the duration of the relevant works.</li> <li>Archaeological Licences: Archaeological licences will be required to conduct the on-site archaeological works. Licence applications require the inclusion of detailed method statements, which outline the rationale for the works, and the means by which the works will be resolved.</li> <li>Archaeological Monitoring: Monitoring will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by the Department of Housing, Local Government and Heritage. Archaeological monitoring is conducted during all seabed disturbances associated with the development. The monitoring will be undertaken in a safe working environment that will facilitate archaeological observation and the retrieval of objects that may be observed and that require consideration during the course of the works. The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland.</li> <li>Time Scale: The time scale for the construction phase will be made available to the archaeologist, with information on where and when ground disturbances will take place.</li> <li>Discovery of Archaeological Material: In the event of archaeologically significant features or material being uncovered during the construction phase, machine works will cease in the immediate area to allow the archaeologist/s to inspect any such material.</li> <li>Archaeological Material: Once the presence of archaeologically significant material is established, full archaeological recording of such material will be recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will be a matter for discussion between the client and the licensing authorities.</li> <li>Archaeological team: It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.</li> <li>Archaeological Dive Team: It is recommended that an archaeological dive team is retained on standby for the duration of any in-water disturbance works on the basis of a twenty-four or forty-eight hour call-out response schedule, to deal with any archaeologically</li> </ul>

Potential Impact	Summary of Proposed Mitigation
	<p>significant/potential material that is identified in the course of the seabed disturbance activities.</p> <ul style="list-style-type: none"> <li>• A Site Office: A site office and facilities will be provided by DPC on site for use by archaeologists.</li> <li>• Secure Wet Storage: Secure wet storage facilities will be provided on site by DPC to facilitate the temporary storage of artefacts that may be recorded during the course of the site work.</li> <li>• Buoying/Fencing: Buoying/fencing of any such areas of discovery will be necessary if discovered and during excavation.</li> <li>• Machinery Traffic: Machinery traffic during construction will be restricted to avoid any identified archaeological site/s and their environs.</li> <li>• Spoil: Spoil will not be dumped on any of the selected sites or their environs.</li> <li>• Post-construction Project Report and Archive: It is a condition of archaeological licensing that a detailed project report is lodged with the Department of Housing, Local Government and Heritage within 12 months of completion of site works. The report should be to publication standard and should include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland.</li> </ul> <p>These measures are subject to the approval of the National Monuments Service at the Department of Housing, Local Government and Heritage. DPC has and will continue to engage with the Department of Housing, Local Government and Heritage.</p>
<b>Chapter 16 POPULATION &amp; HUMAN HEALTH</b>	
Embedded mitigation measures	<ul style="list-style-type: none"> <li>• Monitoring of dust, odour and noise during the capital dredging operations will act as precursors to any health impact, thereby enabling a monitoring regime that enables intervention before any manifest adverse health outcome.</li> </ul>
<b>Chapter 17 CUMULATIVE EFFECTS &amp; ENVIRONMENTAL INTERACTIONS</b>	
Interaction with the MP2 Project capital dredging works	<ul style="list-style-type: none"> <li>• Capital dredging for the Dublin Harbour Capital Dredging Project and MP2 Project will be programmed to be sequential, that is, only one dredger will be allowed to operate within the inner Liffey channel (Dublin Harbour) at any one time. All capital dredging will be restricted to the winter months (October to March).</li> </ul>

## 17.2 Implementation of Construction Phase Mitigation Measures

DPC intends to appoint a specialist Dredging Contractor to undertake the Dublin Harbour Capital Dredging Project. The mitigation measures set out in the EIAR sets out the **minimum requirements** which will be adhered

to during the capital dredging operations. The mitigation measures will form part of the Contract Documents for the construction stage to ensure that the Contractor undertakes the works required to implement the mitigation measures.

### 17.3 Dublin Harbour Capital Dredging Operational Phase

The existing land uses within the footprint of the Dublin Harbour Capital Dredging Project comprise the manoeuvring and berthing of vessels, the handling of Ro-Ro and Lo-Lo cargo, the movement of ferry passengers arriving and departing to/from Dublin Port and the import and export of bulk cargo including petroleum products.

The Dublin Harbour Capital Dredging Project is designed to complement the ABR Project and MP2 Project to provide sufficient depth of water to accommodate the range of vessels using Dublin Port.

The future land uses within the footprint of the Dublin Harbour Capital Dredging will therefore not significantly change and consequently operational mitigation measures are largely based on the following:

- Integration of the new port infrastructure with existing operational plans and procedures;
- Integration with port-wide monitoring programmes to establish environmental trends in order to support future initiatives to enhance the environment or take corrective action, if required; and
- Integration with the strategic objectives of the Dublin Port Masterplan 2040, reviewed 2018.

### 17.4 Concluding Remarks

Overall, the authors of the EIAR believe that the Dublin Harbour Capital Dredging Project complies with the principles of proper planning and sustainable development, and that the EIAR has objectively demonstrated not to adversely affect the environment in all its facets, including the integrity of Natura 2000 sites.

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