MP2 PROJECT

Volume 2

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAIN DOCUMENT (PART 1)

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

rps MAKING COMPLEX EASY

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GLOSSARY OF TERMS

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
AAGR	Average Annual Growth Rate
ABC	Construction noise assessment method
ABR	Alexandra Basin Redevelopment
ABP	An Bord Pleanála
ADCO	Archaeological Diving Company Ltd
ADCP	Acoustic Doppler Current Profilers
AEP	Annual Expedience Probability
AERMOD	Atmospheric dispersion modeling system
AG4	Air dispersion modelling from industrial installations ***guidance*** notes
BAT	Best Available Technique
Bankseat	Abutment to support a ramp in order to provide safe and fast access for loading and unloading a ship.
BCI	Bat Conservation Ireland
BCT	Bat Conservation Trust
bgl	below ground level
Break bulk	Loose cargoes such as reels of paper, bales of timber. Also includes project cargoes such as power transformers, wind turbine components.
BUGS	Bike User Groups
Bulk Liquid	Primarily comprises petroleum products (such as petrol, diesel, aviation fuel) but also includes products such as molasses.
Bulk solid	Products such as animal feed, grains, cereals, peat moss, scrap steel loaded / discharged using quay side cranes with grab attachments.
CD	Chart Datum, depths in the Port vary with tidal conditions and all depths (and heights) are referenced to an appropriate datum point called “chart datum”.
CDL	Coal Distributors Limited, also refers to a mooring structure on the south side of the River Liffey, near the Poolbeg power station owned by Coal Distributers Limited
CDM	CDM Smith, consulting engineers
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk and Management
CIÉ	Córas Iompair Éireann
CIEEM	Chartered Institute of Ecology & Environmental Management

CIRIA	Construction Industry Research and Information Association
CISS	cast-in-steel-shell, concrete piers fabricated within a steel shell.
CL	Conservation Limit, the number of adult fish of a particular species that are needed to return to a system each year to spawn in order to maintain a healthy sustainable population in the system.
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO_{2eq}	Total estimated greenhouse gas emissions
COSHH	Control of Substances Hazardous to Health
CPT	Carriage Paid To
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Traffic Management Plan
cSAC	Candidate Special Area of Conservation
CSO	Central Statistics Office
DART	Dublin Area Rapid Transport
DAHG	Department of Arts, Heritage and the Gaeltacht
dB(A)	Decibel, expression of sound level. The (A) denotes that levels are “A”- weighted.
DBT	Dibutyltin
DDDA	Dublin Docklands Development Authority
Deadman	Buried structure to serve as an anchor for a quay wall
DEDs	District Electoral Divisions
DCC	Dublin City Council
DCIHR	Dublin City Industrial Heritage Record
DEHLG	***Department of the Environment Heritage and Local Government***
DFT	Dublin Ferry Terminal
DGPS	Differential Global Positioning System
DHI	Danish Hydraulic Institute
DIN	Dissolved Inorganic Nitrogen
DMRB	Design Manual for Roads and Bridges
DO	Dissolved Oxygen
DOS	Degree of Saturation
DPC	Dublin Port Company
Dry Bulk	Cargoes of free flowing dry solids such as grain or sand
DS	Directional Signage
Dublin Port Estate	DPC owned lands in the north port area bounded by the River Liffey to the south and East Wall Road to the west.

EA	Environment Agency
EAL	Environmental Assessment Level
EC	European Community
EEA	***European Environment Agency***
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EMEP	European Monitoring and Evaluation Programme, European policy to identify and measure air pollutants
EMS	Environmental Management System
EPA	***Environmental Protection Agency***
EQS	Environmental Quality Standard
ERBD	Eastern River Basin District
ES	Estuarine Species, fish species dependent on estuaries.
ESB	***Electricity Supply Board***, also refers to a mooring structure on the south side of the River Liffey, near the Poolbeg power station owned by the Electricity Supply Board
EU	European Union
EUNIS	European Nature Information System
FRA	Flood Risk Assessment
FRAM	Flood Risk Assessment Management
GDA	Greater Dublin Area
GDP	Gross Domestic Product
GES	Good Environmental Status
GGBS	Ground Granulated Blast Furnace Slag
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GPS	Global Positioning System
GSI	***Geological Survey of Ireland***
GHG	Green House Gas
Gross tonnes	Dublin Port measures cargo tonnage in gross tonne. The CSO , on the other hand, uses net tonnes. In the case of bulk liquid, bulk solid and break bulk, gross tonnes and net tonnes are the same. For unitised freight (Ro-Ro or Lo-Lo), gross tonnes includes the weight of the shipping container or trailer; net tonnes includes the weight of the goods themselves plus immediate packaging. For port operations, gross tonnes is a more useful measure as ship carrying capacity, crane handling capacities and road / rail capacities are determined by gross tonnage.
HCB	Hexachlorobenzene
HD	Hydro Dynamic
$\mathbf{H_{mo}}$	Significant wave height
$\mathbf{H_2S}$	Hydrogen sulphide
HAT	Highest Astronomical Tide

Hectare	Land areas in Dublin Port are referred to in hectares (where one hectare is equivalent to 2.47 acres and is equal to 10,000m^2).
HGV	Heavy Goods Vehicle
HS	Hydrographic Surveys Ltd., environmental and hydrographic survey company
HSA	***Health and Safety Authority***
Hz	Hertz, SI unit of frequency. It is defined as the number of cycles per second of a periodic phenomenon.
HV	Heavy Vehicle
ICAN	noise and vibration consultancy
ICOMOS	International Council on Monuments and Sites
ICPSS	Irish Coastal Protection Strategy Study
IFI	***Inland Fisheries Ireland***
IGSL	Ground investigation and geotechnical company
IMO	***International Maritime Organization***
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resources.
INSS	Irish National Seabed Survey
IPPC	Integrated Pollution Prevention Control
ISO	International Standards Organisation
ISPS	International Ship and Port Security code, originally introduced by the IMO (International Maritime Organisation) and later incorporated into EU legislation.
IQI	***Infaunal Quality Index***, assessment of the ecological status based on the soft ***sediment*** infaunal communities of transitional and coastal waters.
ITAP	Institut für technische und angewandte Physik GmbH, a measuring body for noise emission
ITM	***Irish Transverse Mercator,*** geographic coordinate system for Ireland
IUCN	***International Union for Nature Conservation***
IUFT	Interim Unified Ferry Terminal
IWeBS	Irish Wetland Bird Survey
IWDG	***Irish Whale and Dolphin Group***
MS	Marine Stragglers, fish species which are fully marine and are only occasionally found in the lower reaches of estuaries.
JNCC	***Joint Nature Conservation Committee***
L_{Aeq}	The continuous equivalent A-weighted sound pressure level. This is an “average” of the sound pressure level.
L_{Amax}	This is the maximum A-weighed sound level measured during a sample period.
L_{Amin}	This is the minimum A-weighted sound level measured during a sample period.
$L_{night,outside}$	Threshold of night noise exposure for the purposes of assessing overall annoyance.
LAT	Lowest Astronomical Tide

LCS	Land Control Systems
LGV	Light Goods Vehicle
Linkspan	Structure to level the height difference between the quay and the cargo deck of a ship in order to provide safe and fast access for loading and unloading.
LV	Light Vehicle
Lo-Lo	Lift-on Lift-off , cargo mode which involves shipping containers lifted on and off ships with quayside cranes
LOI	Loss on Ignition, method of calculating organic matter content of soil samples
LVIA	Landscape and Visual Impact Assessment
MARPOL	International Convention for the Prevention of Pollution From Ships
MDS	Multidimensional Scaling
MEPC	Marine Environment Protection Committee
MHWM	Mean High Water Mark
MIKE	Coastal process modelling software
MM	Marine Migrant, marine fish species that use estuaries primarily as nursery grounds but usually spawn and spend much of their adult life at sea, while often returning seasonally to estuaries when adult.
MMP	Mobility Management Plan
MMO	Marine Mammal Observer, a qualified marine mammal observer is a visual observer who has undergone formal marine mammal observation training.
MOLA	Murray Ó Laoire Architects, architecture company
MRP	Molybdate Reactive Phosphorus
MSFD	Marine Strategy Framework Directive
MSL	Mean Sea Level
MTL	***Marine Terminals Ltd.,*** shipping & forwarding agents
NBDC	National Biodiversity Data Centre
NCEHD	National Civil Engineering Heritage Database
NCT	National Car Test
NHA	Natural Heritage Area
NIEA	***Northern Ireland Environment Agency***
NIR	Natura Impact Report
NMI	***National Museum of Ireland***
NNG	Night Noise Guideline
NO_2	Nitrogen Dioxide
NO_x	Oxides of nitrogen
NPWS	***National Parks and Wildlife Service***
NQE	North Quay Extension

NRA	***National Roads Authority***
NSS	National Spatial Strategy
NTA	National Transport Authority
NTS	Non-Technical Summary
NTS	Not To Scale (drawings)
OD	Ordnance Datum
ODOM	Single frequency portable hydrographic echo sounder
OEE	Office of Environmental Enforcement
OGV1	Other Goods Vehicle Type 1
OGV2	Other Good Vehicle Type 2
OMP	Odour Management Plan
OPW	***Office of Public Works***
OSPAR	Convention of fifteen Governments of the western coasts and catchments of Europe, together with the European Union, aiming to protect the marine environment of the North-East Atlantic.
P&O	Ferry operators
Pa	Pascal, SI derived unit of pressure. It is a measure of force per unit area, defined as one Newton per square meter.
PAH	Poly Aromatic Hydrocarbon
PAG	Project Appraisal Guidance
PCB	Polychlorinated Biphenyl
PCU	Passenger Car Units
PRC	Practical Reserve Capacity
PPV	Peak Particle Velocity
pNHA	Proposed Natural Heritage Area
$PM_{2.5}$	Particles measuring 2.5µm or less
PM_{10}	Particles measuring 10µm or less
PSA	Particle Size Assessment
PSD	Particle Size Distribution
PSV	Passenger Service Vehicle
pSPA	proposed Special Protected Area
PTS	Permanent Threshold Shift, a permanent elevation of the hearing threshold due to noise exposure
Ramsar	Convention on Wetlands of International Importance, an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
RMP	Record of Monuments and Places
RNLI	***Royal National Lifeboat Institution***

RPII	***Radiological Protection Institute of Ireland***
RPS	Rural Planning Service, consulting engineers
RPS	Record of Protected Structures
Ro-Ro	Roll-on Roll-off, cargo mode which includes freight trailers, tourist vehicles and trade car imports all of which are driven on or off ferries / specialised ships.
SAC	Special Area of Conservation
SECA	Sulphur Emission Control Area
SEA	Strategic Environmental Assessment
SEPA	***Scottish Environmental Protection Agency***
SEL	Sound Exposure Level, the constant sound level in one second, which has the same amount of acoustic energy as the original time-varying sound i.e., the total energy of a sound pulse
SFPA	***Sea Fisheries Protection Authority***
SMRU	Sea Mammal Research Unit
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SPAR	Southern Port Access Route
Standard Depth	The Standard Depth is the minimum depth to which the navigation channel or berths will be maintained. It is the minimum depth available for vessels, measured from Chart Datum. The dredged depth during capital or maintenance dredging operations may be below the Standard Depth to allow for dredging tolerances
$S0_2$	Sulphur Dioxide
SPA	Special Protection Area
SPL	Sound Pressure Level, a logarithmic measure of the effective sound pressure of a sound relative to a reference value.
S/S	Solidification/Stabilisation, remediation technology that relies on the reaction between a reagent and soil to reduce the mobility of contaminants
SSC	Suspended Sediment Concentration
SW	Spectral Wave, simplification of surface conditions giving the distribution of wave energy among different wave frequencies of wave-lengths on the sea surface.
TEN-T	Trans-European Transport Networks, a set of integrated international road, rail, air and water transport networks in Europe.
TEU	Twenty Foot Equivalent Unit. Shipping containers come in many lengths including 20”, 30”, 40” and 45”. TEU is used as an industry standard measurement for containers where a 20” is 1.0 TEU , a 40” 2.0 TEU and so forth. The TEU measurement particularly is useful when specifying container ship or container terminal capacities.
TICCIH	***The International Committee for the Conservation of the Industrial Heritage***
T_m	Mean wave period
TSAS	Trophic Status Assessment Scheme
TBT	Tributyltin
TBM	Temporary Benchmark

TII	Transport Infrastructure Ireland
TTA	Traffic and Transport Assessment
TSP	***Total Suspended Particulate***
TTS	Temporary Threshold Shift, a temporal elevation of the hearing threshold due to noise exposure
UN	***United Nations***
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UFT	Unified Ferry Terminal
Units Unitised	Freight can be in the form of shipping containers or trailers. The sizes of shipping containers vary and are measured in terms of TEU . Trailers vary to a lesser extent and are generally 13.6m long. Trailers are shipped either accompanied (by a road tractor unit and driver) or unaccompanied. In general each unit of unitised freight moved by road will generate at least one HGV movement into the Port and a second one out of the Port.
URPACTII	Programme funded by the European Regional Development Fund to develop a strategy for the development of cruise traffic and the urban regeneration of city ports.
USEPA	***United States Environmental Protection Agency***
UTC	Coordinated Universal Time
UWWT	Urban Waste Water Treatment
VDV	Vibration Dose Value
VMU	Vertical Mixed Use
VMS	Variable Message Signage
VOC	Volatile Organic Compound
W	Historic shipwreck inventory
WFD	Water Framework Directive
WHO	***World Health Organisation***
y-HCH	Lindane
ZVI	Zone of Visual Influence

1 INTRODUCTION

1.1 Context

This Environmental Impact Assessment Report (EIAR) has been prepared by RPS on behalf of Dublin Port Company (DPC) for the MP2 Project, the second Strategic Infrastructure Development (SID) project at Dublin Port from the Dublin Port Masterplan 2040, reviewed 2018, for which development consent is sought.

DPC is seeking a 15-year permission to facilitate the construction of the MP2 Project.

Additional consents will be required for the marine works, including a Foreshore Lease, Licence, and Ministerial Consent from the Foreshore Unit of the Department of Housing, Planning and Local Government (DHPLG), and a Dumping at Sea Permit from the Environmental Protection Agency (EPA).

This 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.

This chapter of the EIAR introduces the project for which development consent is sought and documents the procedure that was followed in preparing this EIAR.

1.2 Purpose of the EIAR

Environmental Impact Assessment (EIA) is a procedure under the terms of European Directives[1] for the assessment of the likely significant effects of a project on the environment. An Environmental Impact Assessment Report (EIAR) is a statement prepared by the applicant, providing information on the likely significant effects on the environment based on current knowledge and methods of assessment. It is carried out by competent experts, with appropriate expertise, to provide informed assessment within their discipline.

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. In preparing the EIAR, the following legal provisions and guidelines were considered:

- the requirements of EU Directives and Irish law regarding Environmental Impact Assessment *(including the European Union (Planning and Development) (Environmental Impact Assessment)* Regulations 2018);
- 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);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017);

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[1] EU Directive 85/337/EEC as amended by Directives 2011/92/EU and DIRECTIVE 2014/52/EU

- draft Advice Notes for Preparing Environmental Impact Statements, (EPA 2015);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018.

In addition, specialist disciplines have had regard to other relevant guidelines, as noted in the specific chapters of the EIAR.

1.3 Function of the EIAR

This EIAR is a report of the effects, if any, which proposed development, if carried out, would have on the environment and includes the information specified in Annex IV of the Environmental Impact Assessment Directive. The EIAR is the document prepared on behalf of the developer that presents the output of the assessment conducted on behalf of the developer, and contains information regarding:

- the project;
- the likely significant effects of the project;
- the baseline scenario;
- the proposed alternatives;
- the features and measures to mitigate adverse significant effects;
- any additional information specified in Annex IV of the EIA Directive; as well as
- the Non-Technical Summary.

The EIAR must include the necessary information for the competent authority to reach a reasoned conclusion and should be of a sufficient quality to enable this judgement. Many of the EIA Directive's requirements and provisions aim to ensure that the EIAR is of a sufficient quality to effectively serve this purpose. Article 5 of the EIA Directive sets out what must be included in the EIAR, and how to ensure that it is both of a sufficient high quality and complete.

The EIAR has been prepared following an examination, analysis and evaluation of the direct and indirect significant effects of the project in relation to the receiving environment.

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;
- 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 MP2 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.

1.5 The Applicant & Masterplan

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 Masterplan 2012-2040 was first adopted by the Board of DPC on 26th January 2012, and published in February 2012. In the six years since, it has guided the development of the port particularly through two major initiatives:

- Firstly, the Alexandra Basin Redevelopment (ABR) Project obtained planning permission in July 2015 and construction is now underway.
- Secondly, the construction of the 44 hectare Dublin Inland Port, located 14 km from Dublin Port, has commenced, following a grant of planning permission by Fingal County Council, and will allow non-core port-related activities to be relocated away from Dublin Port. This, in turn, will free up much needed land close to the quays and berths in Dublin Port for the transit storage of cargo.

In the years from 2012 to 2019, five significant policy documents have been published:

- National Ports Policy, 2013;
- DPC's Franchise Policy, 2014;
- Dublin City Development Plan 2016 – 2022;
- Project Ireland 2040 National Planning Framework, 2018; and
- DPC's Dwell Time Policy, 2019

In addition, there has been unanticipated and strong economic recovery after the 2008 recession which has 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%.

Against this background, a review of the Masterplan 2012-2040 was completed in 2018 and this review has led to two fundamental conclusions:

- Firstly, where the Masterplan had originally envisaged a return to an eastern expansion of Dublin Port into the Tolka Estuary, DPC is no longer pursuing this as an option.
- Secondly, to meet anticipated capacity requirements, Dublin Port needs to be developed on the basis of an average annual growth rate (AAGR) in port volumes of 3.3% over the 30 years from 2010 to 2040, rather than the 2.5% originally assumed in 2012.

Taken together, these conclusions create a high degree of certainty on the ultimate scale and impact of Dublin Port on the city, the environment and on local and national transport networks.

Between now and 2040, major development projects are envisaged on both the north side of the port and on the Poolbeg Peninsula, as envisaged in the Dublin Port Masterplan 2040. All of these major projects will be subject to detailed scrutiny in terms of their environmental impact and, particularly, their potential impact on Natura 2000 sites in or near Dublin Bay.

Given the high growth rates projected, and the need to cater for this growth without further eastern expansion into the Tolka Estuary, DPC will only bring forward development projects which are consistent with the principles of proper planning and sustainable development, and which can be objectively demonstrated not to adversely affect the environment in all its facets, including the integrity of Natura 2000 sites.

DPC is challenged to complete major construction projects without disruption to the port's large and increasing throughput of both cargo and passengers.

Dublin Port's Masterplan 2040 provides the necessary framework to allow these essential projects to be brought forward for planning and other consents and to be constructed in time to meet demand. The Masterplan also indicates to all of the port's stakeholders how the port will be developed to meet their needs in the years ahead.

The past and projected growth to 2040 is in large part due to the growth in the country's population. In 1950, the population was 3.0m and by 2040 is projected to grow to 5.6m. Over this period, volumes through Dublin Port are projected to increase 27-fold from 2.9m gross tonnes in 1950 to 77.2m in 2040.

Port infrastructure is long lived. For instance, Dublin Port critically depends, for its depth of water and sheltered berths; firstly, on the 18th century Great South Wall; and, secondly on the North Bull Wall, completed in 1824. These breakwater structures, which today are of significant historic value, remain the port's primary line of defence against storm waves entering Dublin Bay from the expansive waters of the Irish Sea. The maintenance and long-term stability of the Great South Wall and the North Bull Wall are thereby essential to the operation of Dublin Port.

In addition to accommodating increased port capacity, the Dublin Port Masterplan 2040 also guides the development of Dublin Port to achieve a second and equally important objective of integrating Dublin Port with Dublin City and with Dublin Bay. This will involve a range of projects and initiatives based on the port's heritage and on the natural environment.

Dublin Port is an essential part of Dublin and contributes to the life of the city in many ways. Dublin Port is a crucial part of the national infrastructure which facilitates merchandise trade in and out of Ireland. The port is also of key importance to the national tourism sector as an important gateway for visitors to Ireland. The contribution that Dublin Port makes to the national and regional economy and to the people of Ireland as a strategic piece of infrastructure gives port lands their real intrinsic value.

Dublin Port is a significant focal point for employment in Dublin, both directly through businesses operating in the port and regionally through enterprises supported by the trading activity carried out at the port. An efficient and dynamic Dublin Port will contribute to the generation of more employment in the economy.

The MP2 Project is the second Strategic Infrastructure Development (SID) project at Dublin Port to be brought forward to development consent stage from the Dublin Port Masterplan 2040.

1.6 The MP2 Project

The MP2 Project at Dublin Port is being proposed for development in accordance with the Dublin Port Masterplan, reviewed 2018. Figure 3 in the Masterplan (reproduced in Figure 1-1) identifies the land uses and development 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 not less than three large Strategic Infrastructure Development (SID) projects:

1. the Alexandra Basin Redevelopment (ABR) Project (29N.PA0034), which is under construction;
2. the MP2 Project, now proposed; and
3. a final project on the Poolbeg Peninsula (as shown in Figure 1-1 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.

The MP2 Project complements the ABR Project in providing capacity for growth in the Ro-Ro and Lo-Lo modes on the north side of the port and at its eastern end in addition to providing suitable infrastructure for increasing numbers of ferry passengers (as shown in Figure 1-1 including development of land areas C and D)

The landside works proposed in the MP2 Project are located on the north side of Dublin Port at its eastern end. It includes the DFT container terminal (Land Area D in Figure 1-1) and Ro-Ro freight and passenger terminals currently operated by Sea Truck, Stena Line and Irish Ferries (Land Area C in Figure 1-1).

The existing site is shown in Figure 1-2. Berth 52 and Berth 53 will be removed as part of the ABR Project and the basin between them will be infilled. The new river berth to be developed east of Berth 49 and to the south of this infilled basin will be designated as Berth 52. The designation Berth 53 is likewise being retained for the new jetty berth now proposed in the MP2 Project.

The site is bounded to the north and east by the South Dublin Bay and Tolka Estuary Special Protection Area (SPA), and to the south by the River Liffey and the Dublin Port navigation channel. Planning permission was previously granted for the infilling of Berths 52 & 53 and the creation of a new river-side berth under the Alexandra Basin Redevelopment (ABR) Project (29N.PA0034).

The works proposed in the MP2 Project are shown in Figure 1-3 and comprise a number of elements:

- Construction of a new Ro-Ro jetty (Berth 53) for ferries up to 240m in length on an alignment north of the Port's fairway and south and parallel to the boundary of the South Dublin Bay & River Tolka SPA (004024).
- A reorientation of the already consented Berth 52 (ABP Ref. 29N.PA0034). Berth 52 is also designed to accommodate ferries up to 240m in length. The works will also comprise an amendment to the consented open dolphin structure (ABP Ref. 29N.PA0034) to create a closed berthing face at the eastern end of Berth 49.

[Elsewhere within the ABR Project, the extension of the existing Berth 49 is already consented to also make this berth capable of accommodating ferries up to 240m in length. The combination of the ABR Project with the MP2 Project will therefore deliver three river berths all capable of accommodating ferries up to 240m in length].

- A lengthening of an existing river berth (50A) to provide the Container Freight Terminal with additional capacity to handle larger container ships. These works will include the infilling of the basin east of the now virtually redundant Oil Berth 4 on the Eastern Oil Jetty. These works will also include dredging to a standard depth of -11.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).
- 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 dredging of a berthing pocket to a standard depth of -13.0m CD at Oil Berth 3 will require stabilisation of the existing quay wall at Jetty Road. It is not proposed to use this quay wall for the berthing of vessels.
- Dredging at the proposed Berth 53 and channel widening to a standard depth of -10.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).
- Consolidation of passenger terminal buildings, demolition of redundant structures and buildings, and removal of connecting roads to increase the area of land for the transit storage of Ro-Ro freight units as a Unified Ferry Terminal (UFT). Works include reorganisation of access roads; two proposed check in areas comprising a total of 14 check lanes; proposed set down and parking area for the existing Terminal 1 building; proposed pedestrian underpass to access the existing Terminal 1 building; three proposed toilet blocks and a proposed ESB Substation. These works will comprise amendments to consented developments with planning reference numbers 3084/16 & 3638/18, and the ABR Project (ABP Ref. 29N.PA0034).
- A heritage zone adjacent to Berth 53 and the Unified Ferry Terminal set down area. This will comprise an alteration to consented development planning reference 3084/16.

1.7 Requirement for the EIAR

The MP2 Project falls within the following class of development identified in paragraph 10(e) of Annex II of the Directive 2014/52/EU (the EIA Directive):

(e) Construction of roads, harbours and port installations, including fishing harbours (projects not included in Annex I).

Screening, in respect of the MP2 Project, was undertaken on behalf of the applicant. It was determined that the thresholds set out in the EIA Directive, and applicable Irish Regulations, were exceeded, and therefore an

EIA would be required to be undertaken by the relevant competent authorities on the respective applications for development consent.

Directive 2014/52/EU includes a requirement for a developer to prepare and submit an Environmental Impact Assessment Report (EIAR), rather than an Environmental Impact Statement (EIS), to the competent authority. For the purposes of the application for permission made pursuant to the Planning and Development Acts, the obligations under Directive 2014/52/EU have been transposed into Irish law pursuant to the European Union (Planning and Development) (Environmental Impact Assessment) Regulations (S.I No. 296 of 2018).

This EIAR has been prepared in compliance with the requirements of Directive 2014/52/EU, and the Irish regulations in force as at the date of its finalisation.

For the purposes of the application for permission, under the provisions of Section 37B(4)(a) of the Planning and Development Act 2000 (as amended), (the Planning and Development 2000 Acts) by notice dated 10th August 2018, An Bord Pleanála (Ref 29N.PC0252) determined that the MP2 Project is considered strategic infrastructure development. Accordingly, the application for permission must be made directly to An Bord Pleanála (the Board) under Section 37E of the Planning and Development Acts.

With respect to environmental assessment, section 37E of the Planning Act states:

> *"(1) '"An application for permission for development in respect of which a notice has been served under section 37B(4)(a) shall be made to the Board and shall be accompanied by an environmental impact assessment report in respect of the proposed development."*

In this regard an EIAR is a requirement of the SID application process. To facilitate the Board in carrying out the necessary assessment, the application documentation includes an EIAR.

1.8 Methodology and Structure of the EIAR

The main aim of this EIAR is to provide information on the project to the public, public concerned, prescribed bodies and the competent authority. To this end, Article 3(1) of the EIA Directive requires that significant effects are identified, assessed and described in an 'appropriate manner'. Article 5(1) sets the form – the information should be presented in an EIAR that enables stakeholders and authorities to form opinions, and to make decisions regarding the project. While there are no formal requirements concerning the format and the presentation of the report, this EIAR clearly sets out the methodological considerations and the reasoning behind the identification and assessment of likely significant effects.

1.8.1 EIAR Content

Article 5(1) sets out what must be included as a minimum in the EIA Report. Annex IV to the Directive, expands on these requirements. In short, this includes the following:

- A description of the project: this is an introduction to the project, and includes a description of the location of the project, its characteristics, including land use requirements during construction and operational phases, as well as estimates of the expected residues, emissions, and waste produced during the construction and operation phases.

- Baseline scenario: a description of the relevant aspects of the current state of the environment, and the likely evolution thereof, without the implementation of the project, on the basis of the availability of environmental information and scientific knowledge.
- Environmental factors affected: a description of the environmental factors likely to be significantly affected by the project, including consideration of climate change mitigation and adaptation, biodiversity, natural resource sustainability, and the risks of major accidents and disasters.
- Effects on the environment: a description of the likely significant effects of the project on the environment. Such significant effects include direct and indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, and positive and negative, as appropriate.
- Assessment of alternatives: a description of the studied reasonable alternatives to the project, with an indication of the main reasons for the selection of the option chosen, including a comparison of environmental effects.
- Mitigation measures: a description of the measures envisaged to avoid, prevent, reduce and, where possible, offset any identified significant adverse effects on the environment, including a determination of the effectiveness of such measures, their reliability and certainty, as well as the commitment to ensuring their practical implementation and monitoring of results.
- Monitoring: a description of any measures proposed to monitor significant adverse effects on the environment and/or measures taken to mitigate them.
- Non-Technical Summary: an easily accessible summary of the content of the EIAR presented without technical jargon, hence understandable to anybody without a background in the environment or the project.
- Quality of the EIAR: the experts responsible for preparing the EIAR are competent.

1.8.2 Assessment Methodology

Specific topic-related methodologies are outlined in this section.

<u>Baseline Scenario</u>

An assessment of the relevant aspects of the current state of the environment, and the likely progression thereof, without implementation of the project, is undertaken by relevant and qualified experts on the basis of the environmental data and scientific knowledge which is available.

The outcomes of the assessment are provided in a description of existing environmental conditions, and the do-nothing scenario, within each environmental topic chapter. This forms the foundation against which likely significant effects can be compared and evaluated. It further provides the basis upon which ex-post monitoring can be used to measure change once the project has been initiated.

<u>Environmental Factors</u>

The following environmental factors are considered so as to appropriately identify, describe and assess the likely significant effects which might impact upon them as a result of the implementation of the project:

- biodiversity, flora and fauna;
- soils, geology and hydrogeology;
- water quality and flood risk;
- air and climate;
- noise and vibration;
- material assets - coastal processes;
- material assets - traffic and transportation;
- archaeology and cultural heritage;
- landscape and visual;
- population and human health; and
- waste.

Further to these, consideration is also given to the below factors. These are incorporated into assessment procedures so as to provide a complete understanding of the interaction between the project and the environment.

Climate Change

In addition to considering the effects of the project upon climatic factors, consideration is also given to the vulnerability of the project to future changes in the climate, and to its capacity to adapt to such changes into the future.

Accidents and Disasters

Consideration is given to the potential of the project to cause accidents and/or disasters (both natural and man-made), and to the vulnerability of the project to potential accidents and/or disasters.

Biodiversity

Further to consideration of the effects of the project upon flora and fauna, particularly with regard to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC, consideration is also given to the effects of the project upon biodiversity; understood to be the interactions and variety of, and variability within species, between species and between ecosystems.

Natural Resources

Consideration is given to the sustainability of resources, particularly with regard to land, soil, water and biodiversity, as well as energy. The assessment of the project's impacts upon the availability of natural resources is in addition to the assessment of the impacts of the project upon the resource itself.

Assessing Impacts

The identification, description and assessment of the effects of the project upon the aforementioned factors is premised upon an understanding of the likely magnitude of predicted impacts and the sensitivity to change of affected receptors. This provides for a determination of the likely significance of effects.

The baseline scenario relating to each environmental factor is used to identify potential receptors. The sensitivity of a given receptor is dependent on the receptor concerned, and the effect to which it is subject. For this reason, given that sensitivity is context-specific, it is thus defined within each topic chapter, but nonetheless considers:

- the vulnerability of the receptor;
- the capacity of the receptor to recover; and
- the value/importance attributed to the receptor.

An impact is defined as a physical change to the environment which is attributable to the implementation of the project. The impacts which are likely to arise, and their magnitude, are detailed within individual topic chapters. Nonetheless, unless otherwise stated, the magnitude of impacts generally takes into account factors such as:

- the extent of the impact;
- the duration of the impact;
- the frequency of the impact; and
- the capacity for the impact to be reversed.

The significance of an effect, defined in terms of the express consequence of an impact, is determined with regard to the magnitude of the impact and the sensitivity or value of the receptor. Resultantly, the level of significance of effects is defined separately within each section. With that being said, the following provides an indication of the categorisation of the scale of significance:

More Significant	**Effects which are substantial.** They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with site or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity.
	Effects which are major. These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
	Effects which are moderate. These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
	Effects which are minor. These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Less Significant	**Effects which are negligible.** No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Effects are also considered, and categorised, in terms of being direct and indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, and positive and negative, as appropriate.

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from a number of sources, where relevant, including::

- the interaction between all of the different projects in the same area; and
- the interaction between the various impacts within a single project.

The cumulative effects of the MP2 Project, in conjunction with other proposed projects, are considered within each topic chapter. Relevant developments considered within the cumulative assessments include those which are:

- under construction;
- permitted, but not yet implemented;
- submitted, but not yet determined; and

- identified in the Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption), recognising that much information on any relevant proposals is limited.

It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

Each topic chapter further considers whether there are significant cumulative effects which are likely to arise as a result of interaction between effects as part of the same project, so as to identify potential secondary, cumulative or synergistic effects.

Mitigation and/or Compensation Measures

Where required, mitigation measures are identified and described within individual topic chapters. These are measures which could further avoid, prevent, reduce and, where possible, offset likely significant adverse effects upon the environment.

A description of those adverse effects which proposed mitigation measures are intended to avoid, prevent, reduce or offset are provided in addition to a summary regarding the measure's effectiveness, reliability and certainty, as well as the commitment to ensuring their practical implementation and monitoring of results.

Monitoring

Further to mitigation measures, appropriate and proportionate monitoring measures are also identified and summarised within individual topic chapters.

Such monitoring measures may arise either as a result of legislative requirements and/or directly in relation to the effects of the project upon environmental factors. Nevertheless, duplication of efforts will be strictly avoided.

In any case, monitoring measures will be developed so as to ensure that:

- significant adverse impacts from the construction and operation of projects do not exceed impacts projected in the EIAR, and that measures taken to avoid, prevent, reduce and/or offset such impacts are carried out as planned;
- mitigation methods can be assessed for robustness. This can help to improve the identification of impacts in future EIARs;
- the EIAR is in line with other EU legislation, especially the SEA Directive; and that
- the systematic ex-post impact monitoring of adverse significant effects, resulting from the project, offers an opportunity to identify if forecasted impacts are not developing as predicted, so that steps may be taken for rectification.

Conclusion on Likely Significant Effects

A conclusion by the authors of the EIAR on the likely significant effects of the MP2 Project on the environment, taking into account the results of the examination of the information presented in the EIAR is provided. In addition, a summary of the key impacts and mitigation and monitoring measures associated with the MP2 Project is provided, along with a discussion of cumulative impacts, interactions and interrelationships between environmental topics. This conclusion will inform the reasoned conclusion to be made by the competent authority in conducting the EIA.

1.8.3 Structure of the EIAR

The EIAR has been structured in accordance with the European Commission's Guidance "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)" (2017). Accordingly, the EIAR:

- is presented with a clear structure with a logical sequence that describes, inter alia, existing baseline conditions, predicted impacts (nature, extent and magnitude), scope for mitigation, proposed mitigation measures, significance of unavoidable/residual impacts for each environmental factor;
- contains a table of contents at the beginning of the document;
- comprises a description of the development consent procedure and how EIA fits within it;
- reads as a single document with appropriate cross-referencing and is concise, comprehensive and objective;
- is written in an impartial manner without bias;
- includes a full description and comparison of the alternatives studied;
- makes effective use of diagrams, illustrations, photographs and other graphics to support the text;
- uses consistent terminology with a glossary;
- references all information sources used;
- has a clear explanation of complex issues;
- contains a good description of the methods used for the studies of each environmental factor;
- covers each environmental factor in a way which is proportionate to its importance;
- provides evidence of effective consultations;
- provides a basis for effective consultations to come;
- makes a commitment to mitigation (with a programme) and to monitoring;
- contains a Non-Technical Summary which does not contain technical jargon;
- contains, where relevant, a reference list detailing the sources used for the description and assessments included in the EIAR.

The EIAR is broken down into the following Chapters.

- Introduction
- Need for the MP2 Project
- Project Description

- Examination of Alternatives
- Project Scoping and Consultation
- Risk of Major Accidents
- Subsequent chapters address specific environmental factors and provide a description of the existing environment, the likelihood of effects, the significance of effects, remedial and mitigation measures, residual impacts and monitoring measures. The specific environmental factors considered are:
  - Biodiversity, Flora and Fauna
  - Soils, Geology and Hydrogeology
  - Water Quality and Flood Risk Assessment
  - Air Quality and Climate
  - Noise and Vibration
  - Material Assets - Coastal Processes
  - Material Assets - Traffic and Transportation
  - Cultural Heritage (including Industrial and Archaeological)
  - Landscape and Visual
  - Population and Human Health
  - Waste
- Cumulative Effects and Environmental Interactions
- Summary of Mitigation Measures and Conclusion
- References and Bibliography
- Glossary of Terms

The advantages of using this type of format are that it is easy to examine each environmental topic and it facilitates easy cross-reference to specialist studies undertaken as part of the assessment.

Each topic of environmental assessment is considered as a separate chapter and is drafted by relevant specialists. The EIAR is presented in five volumes of the application documentation, as follows:

- Volume 1 EIAR Non-Technical Summary
- Volume 2 EIAR Main Document (Part 1 & Part 2)
- Volume 3 EIAR Appendices (Parts 1, 2a, 2b, 3, 4)

In addition to the EIAR and its appendices, the application documentation also comprises:

- Planning Report
- Planning Drawings (A1) and (A3)

- Screening for Appropriate Assessment & Natura Impact Statement Main Report
- Screening for Appropriate Assessment & Natura Impact Statement Appendices
- Draft Construction Environmental Management Plan (CEMP)
- Summary of Mitigation Measures
- Conservation Strategy and Industrial Heritage Appraisal
- Industrial Heritage Impacts & Compensation Planning & Design Report
- Control of Major Accident Hazards (COMAH) Land Use Planning Assessment

The following companies were involved in the preparation of the EIAR

- RPS – Planning consultants for the MP2 Project
- RPS – Lead Environmental consultants for the MP2 Project
- ABL (Atkins Byrne Looby) – Engineering consultants for the MP2 Project

The production of the EIAR has been co-ordinated by RPS. The EIAR structure, responsibility and qualified input for each chapter are detailed in Table 1-1.

Table 1-1 List of Contributors to EIAR Chapters

Chapter of EIAR	Lead Author(s)	Company	Subject	Qualifications
Chapter 1	Alan Barr	RPS	Introduction	BSc PhD CEng CSci CWEM FICE FIEI MCIWEM
Chapter 2	Eamonn O'Reilly	DPC	Need for the MP2 Project	CEO Dublin Port Company
	Helena Gavin	RPS	Planning	BA, MSc Town & Country Planning, PG Dip EnvEng, MIPI
Chapter 3	Adam Cronin	ABL	Project Description	B.Eng., M.Sc., C.Eng., MIEI
Chapter 4	Grace Glasgow	RPS	Examination of Alternatives	MEng EurIng CEng CSci CWEM FIEI FCIWEM FICE
	Adam Cronin	ABL		B.Eng., M.Sc., C.Eng., MIEI
Chapter 5	Alan Barr	RPS	Project Scoping and Consultation	BSc PhD CEng CSci CWEM FICE FIEI CIWEM
Chapter 6	Douglas Adamson	Byrne Ó Cléirigh Consulting	Risk of Major Accidents	BA BAI ME(Mgmt) CEng MIEI MEI
Chapter 7	James McCrory	RPS	Biodiversity, Flora & Fauna Terrestrial Biodiversity	BA (Mod) MSc CEcol CEnv MCIEEM CBiol MRSB
	Gerard Morgan	Aquatic Services Unit	Benthic Biodiversity and Fisheries	BSc (Hons) MSc
	Simon Berrow	IWDG	Marine Mammals	BSc (Hons) PhD
	Richard Nairn	Natura	Avian Biodiversity	BA(Mod) MSc CEnv FCIEEM
Chapter 8	Joe McGrath	RPS	Soils, Geology & Hydrogeology	BSc (Hons) MSc MCIWEM MIEnvSc
Chapter 9	Grace Glasgow	RPS	Water Quality	MEng EurIng CEng CSci CWEM FIEI FCIWEM FICE
	Andrew Jackson	RPS	Flood Risk	BEng CEng MICE MIEI

Chapter of EIAR	Lead Author(s)	Company	Subject	Qualifications
Chapter 10	Paul Chadwick	RPS	Air Quality and Climate	BA (Mod) M.Phil AIEMA
Chapter 11	Stephen Cleary	RPS	Noise and Vibration	BA(Mod) MSc MIEMA MIOA CEnv
	Eugene McKeown	RPS	Underwater Noise	BE, LLB, MSc., C. Eng., MIoA, MASA
Chapter 12	Adrian Bell	RPS	Material Assets - Coastal Processes	BSc CEng FIAE FIEI MICE MIStructE
Chapter 13	Celine Daly	RPS	Material Assets - Traffic and Transportation	BSc (Hons) CMILT MCIHT MTPS
Chapter 14	Niall Brady	ADCO	Cultural Heritage (Marine Archaeology)	PhD, FSA
	Chris Southgate	Southgate Associates	(Industrial Heritage)	MA (Cantab) MI Sruct E FIEI
Chapter 15	Raymond Holbeach	RPS	Landscape and Visual	BSc(Hons) MLA CMLI
Chapter 16	Andrew Buroni	RPS	Population and Human Health	PhD, MSc, BSc (Hons), Fellow of the Royal Society of Medicine, Fellow of the Royal Society for Public Health
Chapter 17	Debbie Nesbit	RPS	Waste	BSc MSc CEnv MCIWM MIEMA
Chapter 18	Grace Glasgow Alan Barr	RPS	Cumulative Effects & Environmental Interactions	MEng EurIng CEng CSci CWEM FIEI FCIWEM FICE BSc PhD CEng CSci CWEM FICE FIEI CIWEM
Chapter 19	Alan Barr	RPS	Summary of Mitigation Measures and Conclusions	BSc PhD CEng CSci CWEM FICE FIEI CIWEM

1.9 Viewing and Purchasing of the EIAR

The EIAR is available to view and download at the following dedicated web address www.dublinportmp2.ie

The EIAR can be inspected free of charge or purchased on payment of a specified fee (which shall not exceed the reasonable cost of making such copy) during public opening hours at the offices of An Bord Pleanála and Dublin City Council.

The EIAR can be viewed at the reception of the Dublin Port Centre, Alexandra Road, Dublin 1 during normal working hours. A computer and screen has also been made available with appropriate search facilities. Hard copies and e-copies of the EIAR may also be purchased from Dublin Port Company at the reasonable cost of making such copy by phoning the following number during normal business hours, 01 8876000 and ask for Charlie Murphy or in his absence Edel Currie; or by post to Dublin Port Centre, Alexandra Road, Dublin 1; or by email to info@dublinport.ie

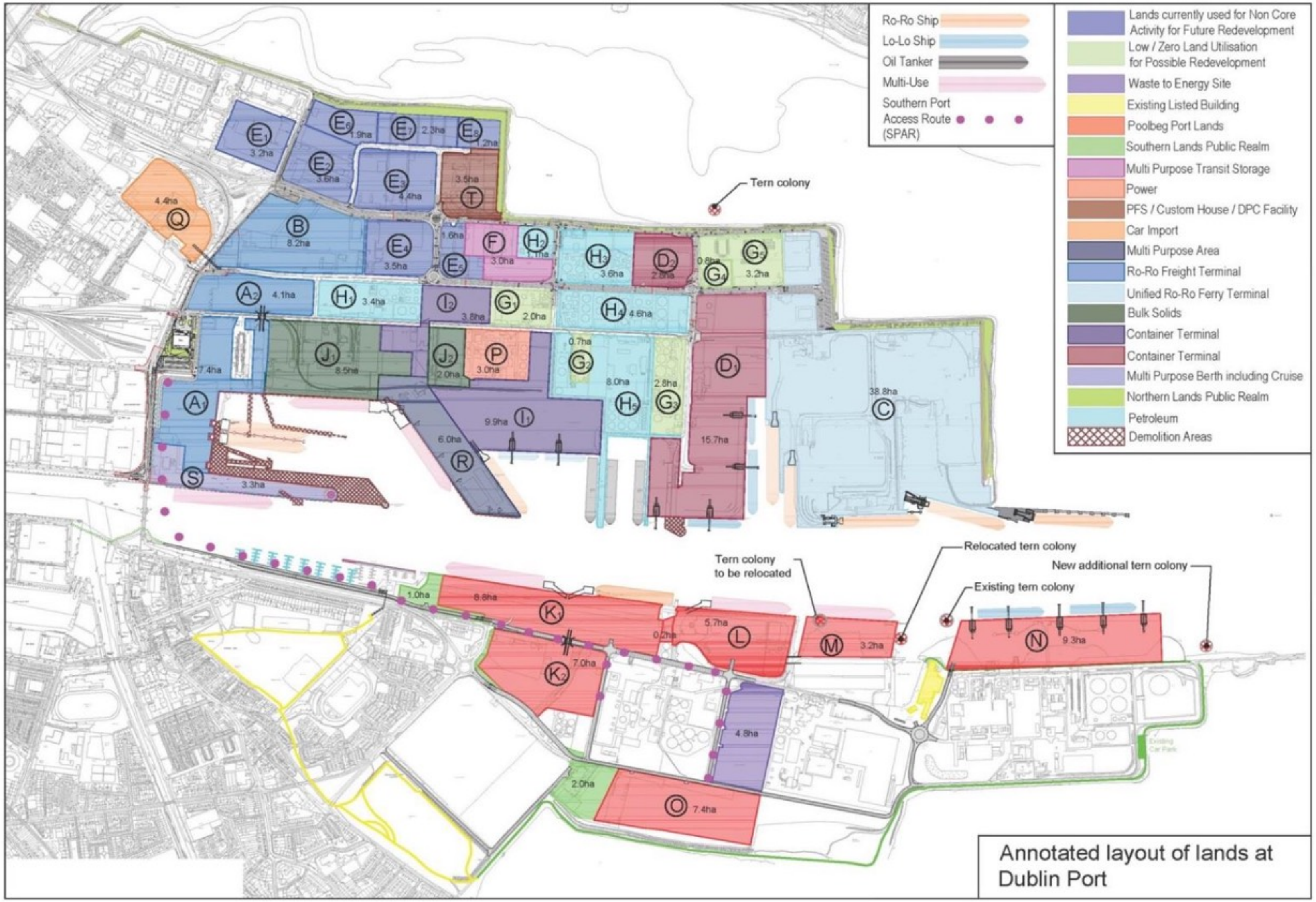

Figure 1-1 Dublin Port Masterplan 2040, reviewed 2018, Annotated Layout at Dublin Port (Reproduced from Figure 3 of the Masterplan)

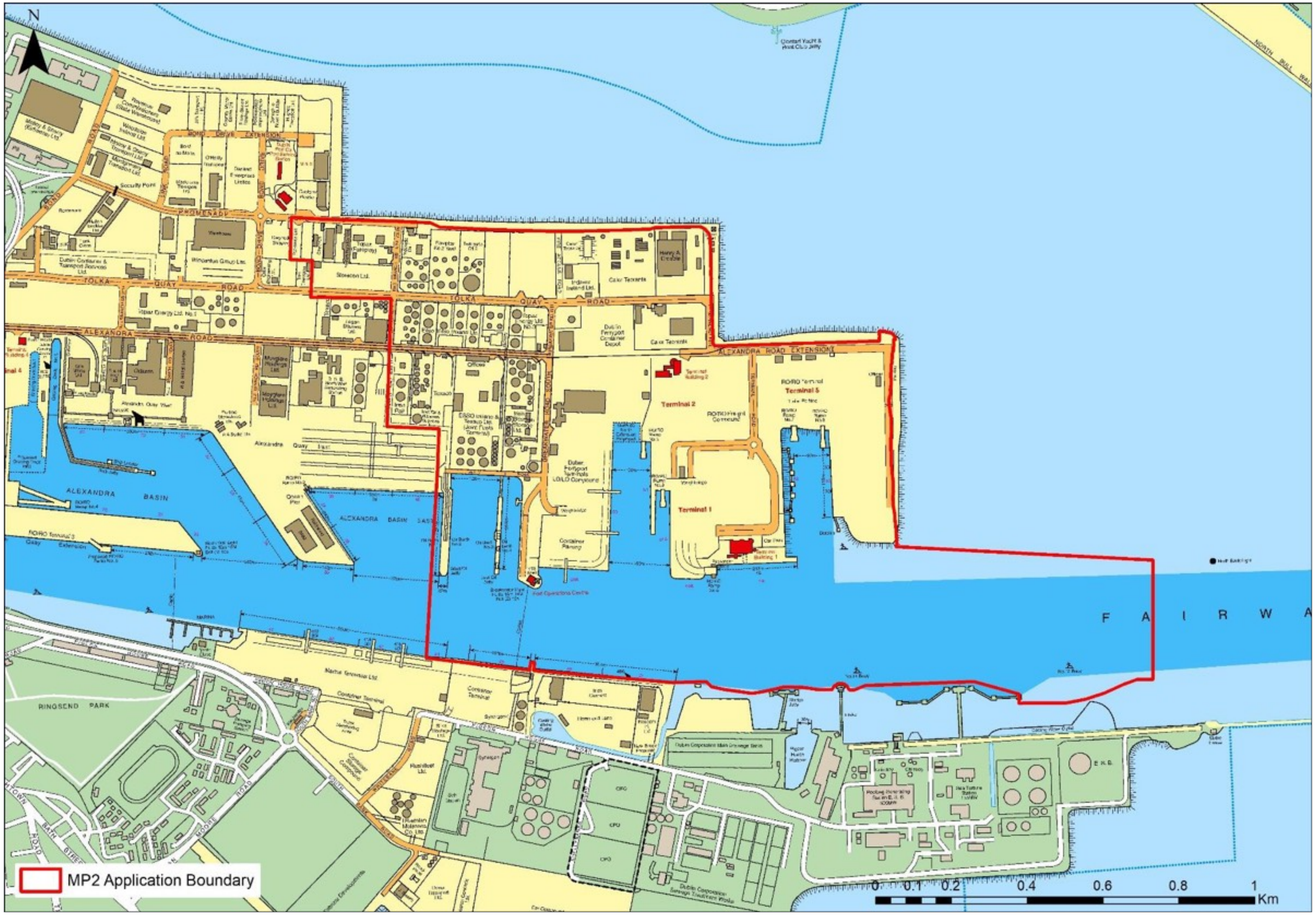

Figure 1-2 Existing Site with MP2 Application Boundary

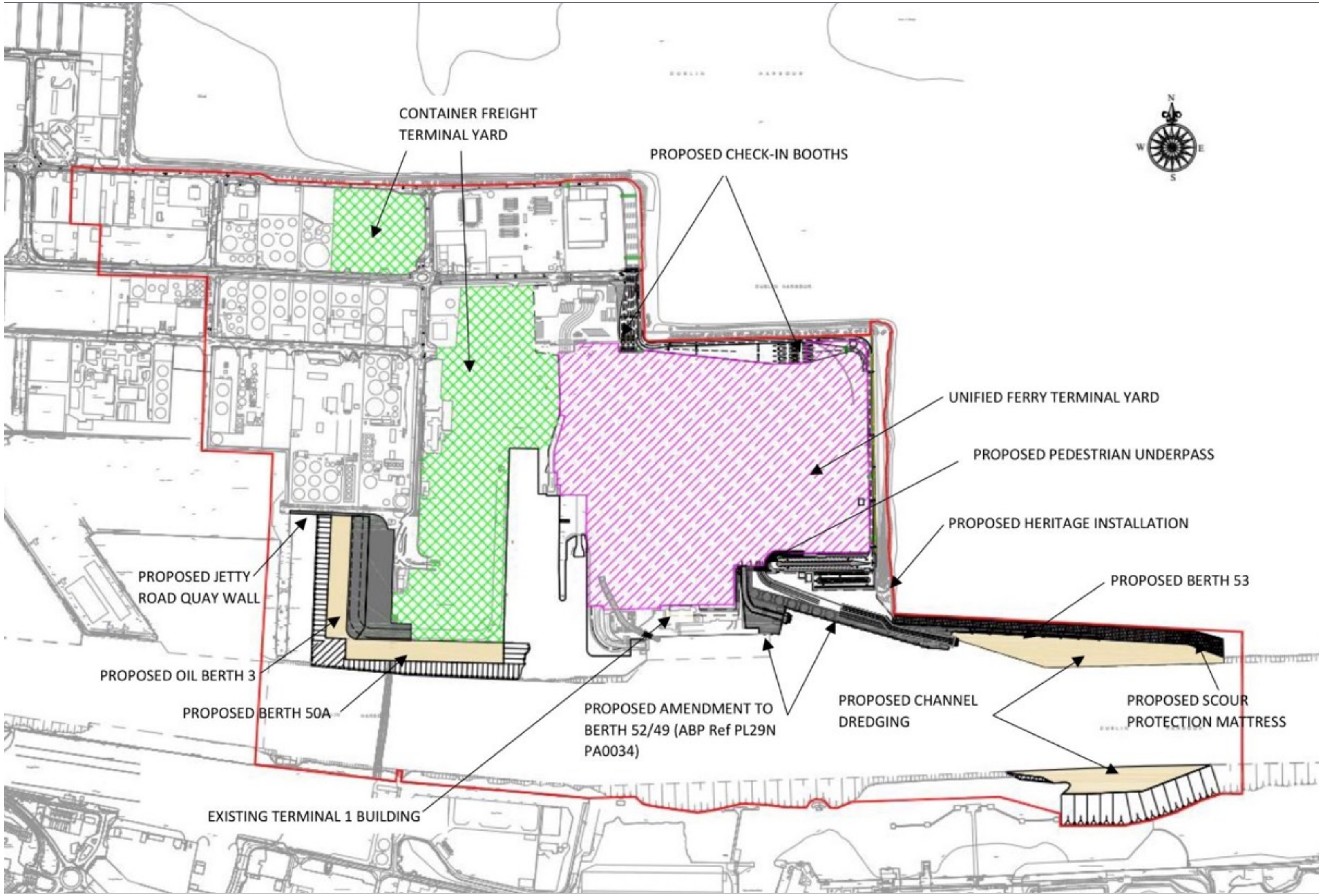

Figure 1-3 Main elements of the MP2 Project

2 NEED FOR THE MP2 PROJECT

2.1 Introduction

This chapter of the EIAR details the need for the MP2 Project and examines this in context of relevant spatial planning policy having regard to international, national, regional and local policy objectives.

This chapter should be read in conjunction with Chapter 3 'Project Description' which describes the MP2 Project and provides information on the project site, design, size and other relevant features.

2.2 Project Rationale

2.2.1 Introduction

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[1] 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 ***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.

[1] The Trans European Network for Transport (TEN-T) is a central concept within EU Transport Policy as set out in the EU white paper *Roadmap to a Single European transport area – Towards a competitive and resource efficient transport system, COM(2011) 144 final* and in many EU policy and funding initiatives subsequently. The TEN-T network recognises ports as key nodes within the wider road, rail and shipping networks that facilitate trade within and outside the EU. There are 319 ports identified in the network. 83 (including Dublin) are in the *core* network and 236 are in the *comprehensive* network.

- Following the referendum in the UK in June 2016, Brexit is anticipated in the near future and 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 review of the Masterplan modified DPC's view of how Dublin Port needs to be developed:

- Firstly, the long-term growth rate assumption for capacity planning[2] was increased from 2.5% to 3.3%
- Secondly, where the original Masterplan had posited the ultimate deepening of the Port to -12.0m CD, it is now accepted that the ultimate depth will be -10.0m CD.
- Thirdly, where the Masterplan published in 2012 had envisaged a possible return to the eastwards expansion of the Port, this has now been ruled out and all remaining developments will be based on the existing footprint of the Port.
- Finally, it is envisaged that major works in Dublin Port will need to be completed before 2040 at which stage the Port will have reached its maximum and ultimate capacity of 77.2m gross tonnes.

Figure 3 in the Masterplan (reproduced in Figure 2-1) identifies the land uses and development projects on port lands which will allow the Port to increase its capacity to 77.2m gross tonnes by 2040.

DPC envisages that the development of Dublin Port to its ultimate capacity will be achieved by three large developments, all SID projects:

1. Alexandra Basin Redevelopment (ABR) Project (PA0034), which is under construction.
2. MP2 Project, now proposed.
3. A final project including development of land areas K, L, M, N and O (Figure 2-1) 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.

The MP2 Project complements the ABR Project in providing capacity for growth in the Ro-Ro and Lo-Lo modes[3] in **Area C** and **Area D** on the north side of the Port and at its eastern end (as shown in Figure 2-1).

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[2] 30 year average annual growth rate of gross tonnes of cargo

[3] Roll-On-Roll-Off (Ro-Ro) and Lift-On-Lift Off (Lo-Lo)

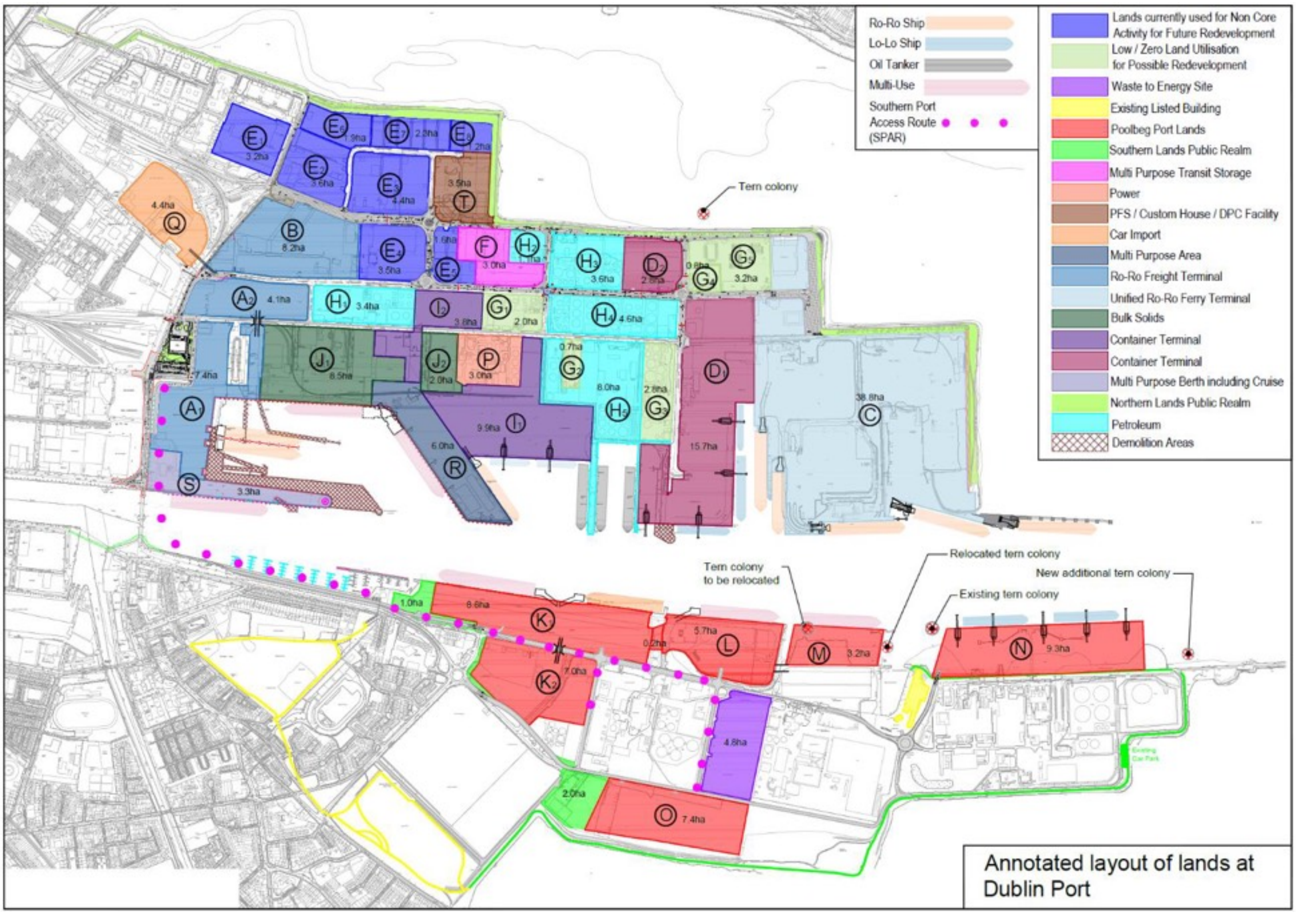

Figure 2-1 Dublin Port Masterplan 2040 (Figure 3)

2.2.2 MP2 Project Objectives

The MP2 Project is intended to provide a second tranche (after the ABR Project) of the additional capacity required to cater for a projected demand of 77.2m gross tonnes by 2040.

The project has been carefully devised by DPC to ensure that:

- It is consistent with the Dublin Port Masterplan 2040
- The proposals selected for development make optimum use of the Port's finite resources of river berths and quayside lands
- The proposed configuration reflects and responds to assessments of the potential environmental impact of different options to achieve the project's objectives
- The chosen project option best meets all applicable environmental and ecological requirements
- The project can be constructed in a way that minimises the impact on existing port operations
- The proposed project is consistent with the principles of proper planning and sustainable development
- The project makes provision for future population growth and a concomitant increase in demand for port infrastructure at the location closest to where the need for additional capacity arises

The landside works proposed in the MP2 Project are all on the north side of Dublin Port at its eastern end. The existing layout of this area of the Port is shown in Figure 2-2[4].

The MP2 Project is designed to provide:

- A new Ro-Ro jetty (Berth 53) for ferries up to 240 metres in length on an alignment north of the Port's fairway and south and parallel to the boundary of the South Dublin Bay and River Tolka SPA (004024).
- A reorientation of the already consented (ABR Project, PA0034) Berth 52[5].
- Consolidation of passenger terminal buildings, demolition of redundant structures and buildings, and removal of connecting roads to increase the area of land for the transit storage of Ro-Ro freight units.
- A lengthening of an existing river berth (50A) to provide the DFT Container Terminal with additional capacity to handle larger container ships. These works will include the infilling of the basin east of the now virtually redundant Oil Berth 4 on the Eastern Oil Jetty.
- The redevelopment and future-proofing of Oil Berth 3 as a future deep water container berth (-13.0m CD) for the DFT Container Terminal. The future-proofing 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.

[4] Berth 52 and Berth 53 as shown in Figure 2-2 will be removed as part of the ABR Project and the basin between them will be infilled. The new river berth to be developed east of Berth 49 and to the south of this infilled basin will be designated as Berth 52. The designation Berth 53 is likewise being retained for the new jetty berth now proposed in the MP2 Project.

[5] Berth 52 is designed to accommodate ferries up to 240 metres in length. Elsewhere within the ABR Project, the extension of the existing Berth 49 is already consented to also make this berth capable of accommodating ferries up to 240 metres in length. The combination of the ABR Project with the MP2 Project will deliver three river berths all capable of accommodating ferries up to 240 metres in length.

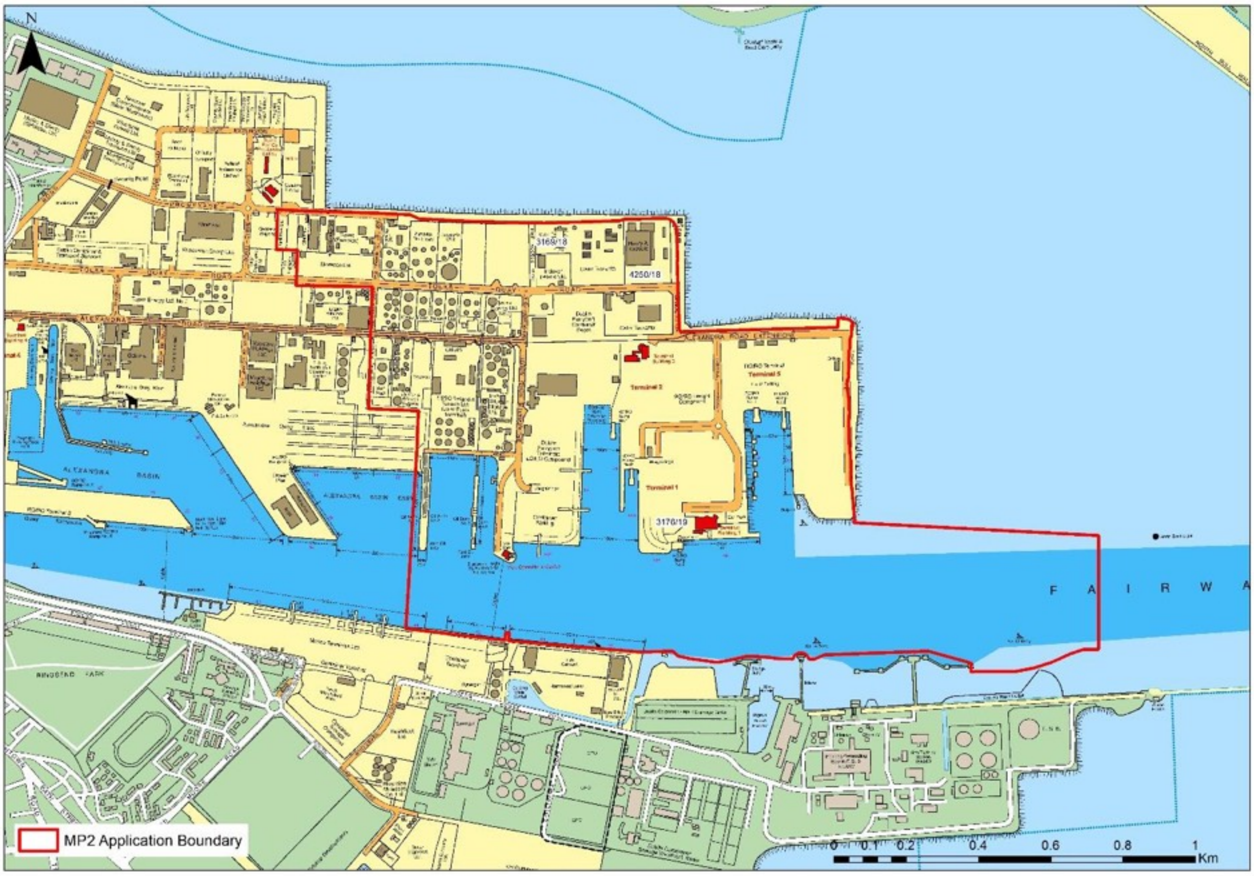

Figure 2-2 Existing layout of the area in which the MP2 Project works are proposed

2.2.3 Berth 53

The additional long river berth to accommodate ferries up to 240m in length is essential to meet the objectives of Masterplan 2040:

- Berth 53 is required to deliver additional Ro-Ro capacity in Dublin Port in line with the projections set out in the Masterplan 2040
- It is optimally located at the North Eastern corner of the Port to provide access to 38.8 hectares of shared passenger and freight terminal lands at **Area C** in Figure 2-1.
- The design of Berth 53 has been developed through an extensive process which had at is core the requirement to ensure that any development in this location respected the integrity of the nearby SPA.
- As a consequence, the location, design and functionality of Berth 53 have evolved since the project was first conceived and the proposal ensures that Berth 53 will not negatively affect the qualifying interests of the South Dublin Bay and River Tolka SPA.

Capacity constraints for Ro-Ro are foreseeable in Dublin Port and have led DPC to introduce policies to maximise the use of existing infrastructure in two ways:

- Firstly, in March 2019 DPC introduced a booking policy for cruise ships with the objective of limiting the number of bookings accepted for cruise ships from 2021 to ensure that future Ro-Ro freight capacity would not be compromised during and after major construction works[6].
- Secondly, in April 2019 DPC introduced a policy to reduce the dwell time of containers and trailers in the port with the objective of maximising the utilisation of the capacity of existing Ro-Ro and Lo-Lo terminals[7]

The additional capacity of the proposed new Berth 53 would increase the Port's Ro-Ro capacity and would mitigate capacity constraints foreseeable for Ro-Ro freight. These policies, particularly the dwell time initiative, would ensure that the utilisation of this capacity would be maximised.

2.2.4 Brexit

The consenting phase of the MP2 Project coincides with Brexit and the construction and operational phases of the project will take place in the aftermath of Brexit.

In the context of the long life cycle for the development and operation of port infrastructure, DPC believes that the impacts of Brexit (which are unknown) will be short-term.

Just as the enormous shock to the Irish economy in the recession post 2008 has already been absorbed and port volumes in Dublin are on course this year for a fifth consecutive annual record, so also the effects of Brexit in years to come (as the MP2 Project is constructed and comes into operation) are not expected to be significant.

These potential effects are twofold:

- Firstly, a diminution in economic growth with a consequent effect on the growth of port volumes.
- Secondly, a changing of trade patterns with an increasing proportion of Ro-Ro and Lo-Lo trade on direct routes to Continental Europe at the expense of UK routes.

The first effect is a timing effect. A negative economic impact from Brexit will result in a lower growth in port volumes than there would otherwise have been in future years. This is consistent with the February 2018 Copenhagen Economics Brexit report which concluded that a hard Brexit would reduce Ireland's GDP in 2030 by 7.0% compared to what it otherwise would have been with no Brexit[8].

Over the 12 years from 2019 to 2030, this 7.0% reduction would be equivalent to an annual reduction in GDP of 0.6%.

Against a background of 36.0% growth in Dublin Port volumes over the six years to 2018, such a slowdown in the years to 2030 would have no perceptible influence on the demand for the additional port capacity which the MP2 Project will deliver.

6 https://www.dublinport.ie/briefing-document-minister-shane-ross-dublin-ports-new-cruise-ship-berthing-pricing-policy/

7 https://www.dublinport.ie/dublin-port-announces-new-dwell-time-initiative-increase-port-capacity-post-brexit/

8 Ireland & the Impacts of Brexit Strategic Implications for Ireland arising from changing EU-UK Trading Relations: https://dbei.gov.ie/en/Publications/Publication-files/Ireland-and-the-Impacts-of-Brexit.pdf

The second effect of changing trade patterns is already evident with increased deployment of new large ships (e.g. Irish Ferries *W.B. Yeats* and CLdN's *Celine* and *Laureline*) on direct routes to Continental Europe.

The additional capacity of Berth 53, of the extended Berth 50A and the future availability of OB3 as a Lo-Lo berth all facilitate the provision of services to support these changed trade patterns.

2.2.5 Capacity enhancements as a result of the MP2 Project

The MP2 Project will deliver additional capacity in each of the Ro-Ro and Lo-Lo modes in circumstances where existing facilities are inadequate for future growth.

The **first focus** of the MP2 Project is to complete the development of a single unified Ro-Ro ferry terminal in **Area C** to cater both for existing operators (Irish Ferries, Stena Line and P&O) and for possible new operators. Current arrangements are not adequate to cater for anticipated growth and for the emerging changes in trade patterns. The existing operators provide services to ports in Britain and, increasingly, to ports in France. It is expected that there will be a further increase of services to France post Brexit.

The various traffics serviced by these ferries are:

- Driver accompanied freight vehicles
- Unaccompanied freight vehicles
- Passenger traffic mostly in vehicles (private cars and coaches) but also as foot passengers

The unified Ro-Ro ferry terminal will also cater for seasonal fast craft operations (currently by Irish Ferries and the Isle of Man Steam Packet Company).

The MP2 Project will complete development in this part of the Port for Ro-Ro ferry operations and will deliver three long river berths (49, 52 and 53), all with double tier ramps, together with Berth 51 (double-tiered ramp) and Berth 51A (single tiered ramp)

The **second focus** of the MP2 Project is to bring the development of capacity for Lo-Lo operations in the DFT Container Terminal to completion in **Area D**.

In the wider context of Masterplan 2040, the MP2 Project is one of a number of projects which together will deliver the capacity required to cater for the Masterplan's projections to 2040.

In particular, the MP2 Project directly links with three other projects (all consented with one complete and two under construction) to deliver the Masterplan's vision for **Area C** and **Area D**. These three projects are summarised in Table 2.1.

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Table 2-1 Developments complementary to the MP2 Project

Project name	Planning reference	Status	Comment
ABR Project	PA0034	Underway	Includes the infill of the Berth 52/53 basin to provide additional land in **Area C**.
Roads project	3084/16	Underway	Provides expanded capacity for Dublin Port's internal roads network sufficient for projected volumes to 2040.
Redevelopment of Blugas Yard	2429/17	Complete	Provides an additional 2.8 hectares of terminal storage area for the DFT Container Terminal (**Area D_2** in Figure 2-1).

In Masterplan 2040, DPC is planning to develop port capacity based on a projected average annual growth rate (AAGR) of 3.3% over the period from 2010 to 2040. Table 2-2 shows the projections of cargo volumes by mode.

Table 2-2 Masterplan 2040 growth projections[9]

'000 gross tonnes	2010 Actual	2040 Projected	AAGR
Ro-Ro	16,403	54,287	4.1%
Lo-Lo	6,317	15,270	3.0%
Bulk Liquid	4,009	4,000	0.0%
Bulk Solid	2,054	3,500	1.8%
Break Bulk	96	100	0.1%
Total tonnes	**28,879**	**77,157**	**3.3%**
Ro-Ro ('000 units)	701	2,249	4.0%
Lo-Lo ('000 units)	377	926	3.0%
Totals	**1,078**	**3,174**	**3.7%**
Lo-Lo ('000 TEU)	641	1,574	3.0%

Table 2-3 shows the ultimate capacities in **Area C** and **Area D** envisaged in Masterplan 2040 and the contribution which reaching these ultimate capacities will make to catering for the volume projected by 2040.

[9] The figures for '000 gross tonnes are five year rolling averages. Gross tonnes includes the weight of goods, their immediate packaging and (for the unitised modes) the tare weight of containers and freight trailers. Gross weight is derived from ships manifests and differs from the weight of goods shown by the CSO in its statistics. CSO tonnages for the unitised modes do not include the tare weights of containers and freight trailers.

Table 2-3 Impact of expanding the capacity of Area C and Area D

	Area C	Area D	Comment
Use	Ro-Ro units	Lo-Lo TEU	
Area	38.8	18.5	Hectares
Franchise Policy[10] target	30,000 units	40,000 TEU	Per hectare per annum
Capacity	1,164,000 units	740,000 TEU	Per annum
Masterplan projections 2040	2,249,000 units	1,574,000 TEU	
% of capacity required by 2040	52%	47%	

Table 2-3 highlights the importance of the developing **Area C** and **Area D** for Ro-Ro and Lo-Lo respectively. **Area C** is targeted to provide 52% of all capacity required for Ro-Ro in 2040 and **Area D** is targeted to provide 47% of all Lo-Lo capacity in Dublin Port.

The total envisaged increase in Dublin Port's capacity over the 30 years to 2040 is 48.3m gross tonnes (being the increase from a throughput of 28.9m gross tonnes in 2010 to 77.2m by 2040 shown in Table 2-2).

Already, 9.1% of this increased throughput has occurred (as volumes grew from 28.9m gross tonnes in 2010 to 38.0m in 2018). The MP2 Project will provide capacity for a further **30.2%** of the projected volume growth over the 30 years to 2040 as shown in Table 2-4.

Table 2-4 Contribution of the MP2 Project to increasing Dublin Port's throughput

	Units / TEU	Gross tonnes
Area C increased Ro-Ro capacity above 2018 throughput	439,000 units	10.6m
Area D increased Lo-Lo capacity above 2018 throughput	409,000 TEU	4.0m
MP2 Project increased tonnes		**14.6m**
Masterplan increased tonnes		48.3m
MP2 Project increased capacity as %		30.2%

[10] Following the adoption of Masterplan 2012-2040 in February 2012, DPC completed a land use review which culminated in the publication of Dublin Port's Franchise Policy in May 2014 (https://www.dublinport.ie/wp-content/uploads/2017/03/Dublin-Port-Co.-Franchise-Policy-2014.pdf. This policy specifies a target of not less than 40,000 units per hectare per annum for Accompanied Ro-Ro and 20,000 units per hectare per annum for Unaccompanied Ro-Ro. The actual proportions of Accompanied and Unaccompanied units in the future will be a function of supply / demand dynamics. In this table, an average of 30,000 units per hectare per annum is used for illustrative purposes.

2.2.6 Berth capacity, land capacity and projected utilisation levels

By 2040, there will be considerably increased levels of activity and throughput for both Ro-Ro and Lo-Lo.

Table 2-5 shows indicatively how shipping activity and throughput will increase in **Area C** by 2040.

Table 2-5 Indicative increase in Ro-Ro throughput in Area C from 2018 to 2040

	2018	2040	% increase
Volume (units)	725,000	1,164,000	61%
Average units per day	1,986	3,189	61%
Average sailings per day	13	18	38%
Average units per sailing	153	177	16%

The growth in the volume of Ro-Ro freight to 2040 will come on routes to the UK (Holyhead, Liverpool and Heysham) and also on routes to Continental Europe (to ports such as Cherbourg, Zeebrugge and Rotterdam).

Berths dedicated to services to Holyhead can achieve high throughput levels (in the order of 350,000 units per annum) due to the reliability of shipping schedules on the short Dublin to Holyhead route and due to fast cargo handling operations because much of the Ro-Ro freight is accompanied.

Berths used for services to Liverpool, Heysham or ports in Continental Europe have lower potential throughput levels (up to 240,000 units per annum) due to the lower schedule reliability of longer sea routes and due also to the longer time needed for cargo handling operations as a result of a preponderance of unaccompanied Ro-Ro freight units.

In addition to providing capacity for freight and combined freight / passenger ferries, the five berths in **Area C** will also provide capacity for seasonal fast craft services (such as Irish Ferries' *Dublin Swift* service to Holyhead and the Isle of Man Steam Packet Company's service to Douglas).

Taking these uses together, Table 2-6 shows the indicative Ro-Ro freight berth capacity in 2040 for the five berths in **Area C**.

Table 2-6 Indicative berth throughout capacities in Area C

	Units p.a.	Indicative use
Berth 51	240,000	Freight services to Liverpool
Berth 51A	100,000	Fast craft passenger services and occasional use for freight services
Berth 49	350,000	Combined freight / passenger ferry services to Holyhead
Berth 52	350,000	Combined freight / passenger ferry services to Holyhead
Berth 53	240,000	Combined freight / passenger ferry services to Continental Europe
Totals	1,280,000	

The berth capacity of 1,280,000 units per annum shown in Table 2-6 compares to the land capacity of 1,164,000 units per annum for **Area C** shown in Table 2-3.

A margin of surplus berth capacity over land capacity is essential to provide contingency capacity for berth downtime for a range of reasons including: planned maintenance; equipment failure; impact of adverse weather on ship schedules.

The layout of the land area of **Area C** will be capable of being adapted to the requirements of the trade. In general, the higher the proportion of accompanied Ro-Ro units, the greater will be the throughput capacity of **Area C**.

Should there be a higher proportion of unaccompanied Ro-Ro in 2040 than is envisaged in Table 2-3, then it will be necessary for DPC to implement measures to increase the utilisation of the capacity of **Area C**, such as:

- Moving trailer units to back areas within Dublin Port (notably Area E in Figure 2-1)
- Implementing pricing initiatives which financially penalise trailers with long dwell times

The Lo-Lo developments in **Area D** entail the immediate loss of OB4 and the planned cessation of petroleum imports through OB3 at some point in the future as petroleum imports decline.

Table 2-7 shows the average throughputs and capacity utilisations of the Port's four oil berths over the five years to 2018.

Table 2-7 Oil berths' throughput and capacity utilisation, five year averages from 2014 - 2018

	Tonnes	Share	Utilisation
Oil Berth 1	1,732,287	43.3%	48.7%
Oil Berth 2	2,109,846	52.7%	57.8%
Oil Berth 3	147,395	3.7%	11.3%
Oil Berth 4	15,222	0.4%	1.1%
Totals	**4,004,751**	**100.0%**	

The proposed loss of OB4 is of no consequence to the Port's overall throughput capacity.

Although both the throughput and utilisation of OB3 are also low, it provides essential back-up capacity in the event of an outage on OB1 or OB2. This is important given that petroleum imports through Dublin Port account for over 55% of national consumption.

Finally, the Eastern Oil Jetty which contains OB3 and OB4 is now almost 60 years old and the requirement for major capital refurbishment works is foreseeable within the lifetime of the Masterplan. It is timely now to plan to complete this refurbishment and, in doing this, to future proof OB3 for use for alternative purposes.

The developments in **Area D** significantly increase both the berthage and the land area of the DFT Container Terminal and Table 2-8 shows indicatively how shipping activity and throughput will increase to 2040.

Table 2-8 Indicative increase in Lo-Lo throughput and utilisation levels in Area D from 2018 to 2040

	2018	2040	% increase
Berthage	560 metres	927 metres	65%
Berth usage (TEU per metre p.a.)	590	798	35.0%
Land area[11]	12.7 hectares	18.5 hectares	46%
Land usage (TEU per hectare p.a.)	26,027	40,000	54%
Capacity (TEU p.a.)	508,000	740,000	147%
Capacity utilisation	65%	100%	
Average TEU per week	6,357	14,231	124%
Ships per week	8.3	11.0	33%
Average TEU per ship	766	1,294	69%

The levels of activity and throughput in **Area C** and in **Area D** which the MP2 Project will facilitate are high by current standards and high by the standards of other comparable northwest European ports.

The achievement of high land utilisation levels requires pricing mechanisms to decrease the dwell time of containers and unaccompanied trailer units as envisaged in DPC's Franchise Policy, 2014. Decreasing dwell times increases capacity. DPC announced Phase 1 of the Dublin Port Dwell Time Initiative on 10th April 2019[12] and further phases will follow in coming years.

2.2.7 MP2 Project and ferry passenger traffic

In addition to being the country's largest port for cargo, Dublin is also the largest port for passengers, both on ferries and cruise ships. Table 2-9 below shows that two million passengers passed through Dublin Port in 2018, the vast majority (90.3%) on ferry services to Holyhead, Liverpool and Cherbourg.

Table 2-9 Dublin Port passenger numbers, 2018

Ferries	1,827,674	90.3%
Cruise	196,899	9.7%
Total	**2,024,573**	**100.0%**

The significance of Dublin Port's ferry passenger business is emphasised in Table 2-10 which shows the ferry passenger numbers through Irish ports and also the passenger numbers through Irish airports in 2017.

[11] The increased land area in 2040 comes both from the MP2 Project (3.0 hectares) and from the inclusion of Area D2 (2.8 hectares). This latter area has already been developed for container operations but is not yet in use as part of the DFT Container Terminal. Figure 2-1 shows the DFT Container Terminal in 2040 with a total land area of 18.5 hectares comprising two areas designated as Area D1 (15.7 hectares) and Area D2 (2.8 hectares).

[12] https://www.dublinport.ie/dublin-port-announces-new-dwell-time-initiative-increase-port-capacity-post-brexit/

Dublin Port handles more passengers on ferries than the airports of Shannon, Knock and Kerry.

Table 2-10 Comparison of port ferry passenger and airport passenger numbers 2017

Ports			Airports	
Dublin	1,843,000		Dublin	29,454,474
Rosslare	844,000		Cork	2,301,450
Cork	83,000		Shannon	1,599,390
			Knock	748,505
			Kerry	335,480
Total	**2,770,000**		**Total**	**34,439,299**
Source: CSO				

Notwithstanding the impact of low cost aviation, ferry passenger numbers are on an upward trend as shown in Figure 2-3 below and the planned introduction by major ferry operators (Irish Ferries and Stena Line) of large new ships in the next two years will support a continuing increase in ferry passenger numbers not only on routes to Holyhead but also increasingly to France.

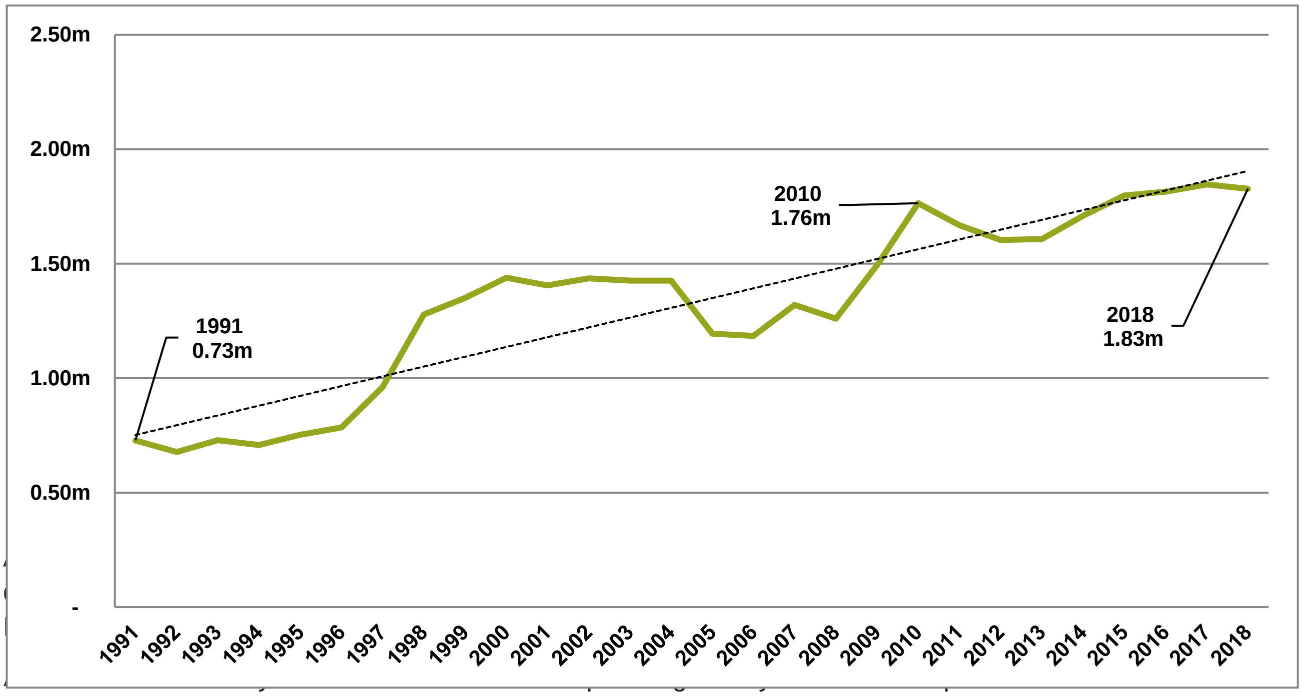


Figure 2-3 Trend in Dublin Port ferry passenger numbers, 1991 to 2018

Although the main focus of the developments proposed in the MP2 Project is on cargo, the overall development of **Area C** (both as a result of the works proposed within the MP2 Project and as a result of other Masterplan projects) will provide capacity of the continued growth of Dublin Port's ferry passenger business.

Area C will be the only area in Dublin Port where passenger ferry services will operate.

2.2.8 MP2 Project in the context of National Port Policy and the EU TEN-T network

The MP2 Project is derived from Dublin Port's Masterplan 2040.

This Masterplan is, in turn, supported by National Ports Policy[13] in the following terms:

Dublin Port Company is the State's largest port company. It handles approx. 43% of all seaborne trade in the State. The port's importance is even more pronounced in the higher-value unitised (Lo-Lo and Ro-Ro) sectors, where it handles approx. 70% of all Lo-Lo and 85% of all Ro-Ro trade in the State (IMDO, 2012).

In February 2012, Dublin Port published its Masterplan, which sets out a vision of development over the next 30 years. The plan represents a comprehensive framework for the long-term development of the port and is underpinned by three core principles:

- Maximisation of usage of existing port lands.
- Reintegration of the port with the city.
- Development of the port to the highest environmental standards.

It is recognised that the location of Dublin Port Company inevitably gives the port competitive advantage over other ports and will give rise to competition concerns. However, a continuation and strengthening of the landlord model of operation in the port's estate will allow for continued intra-port competition between the privately operated port terminals within the port estate.

The Government endorses the core principles underpinning the company's Masterplan, and the continued commercial development of Dublin Port Company is a key strategic objective of National Ports Policy.

National Ports Policy categorises Dublin Port as a Port of National Significance or a Tier 1 port. The other Tier 1 ports are Cork and Shannon Foynes. Tier 1 ports are defined by reference to their:

- Accounting for at least 15% to 20% of national port tonnage.
- Having the potential to lead the development of future port capacity in the medium and long term as and when required.

Beyond this, National Ports Policy clearly states that additional nationally important port capacity to be provided to service the Greater Dublin Area should be provided at Dublin Port[14]:

In relation to the TEN-T core network, it is proposed that the Greater Dublin Area (GDA) Ports Cluster be included as a core port. This port cluster concept encompasses the existing ports within the GDA, and any future port facilities that might be developed up to 2050. This is consistent with the current Regional Planning

[13] National Ports Policy 2013, http://www.dttas.ie/sites/default/files/node/add/content publication/National%20Ports%20Policy%202013.PDF, page 25

[14] National Ports Policy 2013, page 25

Guidelines for the GDA 2010–2022, which support examination of the expansion of Dublin Port and/or a new port facility on the east coast of the GDA.

However, National Ports Policy categorises only Dublin Port Company as a Port of National Significance (Tier 1) within the Greater Dublin Area.

Since National Ports Policy was published, Dublin Port's Masterplan 2040 has been reviewed (in 2018), the National Planning Framework has been published and the Eastern & Midland Assembly Draft Regional Spatial & Economic Strategy (RSES) has been published[15].

The RSES states:

Dublin Port is the largest port in the country handling almost 50% of all trade in Ireland and growth of 25% over the last four years. In 2017 there was a record throughput of 36.4 million gross tonnes, a 4% increase on 2016. Dublin Port is one of five major ports classified as Tier 1 / Tier 2 ports in National Port Policy and categorised as core / comprehensive ports in the EU's TEN-T network. Dublin Port is recognised in this draft RSES as a critical national facility a key economic driver for the Region and the nation and an integral part of Dublin City, in line with the Dublin Port Masterplan 2040 (reviewed 2018).

In addition, the RSES sets a specific Regional Policy Objective for Dublin Port in the following terms:
EMRA will support the role of Dublin Port as a Port of National Significance (Tier 1 Port) and its continued commercial development, including limited expansion and improved road access, including the Southern Port Access Route. [RPO 8.19]

The extent of Dublin Port's acknowledged importance in Ireland's port system for Ro-Ro and Lo-Lo is shown in Table 2-11 below which compares throughput in Dublin with that in the only other Tier 1 port which handles unitised freight (Cork) and in the country's two Tier 2 ports (Rosslare and Waterford)[16].

Table 2-11 Ro-Ro and Lo-Lo volumes in Irish ports, 2018, and average annual

Ro-Ro Units	2018	% share	AAGR (5)
Dublin	1,031,897	88.7%	6.3%
Rosslare	128,414	11.0%	1.5%
Cork	3,561	0.3%	30.1%
Total	**1,163,872**	**100.0%**	**5.7%**
Lo-Lo TEU	**2018**	**% share**	**AAGR (5)**
Dublin	726,212	72.6%	7.0%
Cork	229,761	23.0%	6.2%
Waterford	43,943	4.4%	2.0%
Total	**999,916**	**100.0%**	6.6%

15 https://emra.ie/dubh/wp-content/uploads/2018/11/EMRA-DRAFT-RSES.pdf

16 Tier 2 ports are ports responsible for at least 2.5% of national tonnage and, in the words of National Ports Policy, have clear demonstrable potential to handle higher volumes of unitised trade

Only two ports in Ireland handle significant volumes of Ro-Ro freight (Dublin and Rosslare). Dublin Port is significantly larger than Rosslare (by a factor of eight) and has a higher rate of growth over the past five years (6.3% versus 1.5%).

In the case of Lo-Lo, Dublin is more than three times larger than the next biggest port (Cork) and has the highest growth rate over the past five years of the three Irish ports that have container terminals.

Figure 2-4 below shows the development of Dublin Port's share of national Ro-Ro and Lo-Lo volumes over the period 1995 to 2018. Annual statistics of Ro-Ro and Lo-Lo throughput for the major Irish ports are shown in Table 2-12.

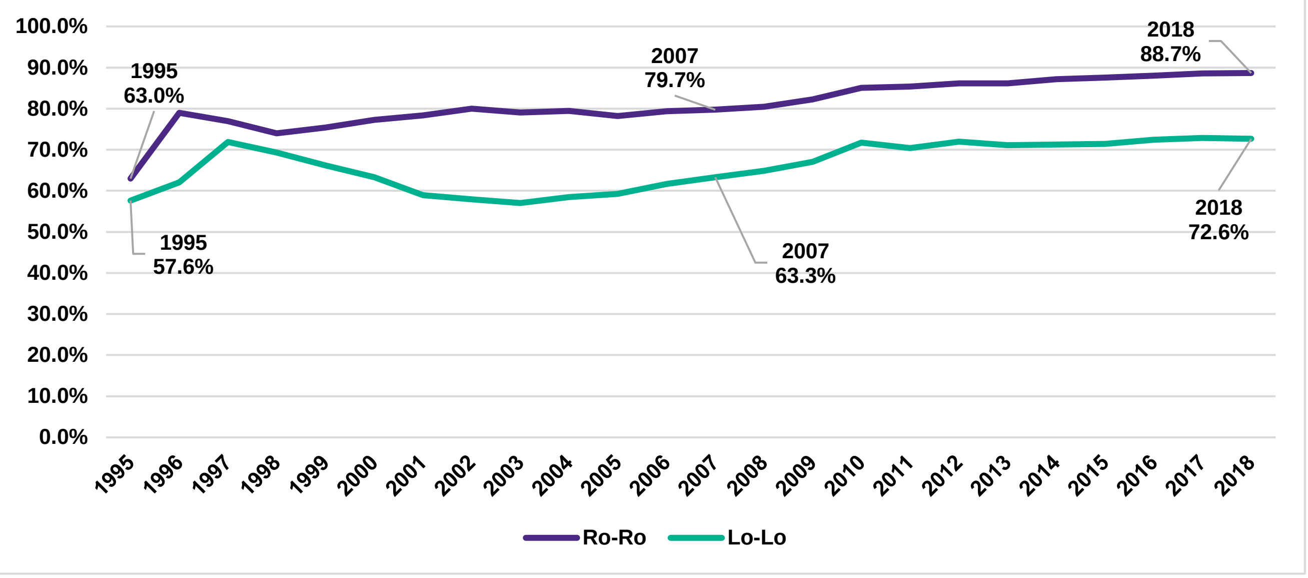


Figure 2-4 Dublin Port share of unitised volumes, 1995 to 2018

Table 2-12 Ro-Ro and Lo-Lo volumes in Ireland's Tier 1 and Tier 2 ports, 1995 to 2018 (Source: IMDO)

	Ro-Ro (units)				Lo-Lo (TEU)			
	Dublin	Rosslare	Cork	Dublin %	Dublin	Waterford	Cork	Dublin %
1995	205,311	73,589	6,412	63.0%	290,564	149,779	59,091	57.6%
1996	340,983	70,147	6,104	78.9%	327,884	131,020	64,930	62.1%
1997	378,101	74,916	5,581	77.0%	381,334	61,345	84,183	71.9%
1998	398,636	92,125	6,207	74.0%	422,927	85,967	97,835	69.3%
1999	451,161	100,629	5,994	75.4%	440,892	105,896	115,495	66.2%
2000	489,669	100,950	3,940	77.3%	449,406	131,518	120,740	63.3%
2001	528,036	106,064	3,777	78.4%	435,451	140,579	117,703	58.9%
2002	554,496	104,718	3,712	80.0%	456,027	147,166	121,279	57.9%
2003	570,789	112,010	4,529	79.0%	495,862	175,049	137,246	57.0%
2004	608,088	121,493	5,895	79.5%	540,779	180,216	155,081	58.5%
2005	629,747	137,182	7,707	78.2%	590,367	181,309	167,300	59.2%
2006	692,992	156,515	4,558	79.4%	680,681	184,857	185,002	61.7%
2007	733,141	165,769	3,748	79.7%	743,937	186,057	199,891	63.3%
2008	704,209	156,488	1,001	80.4%	676,870	173,103	186,656	64.9%
2009	644,696	133,519	1,188	82.3%	548,123	119,220	148,623	67.1%
2010	725,297	122,326	3,820	85.1%	554,056	71,084	147,534	71.7%
2011	724,728	118,888	4,387	85.4%	525,016	63,823	156,669	70.4%
2012	719,121	113,781	828	86.2%	527,735	39,478	166,287	71.9%
2013	761,651	118,928	954	86.2%	517,086	39,835	170,410	71.1%
2014	821,876	119,641	793	87.2%	565,698	36,174	192,308	71.2%
2015	877,826	124,331	763	87.5%	614,226	40,224	205,828	71.4%
2016	944,531	128,350	522	88.0%	663,732	43,240	209,881	72.4%
2017	992,062	127,820	556	88.5%	698,419	42,408	217,764	72.9%
2018	1,031,897	128,414	3,561	88.7%	726,212	43,943	229,761	72.6%

Dublin Port and the other Tier 1 and Tier 2 ports are part of a national ports system which, in aggregate, provides virtually all of the country's port capacity. Dublin Port is a key part of the Irish port system made up of these major ports.

Dublin Port's large share of national volumes in the two unitised cargo modes arises as a result of its location (close to the centre of the largest population concentration in the country) and to the depth of water available.

The demand for port infrastructure is a derived demand and the high volumes through Dublin Port arise from the choices made by shipping lines. These choices do not arise from capacity constraints elsewhere in the Irish port system in either the Ro-Ro or Lo-Lo modes as explained below.

Table 2-13 below shows the volumes of Dublin Port's Ro-Ro and Lo-Lo volumes in 2017 and 2018 and the growth in volumes year on year.

Table 2-13 Growth in Dublin Port Ro-Ro and Lo-Lo, 2018

Dublin	***Ro-Ro units***	***Lo-Lo TEU***
2018	1,031,897	726,212
2017	992,062	698,348
Growth in one year	39,835	27,864

In Table 2-14, these year on year growths are compared to the spare capacity for Ro-Ro and Lo-Lo in Rosslare, Waterford and Cork[17].

Table 2-14 Comparison of Dublin Port's growth with spare capacity in other ports

Rosslare (Ro-Ro)		
Capacity	338,000	Units p.a.
2018 throughput	128,414	Units
Utilisation[18]	38%	
Spare capacity	210,000	Units p.a.
# years of Dublin Port's annual growth	**5**	

Waterford (Lo-Lo)		
Capacity[19]	200,000	TEU p.a.
2018 throughput	43,943	TEU
Utilisation	22%	
Spare capacity	156,000	TEU p.a.
# years of Dublin Port's annual growth	**6**	

[17] Ro-Ro capacity in Cork was not considered because the demand for Ro-Ro freight through the port is so small. In 2017 the total volume was 556 units and in 2018 increased to just 3,561 units.

[18] https://www.rte.ie/news/ireland/2019/0405/1040949-rosslare-brexit/

[19] DPC estimate based on Waterford's actual throughput of 186,507 TEU in 2007

Cork (Lo-Lo)		
Capacity[20]	240,000	TEU p.a.
2018 throughput	229,761	TEU
Utilisation	96%	
Spare capacity	10,000	TEU p.a.
# years of Dublin Port's annual growth	**0.3**	

In the case of Rosslare and Waterford, each port has spare capacity due to low demand and low utilisation of the existing capacity in each port. However, the capacity in each port is small by comparison to Dublin Port. In Rosslare, the spare capacity is equivalent to just five years of Dublin Port’s annual growth in Ro-Ro. For Waterford, it would take only six years of Dublin Port’s annual growth in Lo-Lo to fill up the terminal there.

Rosslare and Waterford have much lower growth rates than Dublin for Ro-Ro and Lo-Lo respectively. From 2013 to 2018, Rosslare’s annual average growth was 1.5% compared to Dublin Port’s 6.3%. Over the same years, Waterford grew by 2.0% on average compared to 7.0% in Dublin.

Both Rosslare and Waterford are characterised by small scale, low demand and underutilisation of existing capacity.

The situation for Lo-Lo in Cork is different. Port of Cork’s Tivoli Container Terminal is currently operating at high capacity and a new replacement terminal is under construction in Ringaskiddy in an €80m development project scheduled to be complete in 2020. However, the capacity of the terminal being built is not significantly greater then Port of Cork’s existing throughput of 229,761 TEU in 2018.

Taking Cork and Waterford together, their combined volumes have waxed and waned over time as shown in Figure 2-5. Their combined throughput in 2018 was only 70% of what it had been in 2007.

[20]Capacity shown is for the new Ringaskiddy Container Terminal: (https://www.ringaskiddyportredevelopment.ie/contentfiles/Ringaskiddy%20Port%20Redevelopment_2.pdf)

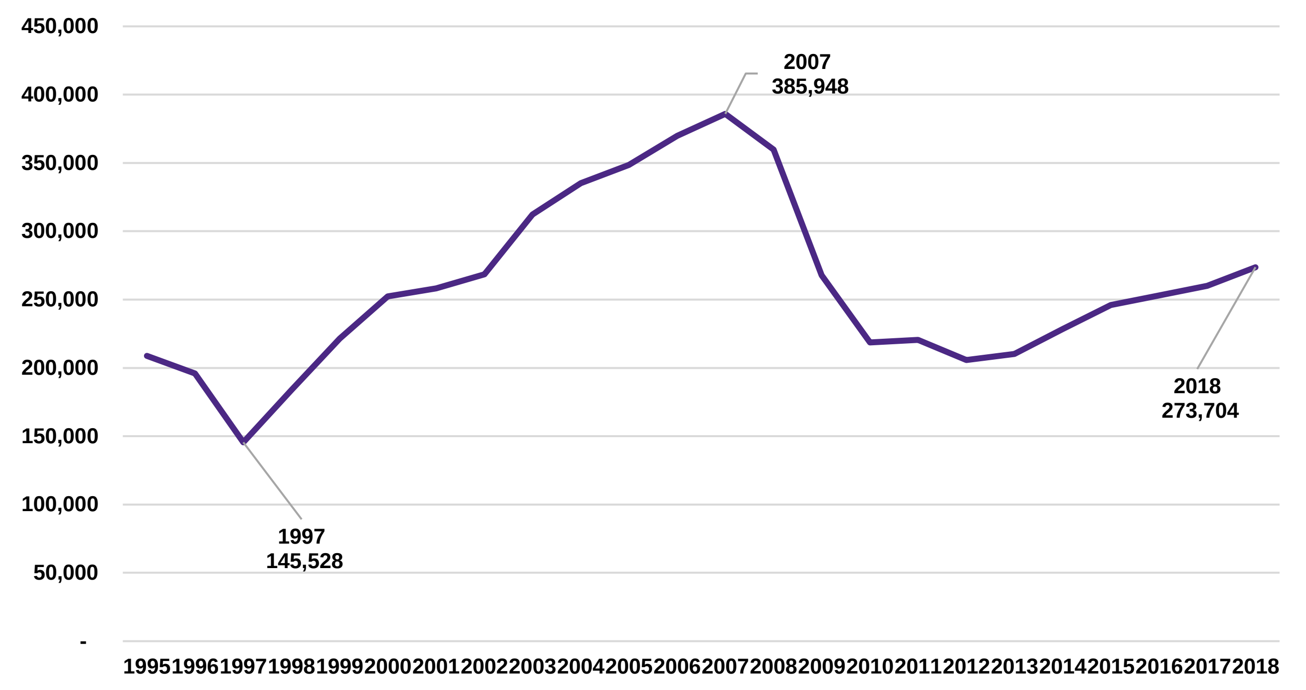


Figure 2-5 Combined Lo-Lo volumes in Cork and Waterford, 1995 to 2018 (TEU)

Within the Irish port system, the scale of throughputs and the rates of growth in Dublin Port are at different levels to those in other Tier 1 and Tier 2 ports that meet national requirements.

Dublin Port's shares of national Ro-Ro (88.7%) volumes and national Lo-Lo (72.6%) volumes mirror that of Dublin Airport's share of air passenger volumes (85.3%). Shipping lines choose to use Dublin Port because of its proximity to the ultimate destination for imported goods and to the origin of export goods. This proximity minimises road haulage which is beneficial both economically and environmentally.

DPC is seeking to increase port capacity by developing the MP2 Project to ensure that national capacity constraints do not emerge in the face of projected rising demand which could undermine Dublin Port's ability to contribute to achieving the objectives of National Port Policy. If capacity constraints are likely in Dublin Port, then they can only be met by creating new capacity in Dublin and not in some distant port elsewhere in Ireland.

At the EU level, Dublin Port is a *core port* and is located on one of the TEN-T networks nine corridors, the North Sea Mediterranean Corridor[21].

National Port Policy is fully aligned with EU transport policy and infrastructure developments in Dublin Port are already supported by the EU through EIB banking facilities[22] and CEF funding under TEN-T policy[23].

21 https://ec.europa.eu/transport/themes/infrastructure_en

22 https://www.eib.org/en/projects/pipelines/all/20140463

23 https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-ie-tm-0222-w

2.2.9 MP2 Project and land utilisation in Dublin Port

The increased levels of Ro-Ro throughput in **Area C** (Table 2-5) and of Lo-Lo throughput in **Area D** (Table 2-8) will result in Dublin Port's throughput per unit of land area increasing towards the Masterplan target of 283,000 tonnes per hectare per annum by 2040.

The fundamental approach of the Masterplan to providing capacity in Dublin Port for the 77.2m gross tonnes projected by 2040 is to favour the efficient and effective use of previously developed (brownfield) land over the use of greenfield land (whether in Dublin Bay or at another east coast location). Based on this approach, DPC has ruled out any increase in the land area of Dublin Port by further infill into Dublin Bay.

Not only is this the most sustainable approach, it is the only approach as shown in Table 2-15 and as explained below.

Table 2-15 Capacity for expansion and land utilisation levels in Dublin, Barcelona and Rotterdam

	Volume growth			**Capacity to expand**		**Land use**	
	2013	***2018***	***Increase***	***Area available for expansion***	***Hectares per million tonnes***	***Hectares***	***Tonnes per hectare per annum***
Barcelona	41.4m	65.9m	59.2%	250 ha	3.8	1,065	61,878
Rotterdam	440.5m	469.0m	6.5%	600 ha	1.3	5,299	88,507
Dublin	28.8m	38.0m	31.9%	-	-	260	146,154

In major European ports such as Barcelona and Rotterdam, large expansion projects have been completed which provide options for future increases to these ports' capacities. These projects have involved the development of large breakwaters to facilitate progressive infill to create additional land area and allow new berths to be constructed.

Dublin Port has no such option and Masterplan 2040 explicitly ruled out such an approach in Dublin because of the potential environmental impact on nearby Natura sites.

Whereas Barcelona has the capacity to expand by 3.8 hectares for every million tonnes of its throughput in 2018, Dublin Port has zero. The equivalent figure in Rotterdam is 1.3 hectares per million tonnes of annual throughput in 2018.

Even today, Dublin Port has a significantly higher land utilisation than either Barcelona or Rotterdam.

As shown in Table 2-15, Barcelona had a throughput of 62,000 tonnes per hectare per annum in 2018 and Rotterdam had 89,000,

By comparison, Dublin Port is already achieving 146,000 tonnes per hectare per annum.

The Masterplan target is to increase still further to 283,000 tonnes per hectare per annum by 2040.

Construction of the MP2 Project is an essential step in achieving this ambitious land utilisation target.

In addition to construction works, DPC is increasingly using pricing measures to encourage operators to make more efficient use of port lands. This approach was signposted in DPC's Franchise Policy in 2014 and the most recent initiative was taken by DPC in April 2019[24].

DPC's strategy of providing more capacity on the same land area while simultaneously increasing utilisation of that capacity is driven by the company's commitment to the principles of proper planning and sustainable development.

2.2.10 Future growth of Ro-Ro and Lo-Lo in Dublin Port

The need for the developments envisaged in the Masterplan and, in particular, the need now for the MP2 Project arises from the level of future growth which DPC is projecting. The basis of these projections is discussed below by reference to trends over the long, medium and short terms.

Long-term growth trends (1950 to 2040)

The key driver of growth in Dublin Port is population increase. The *National Planning Framework* envisages the country's population growing by 20% from 2016 to 2040. This is equivalent to a population increase of just over one million with 49% of this increase occurring in the Eastern & Midland region, the natural hinterland of Dublin Port.

Table 2-16 below shows the historic and projected levels of national population and of Dublin Port cargo throughput from 1950 to 2040. The population projection for 2040 is the planning assumption used in the *National Planning Framework*. The volume projection for 2040 is from Dublin Port's Masterplan 2040.

Table 2-16 National population and Dublin Port volumes 1950 to 2040

	Population	Gross tonnes	AAGR
1950	3.0m	2.9m	
1980	3.4m	7.3m	3.2%
2010	4.6m	28.9m	4.7%
2040	5.6m	77.2m	3.3%

DPC looks at growth trends over long periods (30 years). The current planning projection of an average annual growth rate (AAGR) of 3.3% over the 30 years to 2040 is unremarkable by comparison with historic trends as

Table 2-16 shows.

Figure 2-6 shows the 30 year average annual growth rate from 1980 to 2018[25]. This indicates that the AAGR grew during the boom years to reach a high of 4.9% in 2008. It then fell to 4.5% in 2012 before beginning to grow again, reaching 5.5% in 2018.

[24] https://www.dublinport.ie/dublin-port-announces-new-dwell-time-initiative-increase-port-capacity-post-brexit/

[25] By way of explanation, the growth rate shown in 1980 is the average annual growth rate over the 30 years from 1950 to 1980. Likewise, the rate for 2018 of 5.5% is the average annual growth rate over the 30 years from 1988 to 2018.

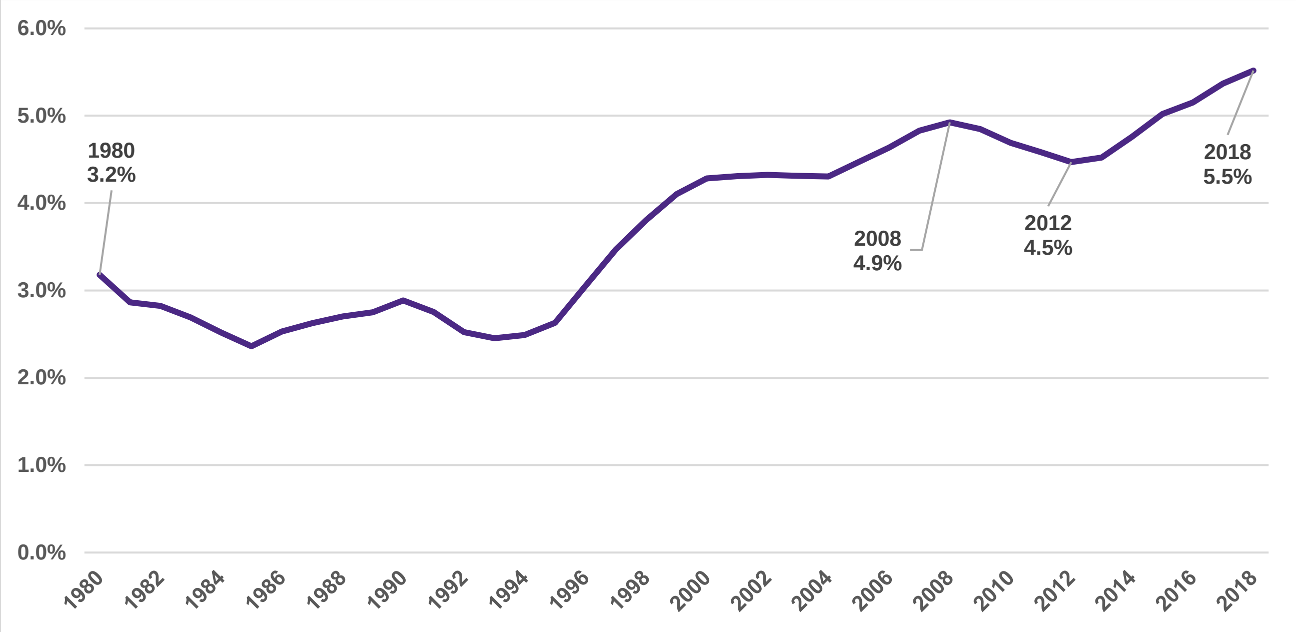


Figure 2-6 30 year Average Annual Growth Rates, 1980 to 2018

The trend shown in Table 2-4 suggests that the Masterplan's long-term planning growth rate assumption of 3.3% is more likely to be an underestimate than it is to be an over-estimate.

Medium-term trends (1995 to 2018)

The unitised modes (Ro-Ro and Lo-Lo) account for 82% of Dublin Port's throughput and 97% of the growth projected over the period to 2040 is in these modes. It is this growth that generates the requirements for the works now proposed in the MP2 Project.

The rapid increase in Dublin Port's unitised volumes began in the mid-1990s as result of major restructuring initiatives and reforms in Dublin Port in 1992. These changes led to an unprecedented period of growth with every year from 1993 to 2007 a record year for overall throughput.

This growth was driven by the unitised modes and Ro-Ro volumes in Dublin Port are now (2018) five times higher than they were in 1995. Lo-Lo volumes are two and a half times higher, as shown in Figure 2-7.

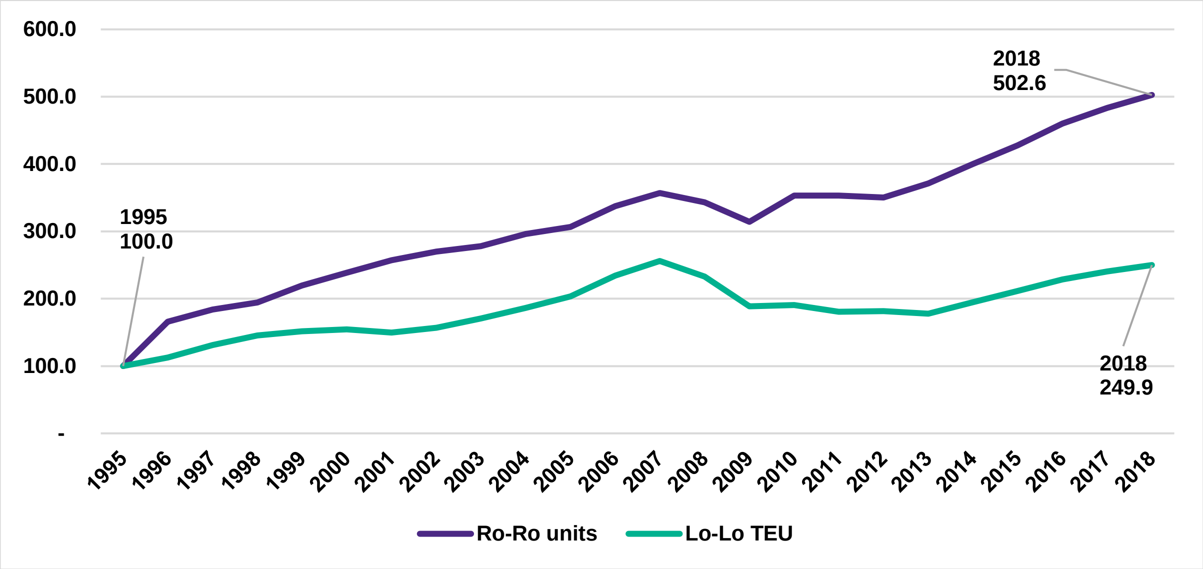


Figure 2-7 Trends in Dublin Port Ro-Ro and Lo-Lo, 1995 to 2018 (1995 = 100)

Short-term growth trends (2013 to 2018)

Looking at more recent trends, Dublin Port's volumes have recovered strongly since the recession in 2008 and are now 23% higher than they were in 2007 (38.0m gross tonnes in 2018 compared to 30.9m in 2007). The growth trends seen from 1995 to 2007 have re-emerged as shown in Table 2-17.

Table 2-17 Year on year growth rates of Ro-Ro and Lo-Lo in Dublin Port, 2013 to 2018

	Ro-Ro	Lo-Lo
2013	5.9%	-2.0%
2014	7.9%	9.4%
2015	6.8%	8.6%
2016	7.6%	8.1%
2017	5.0%	5.2%
2018	4.0%	4.0%

DPC believes that future growth will slow down by comparison to recent trends as shown in Table 2-18. These year-on-year growth rates combined with the actual growth from 2010 to 2016 suggest the 30 year growth rate to 2040 of 3.3%.

Table 2-18 Annual growth rates assumed 2017 to 2040

	Year on year growth rate
2017 to 2019	5.0%
2020 to 2029	4.0%
2030 to 2040	3.0%

Masterplan 2040 projections for Ro-Ro and Lo-Lo

Table 2-19 below shows the projected volumes and growth rates for Ro-Ro and Lo-Lo in Masterplan 2040.

Table 2-19 Masterplan projections for Ro-Ro and Lo-Lo, 2010 to 2040

Dublin	2010	2040	AAGR (30)
Ro-Ro Units	701,000	2,249,000	4.0%
Lo-Lo TEU	641,000	1,574,000	3.0%

These projected levels of growth are consistent with historical trends over the long, medium and short terms. Importantly, they are also consistent with the *National Planning Framework's* Policy Objective 1b which foresees a growth in population of between 490,000 and 540,000 in the Eastern & Midland Region bringing the population in Dublin Port's natural hinterland to 2.85 million.

The MP2 Project is one of a series of Masterplan projects required to provide capacity for this growth and will, of itself, provide capacity for **30.2%** of the projected volume growth over the 30 years from 2018 to 2040 (as shown previously in Table 2-4).

2.2.11 Growth in ship sizes

The future growth in Ro-Ro and Lo-Lo will be accompanied by increases in ship sizes and the MP2 Project will provide longer and deeper berths both for Ro-Ro ferries and for Lo-Lo container ships.

The MP2 Project is being proposed against a background where work is progressing within the ABR Project to deepen Dublin Port to -10.0m CD.

Moreover, Masterplan 2040 has confirmed that this will be the final deepening of Dublin Port.

These factors provide a clear context in which to relate the developments proposed in the MP2 Project to future ship sizes.

Looking firstly at the depth constraints in Dublin Port within which the MP2 Project is being proposed, Table 2-20 shows maximum ship draughts which Dublin Port will be capable of handling.

Table 2-20 Draught handling capabilities at -10.0m CD

		Mean high water	Channel depth	Max draught		Mean low water	Channel depth	Max draught
Spring tides		4.1m	14.1m	13.1m		0.7m	10.7m	**9.7m**
Neap tides		3.4m	13.4m	**12.4m**		1.5m	11.4m	10.4m
Note: max draughts assume an under keel clearance of 1.0m								

In order to be able to maintain set schedules, **Ro-Ro** ferries need to be able to access Dublin Port at all stages of the tide. Table 2-20 above indicates that ferries with draughts up to about 9.7 metres will be able to access the port. This is sufficient for any conceivable size of Ro-Ro ferry that might be deployed by operators in the future.

Within the MP2 Project, therefore, the proposed draught at Berth 52 and at Berth 53 is -10.0m CD. This is also sufficient for any conceivable size of Ro-Ro ferry.

Table 2-21 below shows the dimensions of selected Ro-Ro ferries including both ferries in service in Dublin Port or planned to be introduced together with ferries in service elsewhere or under construction.

Table 2-21 Sample Ro-Ro ferries

Ship	Operator	LOA	Draught	Comment
Ulysses	Irish Ferries	209m	6.4m	In service in Dublin Port since 2001
W.B. Yeats	Irish Ferries	195m	6.7m	In service in Dublin Port since January 2019
Hull 777	Irish Ferries	226m	6.7m	Commences in Dublin Port in 2020
Stena Hollandica	Stena Line	240m	6.5m	In service on Harwich to Hook route
Stena E-flexer	Stena Line	215m	6.4m	Commences in Dublin Port in 2019
Stena E-flexer	Stena Line	240m	6.4m	Construction of two ships commenced in July 2018
Celine	CLdN	234m	8.1m	In service in Dublin Port since October 2017
Laureline	CLdN	216m	8.2m	In service in Dublin Port since March 2019

It is envisaged that both Irish Ferries and Stena Line will operate from the river berths (specifically Berth 49 and Berth 52). Each operator has ferries in operation or on order with lengths in excess of what can currently be accommodated.

Moreover, there are already large ferries (*Celine* with a length of 234m and *Laureline* at 216m) in operation elsewhere in Dublin Port.

There is, therefore, a clear requirement for the MP2 Project to provide three river berths capable of accommodating ships up to 240m in length.

In the case of **Lo-Lo** container ships, the maximum size which can currently be handled in Dublin is limited by a combination of constraints (including berth depths and channel depth) to give a practical maximum draught in the region of 9.0m. The maximum size of container ship which has called to the Port in recent years is in the order of 1,400 TEU.

The deepening of the Port to -10.0m CD as part of the ABR Project removes the channel constraint. The lengthening of Berth 50A and the redevelopment of OB3 would lessen the existing berth constraints and allow large container ships to operate at the DFT Container Terminal.

The planned capacities of these berths is shown in Table 2-22 below.

Table 2-22 Planned capacities of Berth 50A and OB3

Berth	Length	Depth
50A	306 metres	-11.0m CD
OB3	242 metres	-13.0m CD

These berth capacities would allow considerably larger container ships berth at DFT. The median ship capacity in 2018 at DFT was 864 TEU (nominal). Figure 2-8 shows the distribution of ship capacities for the 432 container ships handled at DFT in 2018.

Nominal TEU	# ships
340	1
508	41
509	1
515	1
750	4
801	1
803	155
822	7
864	6
868	53
900	1
974	161
Total	**432**

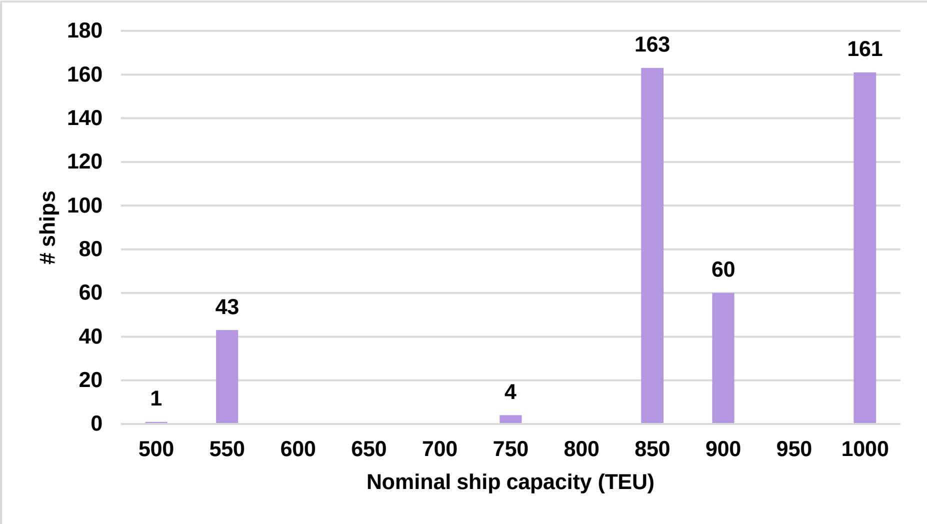


Figure 2-8 Distribution of container ship capacities at DFT (nominal TEU), 2018

Table 2-23 shows an analysis of the distribution of ship lengths and ship draughts for 2,726 ships in the 1,000 TEU to 3,500 TEU subset of the worldwide fleet of container ships.

Table 2-23 Distribution of container ship lengths and draughts in the range 1,000 TEU to 3,500 TEU[26]

Length	# ships
100m	11
150m	327
200m	1,620
250m	737
300m	31
	2,726

Draught	# ships	Cumulative %
8.0m	100	3.7%
9.0m	460	20.5%
10.0m	574	41.6%
11.0m	545	61.6%
12.0m	829	92.0%
12.4m	111	96.1%
13.0m	76	98.9%
14.0m	31	100.0%
	2,726	

Comparing the berth capacities in Table 2-22 with the distribution of ship lengths and draughts in Table 2-23 shows that the MP2 Project would enable a large proportion of the world fleet of container ships in the capacity range from 1,000 TEU to 3,500 TEU to be handled at the DFT Container Terminal.

[26] Based on data extracted from Sea-Web™ database (www.sea-web.com)

The ability to handle larger container ships at DFT is essential if the increased throughput projected at the terminal (740,000 TEU by 2040) is to be achieved.

2.2.12 Implementing the MP2 Project – the need for a 15 year planning permission

Given the Masterplan approach of redeveloping existing brownfield sites which are already in operation, constructing projects such as the MP2 Project is not straightforward. The areas in which construction work is proposed are in daily use and throughput volumes are growing.

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.

This same approach will be necessary with the MP2 Project and its construction will overlap with other projects which have already been consented including:

- ABR Project (PA0034)
- Dublin Port Roads Project (3084/16)
- Initial project at Dublin Inland Port (F18A/0139)

The experience of recent years suggests that there can be unforeseen circumstances which impact on the timing of planned project works in Dublin Port.

Looking to the future, an accelerated take-up of zero-emission cars could precipitate a faster decline in petroleum volumes than can be foreseen today. This, in conjunction with a high growth in Lo-Lo traffic (which is a possible consequence of Brexit), could necessitate bringing forward the works at OB3 and Berth 50A and perhaps pushing out works on Berth 53.

On the other hand, petroleum volumes might continue to grow as they have in recent years and persist at a high level for a long time. The throughput of petroleum products in Dublin Port in 2018 was 13% higher than prior to the recession (2007). More surprisingly, the volume in 2018 was 34% ahead of the low point reached in 2012 in the depths of the recession.

In such circumstances, it is very difficult to predict when individual works packages within the MP2 Project (such as the redevelopment of on OB3) should commence.

Because of such uncertainties, DPC requires a 15 year planning permission such that port capacity which is known to be required in the future can be delivered at the optimum time within that timeframe.

The vision of Masterplan 2040 shown in Figure 2-1 needs to be realised by about 2035 in order for there to be sufficient capacity in Dublin Port to handle a projected throughput of 77.2m gross tonnes by 2040.

DPC estimates that the total cost of implementing Masterplan 2040 will be in the order of €1.6 billion (2018 prices). In the nearer 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 addition to the MP2 Project, the Masterplan development programme includes works to complete the already consented ABR Project, other projects such as the Roads Project and, most recently, the requirement to construct border control inspection facilities for State agencies as a result of Brexit.

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.

Table 2-24 below shows the key milestone dates for the MP2 Project within DPC's overall Masterplan development programme.

Table 2-24 Milestone construction dates for the MP2 Project within DPC's long-term capital programme

Item	Works	Start	Finish	Duration
1	Berth 52	Q2 2022	Q4 2024	30 months
2	Berth 53	Q1 2025	Q4 2026	24 months
2a	B52/ B53 Landside works	Q2 2022	Q3 2028	76 months
3	Oil Berth 3 and infill of Oil Berth 4	Q3 2028	Q1 2031	32 months
4	Berth 50A	Q1 2031	Q2 2032	20 months

The particular complexities in implementing the MP2 Project include:

- The location of the proposed works on the river and the fairway.
- The continuing high level of growth in Ro-Ro and Lo-Lo volumes in the area of the works (**Area C** and **Area D** respectively).
- Uncertainty on the future level of petroleum imports and, because of this, on the optimum start date for the reconstruction of OB3.

In summary, the requested permission of 15 years is required for a number of reasons:

- The overriding imperative to ensure that Dublin Port continues to operate effectively during construction will require works to be staged in distinct phases.
- The works are to, a large extent, sequential and connected – one element cannot commence until an earlier related element is concluded.
- The works are all connected and need to be determined and assessed as a whole by An Bord Pleanála, rather than be subject to separate applications.
- Construction experience in Dublin Port in recent years shows that programme changes are both inevitable and difficult to predict. DPC's best estimate currently is that the MP2 Project works could be completed by 2032 but experience suggests that the actual construction period could be longer. DPC believes that it is

preferable to address this reality at the outset and conduct the assessment of the MP2 Project on this basis.

The framework of the 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 MP2 Project provide a robust basis for An Bord Pleanála to complete all relevant environmental assessments to facilitate a grant of 15 years duration.

The MP2 Project represents a significant part of the overall development of Dublin Port envisaged in Masterplan 2040. In the absence of a major future-proofed expansion project in Dublin Port (equivalent to Rotterdam's Maasvlakte 2 or the Port of Barcelona Expansion Project), a 15 year consent period would provide certainty that elements of the MP2 Project can be deferred, if required, as and when other Masterplan projects need to take priority because of market demand changes or other unforeseeable circumstances.

Having certainty on what can be constructed in Dublin Port over the next 15 years is a proxy for the certainty which ports such as Barcelona and Rotterdam have by virtue of the large greenfield port expansion projects they have completed including major infill works into the Mediterranean and North Sea respectively.

The environmental appraisals presented in this EIAR have taken into account the environmental implications of a 15-year permission and conclude that there is no environmental impediment to the granting of a 15-year permission. A summary is presented below:

- MP2 Project is the second Strategic Infrastructure Development (SID) project at Dublin Port from the Dublin Port Masterplan 2040, reviewed 2018. 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.
- In particular, the traffic and transportation appraisal considers a combination of port traffic growth and construction traffic volumes over a 15-year period. These combined traffic volumes have been used in the environmental appraisals for noise and air quality.
- The footprint of the MP2 Project lies entirely within the Dublin Port Estate together with localised widening of the navigation channel. There are no terrestrial habitats, flora & fauna of conservation value within the application boundary of the site. Prolonged construction activities over a 15-year period will therefore have no impact on terrestrial biodiversity, flora & fauna as no natural changes are expected within that period of time.
- The MP2 Project has been engineered to ensure that any potential impact on the surrounding Natura 2000 sites is at a *de minimis* level. The construction period of 15-years has been assessed in the biodiversity, flora & fauna appraisals.
- The location of the MP2 Project is remote from the nearest noise and air quality sensitive receptors due to the natural separation caused by the presence of the Tolka estuary and River Liffey. No prolonged nuisance to the local communities is therefore expected as a result of a 15-year construction period.

- The landscaping and planting associated with Greenway Project, which will be in place prior to the construction phase of the MP2 Project, will be maturing as the MP2 Project construction works advance over 15-years, thereby providing an enhanced visual buffer to the construction works over time.

2.2.13 Concluding remarks

The MP2 Project is the second major strategic infrastructure project to emerge from Dublin Port's Masterplan 2040. Completion of all of the developments needed to realise the vision of the Masterplan will likely involve one subsequent and final major strategic infrastructure project.

Between 2010 and 2018, 9.1% of the growth projected in Masterplan 2040 has occurred. The MP2 Project will provide capacity for a further **30.2%** of the volume projected in 2040.

The MP2 Project will bring development at the eastern end of Dublin Port on the north side of the Liffey to its ultimate limit and will provide much needed capacity for both Ro-Ro and Lo-Lo cargo. The Masterplan, as a whole, will bring Dublin Port to its ultimate capacity by 2040 and the MP2 Project is an essential step on this path.

The MP2 Project redevelops assets currently used for the importation of petroleum products and future-proofs these assets for alternative uses as and when national and EU policies result in a transition away from fuels such as petrol and diesel.

Finally, given the large rate of growth of cargo volumes in Dublin Port and the absence of either demand or significant capacity elsewhere in the Irish port's system, the MP2 Project is designed to provide essential nationally important port capacity in line with both Government policy (notably National Ports Policy and the National Planning Framework) and with EU transport policy (TEN-T).

2.3 Spatial Planning Policy

2.3.1 Introduction

This section of the EIAR considers EU, national, regional and local land use and transport planning and development policy guiding and regulating the development of Dublin Port. Figure 2-9 illustrates an overview of the Irish Planning System and the importance of policy in the assessment of planning applications. The relevant planning policies are set out for each level within the hierarchy in the sections that follow.

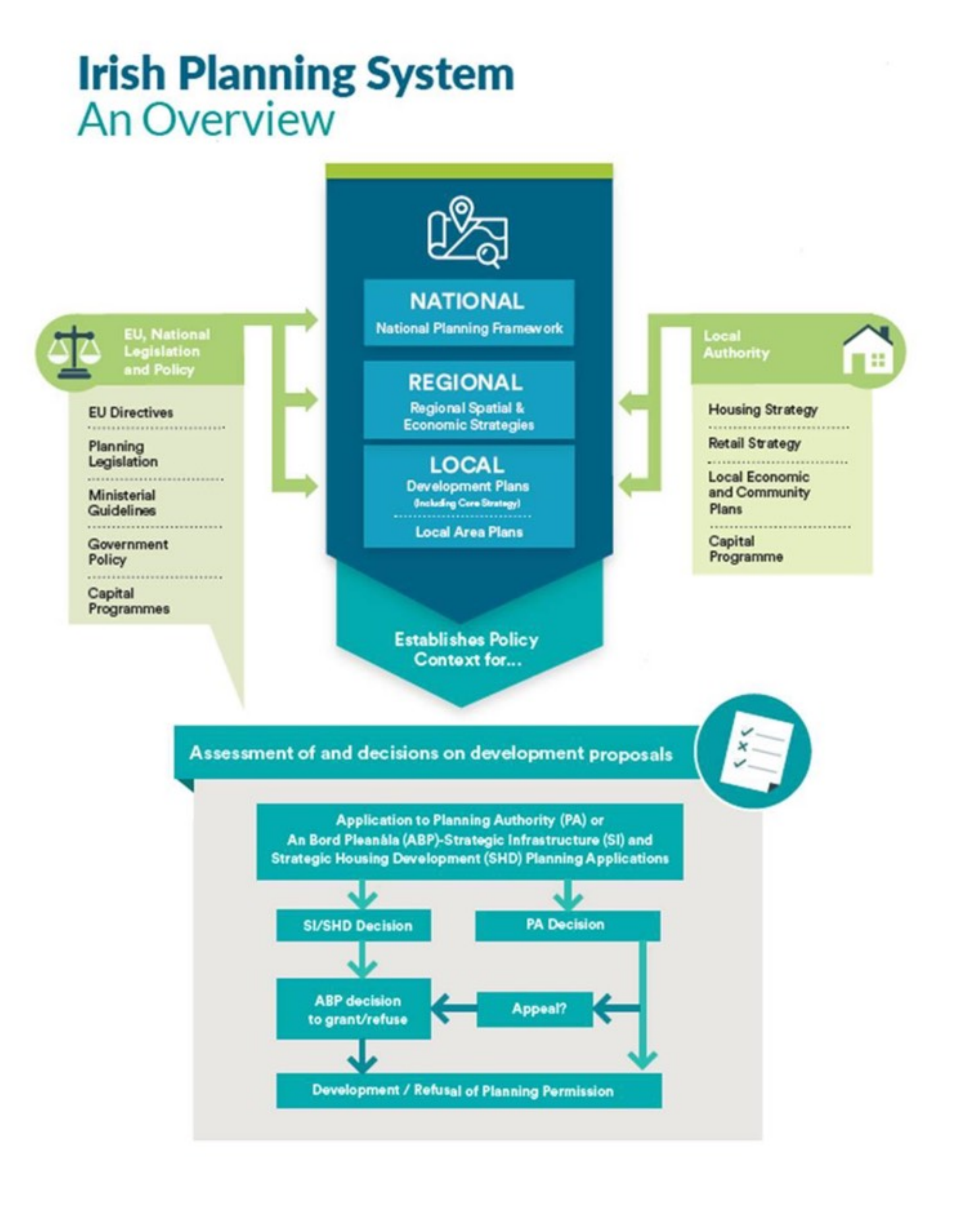


Figure 2-9 Planning Policy Hierarchy (Source: Project Ireland 2040 National Planning Framework, May 2018)

2.3.2 Relevant European Planning and Development Policy

2.3.2.1 Trans European Network – Transport (TEN-T)

The EU has defined a Trans European Network-Transport (TEN-T) which connects the major European urban areas and includes the major European transport corridors and multimodal hubs. The TEN-T network provides integrated international long-distance high speed routes. The network involves the provision of guidance and investment.

Ports are a key part of the TEN-T and Dublin Port is a core port on the TEN-T network. Dublin Port is a designated node on the North Sea-Mediterranean Core Network Corridor as shown in Figure 2-10.

Dublin Port capital projects, including the ongoing Alexandra Basin Redevelopment (Board Ref. PL 29N.PA0034), are grant funded under the TEN-T Programme and supported by finance from the European Investment Bank (EIB).

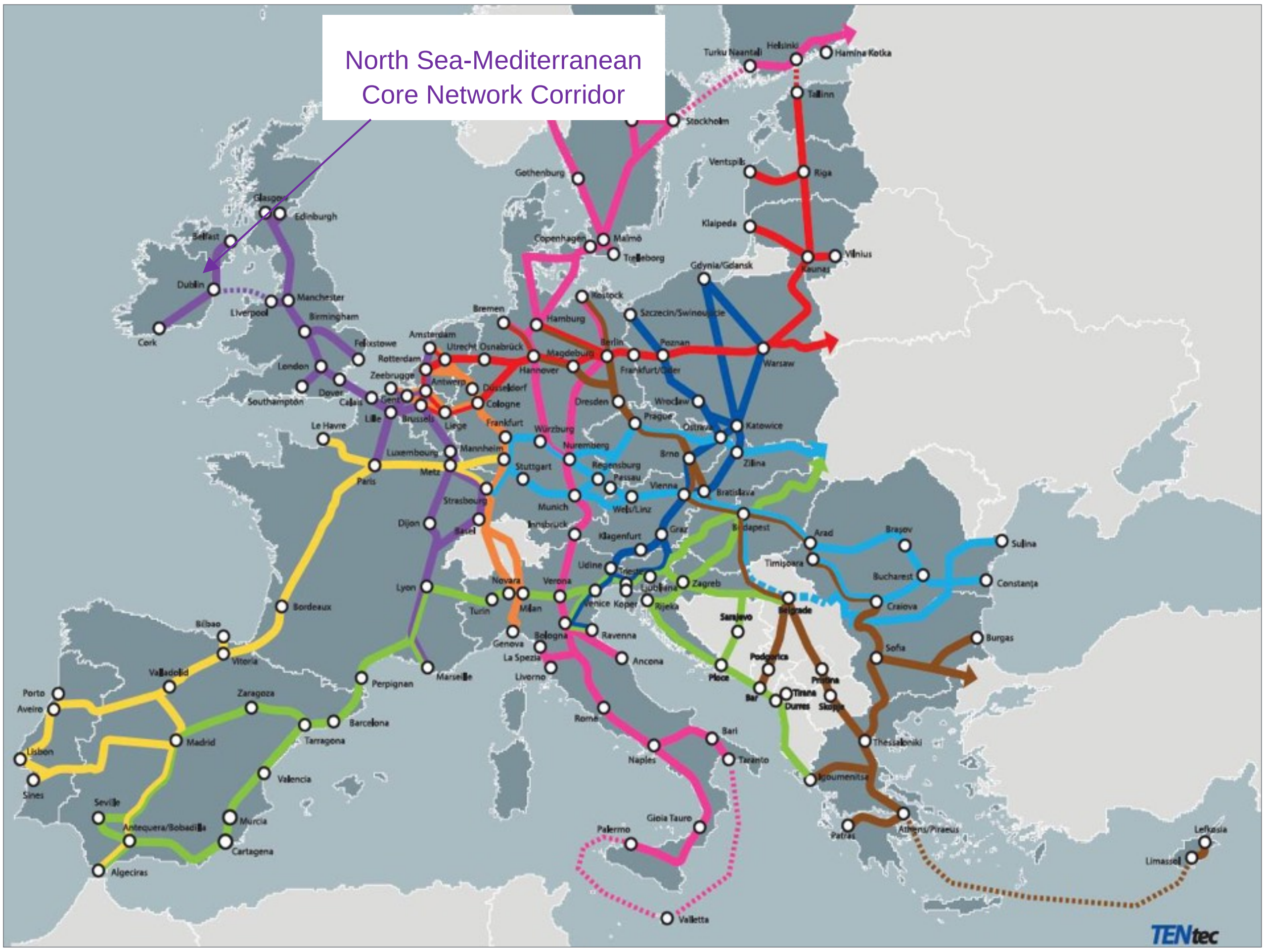


Figure 2-10 TEN-T Core Network Corridors

The programme envisages coordinated improvements to transport infrastructure thereby creating integrated and intermodal long-distance, high-speed corridors. Motorways of the Sea are considered the maritime pillar of the TEN-T and contribute towards the achievement of a European Maritime Transport Space without barriers, connecting Core Network Corridors by integrating the maritime leg and also facilitating maritime freight transport with neighbouring countries. Dublin Port is a designated node on the North Sea-Mediterranean Core Network Corridor (shaded purple on Figure 2-10).

On 29th March 2017, the United Kingdom submitted the notification of its intention to withdraw from the EU pursuant to Article 50 of the Treaty on European Union, commonly referred to as Brexit. The Treaties will cease to apply to the United Kingdom from the date of entry into force of a withdrawal agreement or failing that, two years after that notification unless the period is extended. In view of the withdrawal of the United Kingdom from the EU, parts of the alignment of the North Sea – Mediterranean Core Network Corridor related to the United Kingdom will become obsolete. Recognising this Regulation (EU) 2019/495 amending Regulation (EU) No 1316/2013 provides for a realignment of the corridor once the United Kingdom leaves the EU. This regulation also make provision for infrastructure for purposes of security and checks on external borders.

2.3.2.2 Marine Spatial Plan

In 2014 the adoption of Directive 2014/89/EU established an EU-wide framework for maritime spatial planning. The directive details the main goals and minimum requirements for Member States as follows:

- Balanced and sustainable territorial development of marine waters and coastal zones;
- Optimised development of maritime activities and business climate;
- Better adaptation to risks; and
- Resource-efficient and integrated coastal and maritime development.

Marine spatial planning may be defined as—

> *"… a process by which the relevant Member State's authorities analyse and organise human activities in marine areas to achieve ecological, economic and social objectives"* (Directive 2014/89/EU).

Ireland transposed the Directive through the European Union (Framework for Maritime Spatial Planning) Regulations 2016, signed into law on 29th June 2016. A National Marine Spatial Plan must be in place by 31st March 2021.

2.3.3 Relevant National Planning and Development Policy

2.3.3.1 Project Ireland 2040 National Planning Framework

Project Ireland 2040 National Planning Framework, published in July 2018, is the primary articulation of spatial, planning and land use policy within Ireland. The framework recognises the role ports play in supporting the Irish economy stating:

> *"We depend on the quality and efficiency of our ports to a far greater extent than many of our trading partners. To maintain economic growth, we must be capable of delivering additional port capacity in a timely and predictable manner".* (page 94)

The framework recognises the National Ports Policy stating:

> *"National ports policy requires Tier 1 and Tier 2 ports, or ports of national and regional significance, to lead the response in meeting Ireland's future port capacity requirements. There are major redevelopment projects taking place at our Tier 1 ports (i.e. Dublin, Cork and Shannon-Foynes) at present. These developments will result in a greater concentration of traffic through these ports, with implications for shore-based and marine-based infrastructure.*
>
> *The long-term international trend in ports and shipping is toward increased consolidation of resources in order to achieve optimum efficiencies of scale. This has knock-on effects in terms of vessel size, the depths of water required at ports and the type and scale of port hinterland transport connections.*
>
> *Tier 1 ports are located within close proximity to Dublin, Cork and Limerick and the role of these ports will be considered and addressed in tandem with long-term infrastructural requirements as*

> *part of the relevant Regional Spatial and Economic Strategy and concurrent and subsequent metropolitan area or city/ county development plan processes".* (pages 102-103)

National Policy Objective 40 states:

> *"Ensure that the strategic development requirements of Tier 1 and Tier 2 Ports, ports of regional significance and smaller harbours are addressed as part of Regional Spatial and Economic Strategies, metropolitan area and city/county development plans, to ensure the effective growth and sustainable development of the city regions and regional and rural areas".* (page 103)

National Strategic Outcome 4 outlines "High-Quality International Connectivity". The framework notes that, nationally, infrastructure objectives have been identified to improve land transport connections to the major ports. Infrastructure requirements pertaining to Dublin Port are identified as:

> *"Facilitating the growth of Dublin Port through greater efficiency, limited expansion into Dublin Harbour and improved road access, particularly to/from the southern port area".* (page 37 & 142)

The MP2 Project is consistent with national infrastructure policy and objectives.

2.3.3.2 National Development Plan

The implementation of the National Planning Framework will be fully supported by the Government's investment strategy for public capital investment. The *National Development Plan 2018-2027* identifies the strategic priorities for public capital investment in order to underpin the implementation of the National Planning Framework.

The National Development Plan strongly supports the continued development and improvement in Ireland's ports and strengthening access routes to ports.

The National *Development Plan 2018–2027* (NDP) identifies strategic priorities for public capital investment in order to underpin the implementation of the NPF.

National Strategic Outcome 6 *"High-Quality International Connectivity"* seeks to target continued investment in port and airport connections to the UK, the EU and the rest of the world. Given that Ireland is an island this is considered by the NDP to be integral to underpinning international competitiveness. It is also central to responding to the challenges as well as the opportunities arising from Brexit. Strategic Investment Priorities 2018–2027 allocate €4.8 billion to Airports and Ports.

It is envisaged by the NDP that this investment will strongly support the continued development and improvement in Ireland's ports and State airports by the relevant responsible commercial State Owned Enterprises (SOEs), consistent with sectoral priorities already defined through National Ports Policy and National Aviation Policy.

The NDP continues that significant investment in Ireland's airports and ports will play a major role in safeguarding and enhancing Ireland's international connectivity which is fundamental to Ireland's international competitiveness, trading performance in both goods and services and enhancing its attractiveness to foreign direct investment. The NDP clearly states that the importance of this objective cannot be understated in the context of the UK's exit from the EU in 2019.

The MP2 Project consists of the next phase of this capital infrastructure programme at Dublin Port and is consistent with national policy.

2.3.3.3 National Ports Policy

The *National Ports Policy* is the statement of national policy underpinning the development and operation of Ireland's ports. Ports are divided into Ports of National Significance (Tier1), Ports of National Significance (Tier 2) and Ports of Regional Significance.

Within the Irish Ports Policy, Dublin Port is a Port of National Significance (Tier 1) where Tier 1 ports are responsible for 15% to 20% of overall tonnage through Irish ports (of which Dublin Port handles 44%), and have clear potential to lead the development of future port capacity in the medium and long term, when and as required.

Referring specifically to the *Dublin Port Masterplan* the *National Ports Policy* confirms that:

> *"The Government endorses the core principles underpinning the company's Masterplan and the continued commercial development of Dublin Port Company is a key strategic objective of National Ports Policy".* (page 25)

The *National Ports Policy* highlights that the relationship and interaction between the commercial ports sector and the planning and development system is extremely important in ensuring continued sustainable development of the ports sector. It continues that:

> *"The provision of adequate and efficient capacity into the future is a crucial Government strategic objective".* (page 43)

To this end the policy document states:

> *"Therefore, Government expects the Ports of National Significance (Tier 1) to lead the response of the State commercial ports sector to future national port capacity requirements……It is the Government's position that those ports considered to be of national significance must be capable of the type of port capacity required to ensure continued access to both regional and global markets for our trading economy".* (page 44)

With respect to the planning policy hierarchy the *National Ports Policy* confirms:

> *"National and Regional Planning Guidelines should also recognise the importance of the three categories of ports and allow for their continued development. To this end, the Department contributes as necessary to the development of Regional Planning Guidelines in order to ensure that the goals of National Ports Policy are recognised in the planning hierarchy".* (page 45)

To this end, the Department contributes as necessary to the development of Regional Planning Guidelines in order to ensure that the goals of *National Ports Policy* are recognised in the planning hierarchy.

2.3.3.4 National Marine Spatial Plan

Marine Spatial Planning (MSP) in Ireland is underpinned at the highest level by the European Marine Spatial Planning Directive (Directive 2014/89/EU) (MSPD). This Directive sets out the date by which member states must have in place plans for their seas, 31st March 2021, as well as articulating a range of activities that must be included within the MSP process and plan. he MSPD is reflected in domestic law through the Planning and Development (Amendment) Act 2018. The Act describes MSP in Ireland as being made up of one marine spatial plan for the entire of the maritime area and/or different marine spatial plans for different parts of the maritime area with the singular plan or suit of plans.

Ireland's first marine spatial plan, National Marine Planning Framework (NMPF), will serve as a parallel to the NPF, will set out the Government's long-term planning objectives and priorities for the management of our seas over a 20-year time frame. It will create an overarching framework for marine decision-making that is consistent, evidence based and secures a sustainable future for Ireland's marine area.

A draft NMPF will be published in Q3 2019 for a period of public engagement and consultation (this follows an earlier engagement phase on the development of the NMPF Baseline Report), with the final plan due before end 2020. Both the draft and final plan will set out specific objectives and marine planning policies for all of the activities taking place in Ireland's seas, from aquaculture through to waste water treatment.

2.3.3.5 Marine Planning Policy Statement (Consultation Draft)

The Department of Housing, Planning and Local Government is currently inviting submissions on the Marine Planning Policy Statement. The Marine Planning Policy Statement will apply to all facets of marine planning. It is being introduced initially on a non-statutory basis, pending the introduction of legislation in 2020 that will provide for the preparation, adoption and review of statutory marine planning policy statements on six-yearly cycles. It reflects the comprehensive updating and renewal now underway of Ireland's marine planning system, setting out core principles to inform evolving marine planning and development management process.

The draft Marine Planning Policy Statement is intended to do the following[27]: :

> *"Describe the existing components of Ireland's marine planning system;*
>
> *Outline a vision for the future development of our marine planning system;*
>
> *Set out the overarching policies and principles the Government expects marine planning bodies and other public bodies that engage with the marine planning system to observe (in terms, for example, of public engagement, transparency, governance, environmental assessment, climate action, social and economic benefit);*
>
> *Set out high-level priorities for the enhancement of the marine planning system in Ireland."*

The provisions of national policy provide support for the development of, and investment in, Dublin Port in general as it is recognised as a key element of infrastructure necessary for economic growth. In particular,

[27] https://www.housing.gov.ie/planning/marine-spatial-planning/public-consultation-marine-planning-policy-statement

National Ports Policy explicitly endorses the planned development of Dublin Port. The proposed development is therefore consistent with national policy and objectives.

2.3.4 Relevant Regional Planning and Development Policy

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region including the Metropolitan Area Spatial Plan (MASP) for Dublin was published in June 2019. The RSES is a strategic plan and investment framework to shape the future development of the region to 2031 and beyond. The RSES provides a:

Spatial Strategy – to manage future growth and ensure the creation of healthy and attractive places to live, work, study, visit and invest in.

Economic Strategy – that builds on our strengths to sustain a strong economy and support the creation of quality jobs that ensure a good living standard for all.

Metropolitan Plan – to ensure a supply of strategic development areas for the sustainable growth and continued success and competitiveness of the Dublin Metropolitan Area.

Investment Framework – to prioritise the delivery of key enabling infrastructure and services by government and state agencies.

Climate Action Strategy – to accelerate climate action, ensure a clean and healthy environment and to promote sustainable transport and strategic green infrastructure.

The RSES, prepared in accordance with the NPF, sets the context for each local authority within the Region to develop county and city development plans in a manner that will ensure national, regional and local plans align.

With respect to the profile of the region the RSES notes that the Dublin region is the main global gateway to Ireland, with Dublin Airport one of the fastest growing in Europe and continued growth both in the import and export of goods through Dublin Port. In this regard the RSES identifies three strategic connections in the region which include the Eastern Corridor, strategic connections to the Northern and Western Region, and strategic connections to the Southern Region.

The RSES defines the Dublin - Belfast Economic Corridor, which is contained within the Eastern Corridor, as the largest economic agglomeration on the island of Ireland with the cities and towns along the corridor home to a population of around 2 million. The corridor connects the large towns of Drogheda, Dundalk and Newry by high-capacity national road and rail links, major airports of Dublin Airport, Belfast International Airport and Belfast City Airport and Belfast and Dublin ports. The RSES supports the development of the Dublin - Belfast Economic Corridor through targeted investment in transport infrastructure and services complementing and maintaining its function as part of the EU TEN-T core network. Directly relevant to Dublin Port and its growth is the identification of the M50 Dublin Port South Access Road as one of the Strategic Road Network projects (RPO 8.10) which will be appraised and delivered subject to the outcome of appropriate environmental assessment and the planning process (page 185).

The RSES states that the Dublin City and Metropolitan Area accounts for about half of the Region's population or a quarter of the national population, as well as being the largest economic contributor in the state. As Ireland's only international city of scale, Dublin acts as the global gateway to Ireland and its influence extends well beyond its administrative boundaries. Growth Enablers for Dublin City and Metropolitan Area include:

> *"Protect and improve access to the global gateways of Dublin Airport and Dublin Port for the Region and to serve the Nation, and safeguard and improve regional accessibility and service by rail, road and communication, with a key focus on the Dublin-Belfast Economic Corridor." (page 34)*

To achieve the vision the MASP identifies a number of Guiding Principles for the sustainable development of the Dublin Metropolitan Area. With respect to Dublin Port these include:

> *"Dublin as a Global Gateway – In recognition of the international role of Dublin, to support and facilitate the continued growth of Dublin Airport and Dublin Port, to protect and improve existing access and support related access improvements." (page 95)*

The NPF includes High-Quality International Connectivity as a National Strategic Outcome and recognises the crucial role that the provision of high-quality international connectivity has for overall international competitiveness and addressing opportunities and challenges from Brexit through investment in our ports and airports, in line with sectoral priorities already defined through *National Ports Policy* and *National Aviation Policy* and signature projects such as the second runway for Dublin Airport and major redevelopment at Dublin Port including proposals for a southern port access route.

The RSES recognises that Ireland's port and shipping services play an important role as enablers of economic growth, noting that the Region is home to the largest sea port in the country, Dublin Port. The RSES states that given the nature and function of ports, combined with the location interfacing with the marine environment, there is potential for environmental conflict with the existing ecosystem. It continues that this sensitivity is further increased by the proximity of most of the Region's ports to designated sites.

In order to minimise potential impacts on EU protected habitats, the RSES advocates, brownfield port developments which maximise the capacity of existing port sites should be prioritised over greenfield developments.

It continues that the approach to port development in the Region shall adhere to the European Commission guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones. As required by National Ports Policy (2013), a National Ports Capacity study has been commissioned which will assess the capacity of the national ports network.

In terms of port facilities, the RSES acknowledges that the *National Ports Policy* and the national hierarchy or tiering of ports recognises the longterm international trend in ports and shipping towards increased consolidation of resources in order to achieve optimum efficiencies of scale. It notes that this has knock-on effects in terms of vessel size, the depths of water required at ports and the type and scale of port hinterland transport connections. As set out under Section 3.3 *National Ports Policy* seeks to ensure that the strategic development requirements of Tier 1 Ports, ports of regional significance and smaller harbours are addressed to ensure their effective growth and sustainable development at a national and regional level, this is acknowledged in the RSES.

With specific regard to Dublin Port, the RSES states that it is the largest port in the Country handling almost 50% of all trade in Ireland and growth of 35.7% over the last five years. Dublin Port is recognised in this RSES as a critical national facility; a key economic driver for the Region and the nation and an integral part of Dublin City, in line with the Dublin Port Masterplan 2040, Reviewed 2018.

Regional Policy Objectives guiding the development of ports and specifically Dublin Port within the RSES which states:

> *"RPO 8.21: The EMRA will support the role of Dublin Port as a Port of National Significance (Tier 1 Port) and its continued commercial development, including limited expansion and improved road access, including the Southern Port Access Route.*
>
> *RPO 8.23: The EMRA supports the protection of the marine related functions of ports in the Region in order to ensure the future role of ports as strategic marine related assets is protected from inappropriate uses, whilst supporting complimentary economic uses including the potential for facilitating offshore renewable energy development at ports.*
>
> *RPO 8.24: The EMRA supports the undertaking of feasibility studies to determine the carrying capacity of ports in relation to potential for likely significant effects on associated European sites including SPAs and SACs." (Page 190)*

Strategic Greenways proposed and/or under development in the metropolitan area include:

> *"East Coast Route from Sutton to Sandymount with potential to link into a Dublin Port Greenway, to extend north to link into the Fingal Coastal Way and to develop a wider East Coast Trail from Rosslare to Northern Ireland." (page103)*

The RSES also supports the protection of the Dublin Bay Biosphere. RPO 7.20 states:

> *"Promote the development of improved visitor experiences, nature conservation and sustainable development activities within the Dublin Bay Biosphere in cooperation with the Dublin Bay UNESCO Biosphere Partnership." (Page 156)*

The proposed development seeks to accords with the identified need to enhance international capacity and expand port facilities serving the region whilst protecting Dublin Bay Biosphere.

2.3.4.1 The Transport Strategy for the Greater Dublin Area, 2016 to 2035

The *Transport Strategy for the Greater Dublin Area, 2016 to 2035*, prepared by the National Transport Authority sets out how transport will be developed across the region, covering Dublin, Meath, Wicklow and Kildare up to 2035.

As such the strategy is largely concerned with transport within the GDA and Ireland. The strategy does however seek to protect and enhance the capacity of the TEN-T network including Dublin Port. The importance of Dublin Port at a regional and national level is recognised within the strategy and the need for landside connectivity is prioritised.

> *"The need to facilitate the expansion of activity at Dublin Port into the future, as both a commercial and passenger port, must, therefore, be supported by the Strategy, through the clear identification and safeguarding of designated access routes".* (page 36)

The delivery of a link road connecting the southern end of the Dublin Port Tunnel to the South Port area is included as a National Road project to be delivered in the Transport Strategy.

The provisions of regional policy support the development of Dublin Port as it is recognised as a key element of infrastructure necessary for economic growth at the national level. The proposed development is consistent with regional policy and objectives.

2.3.5 Relevant Local Planning and Development Policy

2.3.5.1 Dublin City Development Plan 2016-2022

The Dublin City Development Plan 2016-2022 (Development Plan) is the primary statutory land use planning policy document guiding development within Dublin City including Dublin Port.

Section 4.5.1.2 of the Development Plan recognises and outlines general support for the activities of Dublin Port:

> *"Dublin City Council fully supports and recognises the important national and regional role of Dublin Port in the economic life of the region and the consequent need in economic competitiveness and employment terms to facilitate port activities.*
>
> *Dublin Port will have a significant role to play in the future development and growth of the city and it is considered prudent to plan the structure of this part of the city, including the proposed public transport network, to fully integrate with the developing new city structure and character, while having regard to the Dublin Port Company Masterplan 2012 – 2040".* (page 59)

In addition to this high level support the Development Plan contains a number of policies and objectives facilitating Dublin Port operations and activities, including:

> *"SC9: To support and recognise the important national and regional role of Dublin Port in the economic life of the city and region and to facilitate port activities and development, having regard to the Dublin Port Masterplan 2012 - 2040.* (page 46)
>
> *CEE23 (iii): To recognise that Dublin Port is a key economic resource, including for cruise tourism, and to have regard to the policies and objectives of the Dublin Port Masterplan".* (page 83)

The protection of the Eastern By-Pass routes is also an objective of the Development Plan:

> *"MTO32: To protect the routes of the proposed eastern by-pass from existing Dublin Port tunnel to Poolbeg, also referred to as the Southern Port Access Route, and in the longer term to provide a route corridor between Poolbeg and the Southern Cross/ South Eastern Motorway (in accordance with the NTA Strategy for the Greater Dublin Area 2016 – 2035). The preferred route for DCC is by means of a bored tunnel, under Sandymount Strand and Merrion Strand and will be subject to full statutory Environmental Assessment, together with an Appropriate Assessment for the entire proposed routes, in accordance with the Habitats Directive, together with a full consultation process".* (page 133)

Key strategic policies and objectives of Dublin City Council set out in the Development Plan endorse the improvement of port infrastructure in order to facilitate economic growth and policies relating to the protection of the natural and built environment. The MP2 Project is consistent with these policies and objectives.

2.3.5.2 Land Use Zoning

The lands that form part of the development as well as those adjoining it, are largely zoned and Z9 Amenity/Open Space Lands/Green Network.

The Z7 Employment Industry zoning objective is, "to provide for the protection and creation of industrial uses and facilitate opportunities for employment creation including Port Related Activities". With respect to lands zoned Z7 Employment Industry the plan states:

> *"The majority of these lands are located in the Port area. The primary uses in these areas are those that can result in a standard of amenity that would not be acceptable in other areas. They can sometimes lead to disamenities which would need to be managed through the planning process to safeguard residential amenity when necessary. Activities include industry, other than light industry; manufacturing repairs, open storage, waste material treatment, and transport operation services".* (page 244)

Port-related industries and facilities are permitted in principle within the Z7 land use zoning objective.

The Z9 Amenity/Open Space Lands/Green Network zoning objective is, "*to preserve, provide and improve recreational amenity and open space and green networks".* This zoning includes all amenity open space lands which can be divided into three broad categories: public open space, private open space and sports facilities in private ownership. With respect to lands zoned Z9 the plan states:

> *"the provision of public open space is essential to the development of a strategic green network…..Generally, the only new development allowed in these areas, other than the amenity/recreational uses, are those associated with the open space use…".*(page 246)

The subject site within the context of the land use zoning objectives is illustrated on Figure 2-11**.**

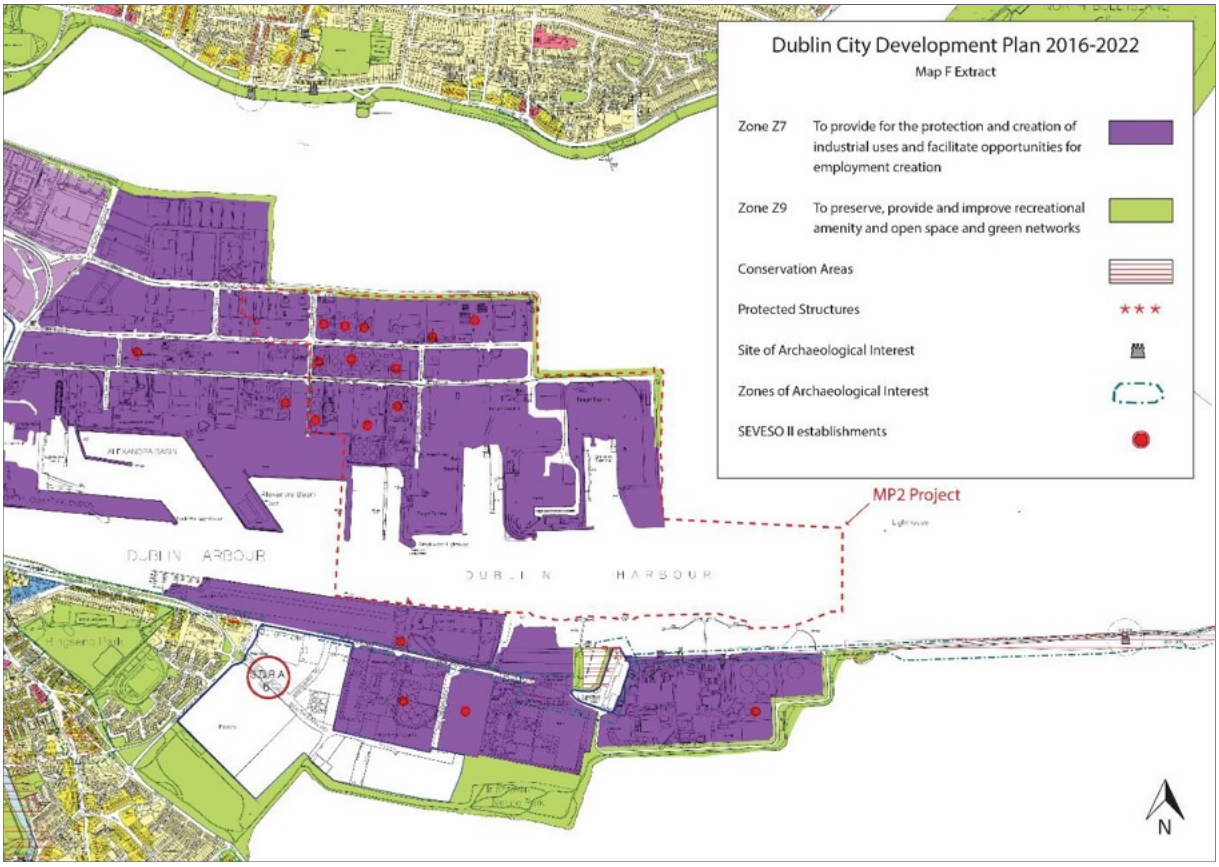


Figure 2-11 Land Use Policies (Source: Dublin City Development Plan 2016-2022, Map F)

The MP2 Project is wholly consistent with the land use zoning objectives applicable to the development site.

2.3.5.3 Built Heritage

There are no Protected Structure sites located within the planning application boundary. The South Great Wall, is a Protected Structure (RPS 6798) and a Site of Archaeological Interest (DU019-028), located within a Conservation Area and a Zone of Archaeological Interest (019-029), is situated to the south of the site. Poolbeg Lighthouse, a Protected Structure (RPS 7553), is located at the eastern end of the South Great Wall, also outside the application boundary.

The Dublin City Industrial Heritage Record (DCIHR) survey makes recommendations for sites to be added to the list of Protected Structures in the life of the Development Plan. The Development Plan notes that a review of the DCIHR will be undertaken for the Kilmainham and Inchicore areas, together with the unique maritime heritage of the North and South Docklands, and the full DCIHR will be published online as soon as

resources permit and within the period of this development plan. Eastern Breakwater (DCIHR 19-09-002) is currently listed on survey. Breakwater Lighthouse listed on the survey no longer exists (DCIHR 19-09-003).

Item 6 of Objective CHCO10 states:

> *"To have regard to the city's industrial heritage and Dublin City Industrial Heritage Record (DCIHR) in the preparation of Local Area Plans (LAPs) and the assessment of planning applications and to publish the DCIHR online. To review the DCIHR in accordance with Ministerial*

> *recommendations arising from the national Inventory of Architectural Heritage (NIAH) survey of Dublin City and in accordance with the Strategic Approach set out in Section 11.1.4 of this chapter".* (page 197)

The proposed development includes measures to address this objective.

2.3.5.4 SEVESO Directive Sites

Map F of the Development Plan identifies the locations of 'Seveso' designated sites (see Figure 2-11). Appendix 12 of the Development Plan provides a list of Seveso sites in the city including their respective consultation zone. Activities are listed in an 'Upper Tier' and others in a 'Lower Tier'. There are 7 no. Upper Tier and 8 no. and Lower Tier Seveso establishments within the general vicinity of the MP2 Project. These include:

Upper Tier

- Calor Teoranta, Tolka Quay, Dublin 1 (600 m from perimeter)
- Dublin Waste to Energy Ltd., Pigeon House Road, Dublin 4 (300 m from bund wall)
- Esso Ireland Ltd., JFT Dublin, Alexandra Road, Dublin Port, Dublin 1 (400 m from perimeter)
- Fareplay Energy Ireland, Tankfarm 1, Alexandra Road and Tankfarm 2, Tolka Quay Road, Dublin Port, Dublin 1 (400 m from perimeter)
- Indaver Ireland Ltd., Tolka Quay Road, Dublin Port, Dublin 1 (700 m from perimeter)
- National Oil Reserves Agency Storage Facility, Shellybanks Road, Ringsend, Dublin 4 (300 m from perimeter)
- Tedcastles Oil Products, Yard 2, Tolka Quay Road, Dublin Port, Dublin 1 (400 m from perimeter)

Lower Tier

- Electricity Supply Board, North Wall Generating Station, Alexandra Road, Dublin 1 (300 m from bund wall)
- Electricity Supply Board, Poolbeg Generating Station, Ringsend, Dublin 4 (300 m from bund wall)
- Iarnród Éireann, Alexandra Road, North Wall, Dublin 1 (300 m from bund wall)
- Iarnród Éireann, Iarnród Éireann Maintenance Works, Inchicore, Dublin 8 (300 m from bund wall)
- Tedcastles Oil Products, Yard 1, Promenade Road, Dublin Port, Dublin 1 (400 m from perimeter)
- Topaz Energy Limited, Terminal 1, Alexandra Road, Dublin Port, Dublin 1 (400 m from perimeter)
- Topaz Energy Limited, Yard 3, Alexandra Road, Dublin Port, Dublin 1 (300 m from perimeter)
- Utility Operations & Maintenance Services Ltd. t/a Synergen Ltd., Dublin Bay Power Plant, Pigeon House Road, Ringsend, Dublin 4 (300 m from bund wall).

A COMAH Land Use Planning Assessment is included within the application for permission package for the MP2 Project.

2.3.5.5 Development Management Standards

The development management guidelines specific to Dublin Port recognise policy CEE 23(iii) and outlines a number of considerations with which the planning authority examine during the assessment of proposals within Dublin Port, which include:

> *"Recognition of the important role of Dublin Port in the economic life of the city and the region and the consequent need in economic and employment terms to facilitate port development*
>
> *The periphery of the port area facing residential areas shall be designed and landscaped to minimise the impact of its industrial character*
>
> *The impact on nature conservation, recreation and amenity use, and other environmental considerations, including having regard to the designation of Dublin Bay as a UNESCO biosphere and other environmental designations such as Special Area of Conservation (SAC) and Special Protection Area (SPA)*
>
> *The protection of the amenities of residential and commercial uses in adjoining areas*
>
> *Design criteria including landscaping, finishes, signage and site layout*
>
> *Facilitating plans to make Dublin a 'home port' for cruise tourism, with complementary cruise tourism facilities in the port and wider city/region". (page 347)*

The Development Plan is relevant in terms of assessing whether the proposed development is consistent with the proper planning and sustainable development of the area in which it is proposed to be located. The key strategic policies and objectives of Dublin City Council considered relevant to this proposed development relate to endorsing the improvement of port infrastructure in order to facilitate economic growth and policies relating to the protection of the natural and built environment.

A Planning Report addressing policies, objectives and development management considerations against which the proposed development will be assessed is included with the planning application.

2.3.6 The North Lotts and Grand Canal Planning Scheme

The North Lotts and Grand Canal Planning Scheme was approved by the Board on 16th May 2014 and includes lands adjacent to Dublin Port to the west. The proximity of Dublin Port to the Planning Scheme lands and the opportunity to maintain the maritime character of the area and integrate better with Dublin Port is recognised in the Planning Scheme.

There are limited policies and objectives within the Planning Scheme pertaining to Dublin Port, however a number of objectives support improved cruise liner and passenger facilities including:

> *"ER17 To engage with Dublin Port Company, Fáilte Ireland and the Department of Transport, Tourism and Sport to facilitate the development of a new cruise tourism terminal at Alexandra Basin.* (page 44)
>
> *PR12 To support the provision of a suitable terminal for cruise liners and other passenger vessels with Dublin Port".* (page 154)

2.3.7 Poolbeg West SDZ Planning Scheme

The Poolbeg West SDZ Planning Scheme has been prepared on foot of the Planning and Development Act 2000 (Designation of Strategic Development Zone: Poolbeg West, Dublin City) Order 2016.

The Order states the SDZ is designated a "*mixed use development which may principally include residential development, commercial and employment activities including, office, hotel, leisure and retail facilities, port related activities and the provision of educational facilities, transport infrastructure, emergency services and the provision of community facilities as referred to in Part III of the First Schedule to the Act, including health and childcare services, as appropriate".*

Article 4 of the Order states development of this area shall take into consideration inter alia the Dublin Port Masterplan 2012-2040.

The Poolbeg West Planning Scheme lands are south of the Liffey and approximately half of which are owned by Dublin Port Company. The Planning Scheme before the Board is centred on 'Themes', one of which is to 'Protect'. In this regard the Planning Scheme states the following:

> *"Key principle: Ensure that the development of Poolbeg West and the ongoing operations of Dublin Port, municipal facilities and future transport schemes are mutually taken in account and integrated into the urban structure of the city.*
>
> *The peninsula will have an ongoing industrial function related to port activities, waste water treatment and energy generation. To ensure that these essential regional services continue the SDZ Planning Scheme includes lands for 'Port/ Industrial Compatible Uses' to facilitate growth, consolidate activities, and promote alternatives for underutilised lands, together with 'soft edges' and 'buffer zones'".* (page 8)

With specific regard to Dublin Port the Planning Scheme states in section 5.4.3:

> *"Dublin City Council fully supports and recognises the important national and regional role of Dublin Port in the economic life of the region and the consequent need in economic competitiveness and employment terms to facilitate port activities. Dublin Port will have a significant role to play in the future development and growth of the Poolbeg West area as well as the wider city. With this in mind, this planning scheme recognises the importance of retaining port uses and port related activities on site"* (page 21)

The Planning Scheme supports the Southern Port Access Route and Eastern Bypass:

> *"MV4 To protect the route of the proposed Southern Port Access Route and Eastern Bypass in accordance with the objectives of Transport Infrastructure Ireland and the National Transport Authority Strategy for the Greater Dublin Area 2016-2035. As an interim measure it is proposed to provide a separate road access to the south port area via a new link located north of the existing Seán Moore Roundabout".* (page 28)

Dublin City Council on 2nd October 2017 decided by resolution to make the Poolbeg West Planning Scheme. The decision of the Council was subsequently appealed to An Bord Pleanála (Ref. PL29S.ZD2013). On 9th April 2019 the Board approved the Poolbeg West Planning Scheme.

The role and function of Dublin Port is recognised and facilitated in the Planning Scheme as approved with some modifications.

2.3.8 Dublin Port Masterplan 2040

The Dublin Port Masterplan 2040 is a key document guiding future development within the port up to 2040. The Masterplan is a non-statutory plan which has nonetheless been framed within the context of EU, national, regional and local development plan policies and explicitly endorsed in the National Ports Policy, 2013. The Masterplan presents a vision for future operations at the Port and critically examines how the existing land use at Dublin Port can be optimised for merchandise trade and passenger (including cruise ships).

The Masterplan was prepared by DPC in order to:

- *"Plan for future sustainable growth and changes in seaborne trade in goods and passenger movements to and from Ireland and the Dublin Region in particular.*
- *Provide an overall context for future investment decisions.*
- *Reflect and provide for current National and Regional Guidelines and initiatives.*
- *Ensure there is harmony and synergy between the plans for the Port and those for Dublin City, the Dublin Docklands Area and neighbouring counties within the Dublin Region.*
- *Give some certainty to customers about how the Port will develop in the future to meet those requirements"* (page 14)

Since the Masterplan was published in 2012 Dublin Port has experienced particularly high rates of economic growth and traffic growth with volumes of traffic increasing by 30.1% in the five years to 2017. In light of the high level of growth a review of the Masterplan took place in 2017-2018. The Review concluded:

- An eastern expansion of Dublin Port into Dublin Bay is no longer a viable and is not being pursued as an option.
- To meet anticipated capacity requirements Dublin Port needs to be developed on the basis of an average annual volume growth of 3.3% over the 30 years from 2010 to 2040 rather than the 2.5% originally assumed in 2012.

The *Dublin Port Masterplan 2040 Reviewed 2018,* published in July 2018, sets out options for the development of Dublin Port which will meet these requirements and objectives. These options are shown in Figure 2-1[28]**.**

The MP2 Project subject site is largely located within Area C: Unified Ro-Ro Ferry Terminal and Area D: Container Terminal. The identified infrastructure development option for Area C: Unified Ro-Ro Ferry Terminal is:

> *"To create a Unified Ferry Terminal which would incorporate the existing Terminals 1, 2 and 5.*
> *In doing this:*

[28] Source: *Dublin Port Masterplan 2040 Reviewed 2018*

- *Existing internal roadways would be eliminated and existing buildings would be removed to create an additional three hectares of usable terminal area.*
- *A new single set of in-gates would be provided north of the existing terminal areas accessed from the new Promenade Road Extension to be built as part of the project to redevelop the Port's internal road network.*
- *A new jetty would be built at the eastern end of the Port to provide a fifth Ro-Ro berth*
- *A new ferry terminal building would be provided to the north overlooking the Tolka Estuary.*
- *In developing the new Unified Ferry Terminal, necessary State facilities would be provided for border controls by a range of State agencies".* (page 48)

The identified infrastructure development option for Area C: Unified Ro-Ro Ferry Terminal states:

> *"This option provides for a considerable expansion of the already existing container terminal both in terms of berthage and, more particularly, storage land for the transit storage of imported and exported containers from Lo-Lo container ships. The option includes:*

- *The removal of existing buildings on the terminal to provide additional transit storage* capacity *for containers*
- The *cessation of an existing empty container depot operation*
- The *infill of Oil Berth 4*
- *The reconstruction of Oil Berth 3 to facilitate its reuse as a container berth as when it is no longer required for petroleum imports*
- The *extension of the existing river berth (Berth 50A)*
- *The development of a nearby 2.8 hectare yard overlooking the Tolka Estuary as a back* area *for the transit storage of containers*
- *Existing check-in facilities will be moved to a remote shared facility in Area E close to the Promenade Road entrance to the Port."* (page 48)

The MP2 Project seeks to deliver a number of the elements envisaged for each of the areas as set out in the Masterplan.

3 PROJECT DESCRIPTION

This Chapter of the EIAR sets out a description of the proposed development and contains information on the project site, design, size and other relevant features in order to establish the characteristics of the project for the purposes of environmental assessment.

3.1 Location of the Project

3.1.1 Site Location

The proposed development is located mainly within the Northern Lands of Dublin Port, Dublin City. Dublin Port is the largest Port in Ireland, situated on Ireland's Eastern Coastline, as shown in Figure 3-1. The project also includes capital dredging works within Dublin Port Harbour.

The Northern Lands of Dublin Port (referred to as the Dublin Port Estate within this EIAR) comprise 207 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 as shown in Figure 3-2.

Dublin Port's navigation channel and fairway are currently maintained to a standard depth of -7.8m CD. The main navigation channel and fairway are currently being deepened to -10.0m CD under the permitted Alexandra Basin Redevelopment (ABR) Project (ABP Ref. 29N.PA0034) to enable the safe passage of larger vessels bringing freight and passengers to and from the Port.

Figure 3-1 Site Location Map (reproduced from the Dublin Port Masterplan 2040, reviewed 2018

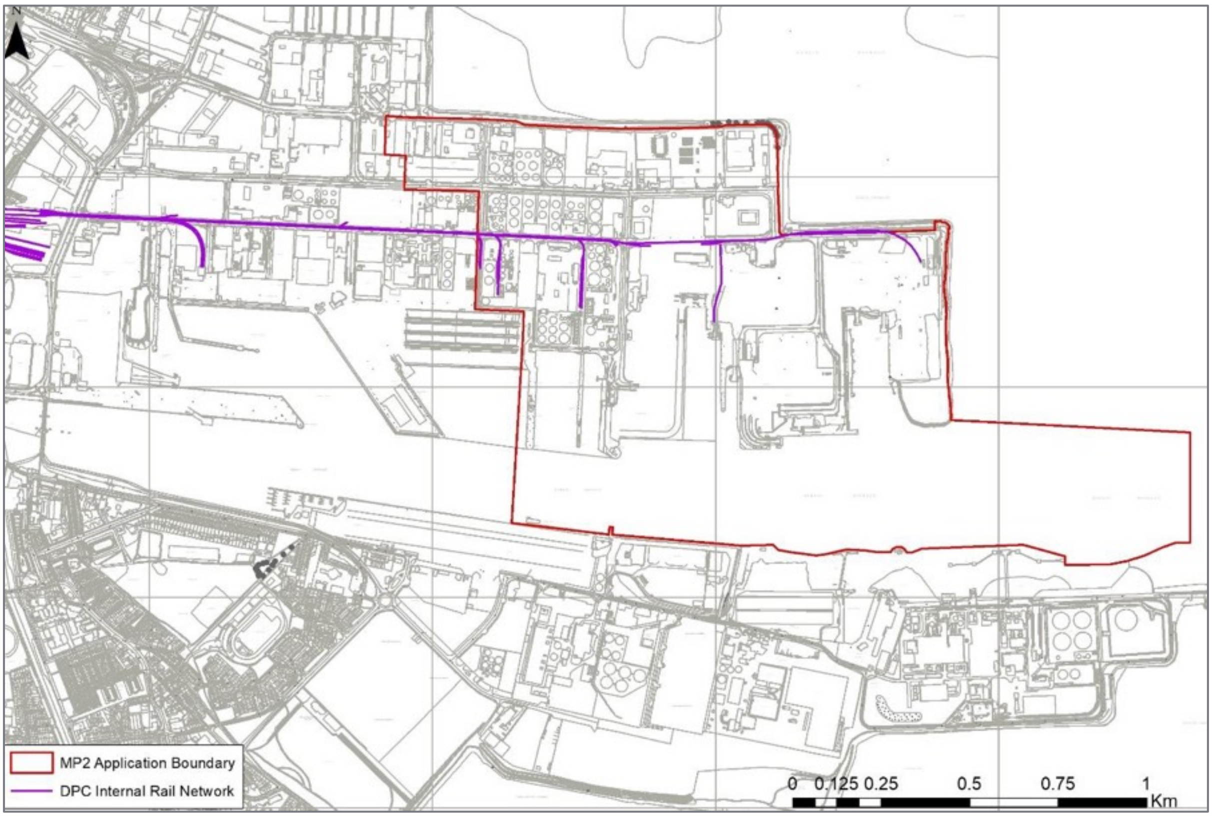


Figure 3-2 Rail network within the Dublin Port Estate

3.1.2 Development Area

The area of the proposed development for which permission is 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 in Chapter 1, Figure 1-2. The site is located at the eastern end of the Dublin Port Estate including an area to be dredged to the south of the site, as shown on Plate 3-1. The application site area is 165.2 ha.

Plate 3-1 Existing Land Uses within the development area

Oil Berths

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 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.

Plate 3-2 Oil Berth 4

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

There is one major Lo-Lo Container Freight Terminal within the application boundary of the MP2 Project.

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.

Plate 3-3 Lo Lo Container Freight Terminal

Ro-Ro (Roll-On Roll-Off) Terminals

There are a currently five Berths within the development area with ramps for Ro-Ro freight and passengers. 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.

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.

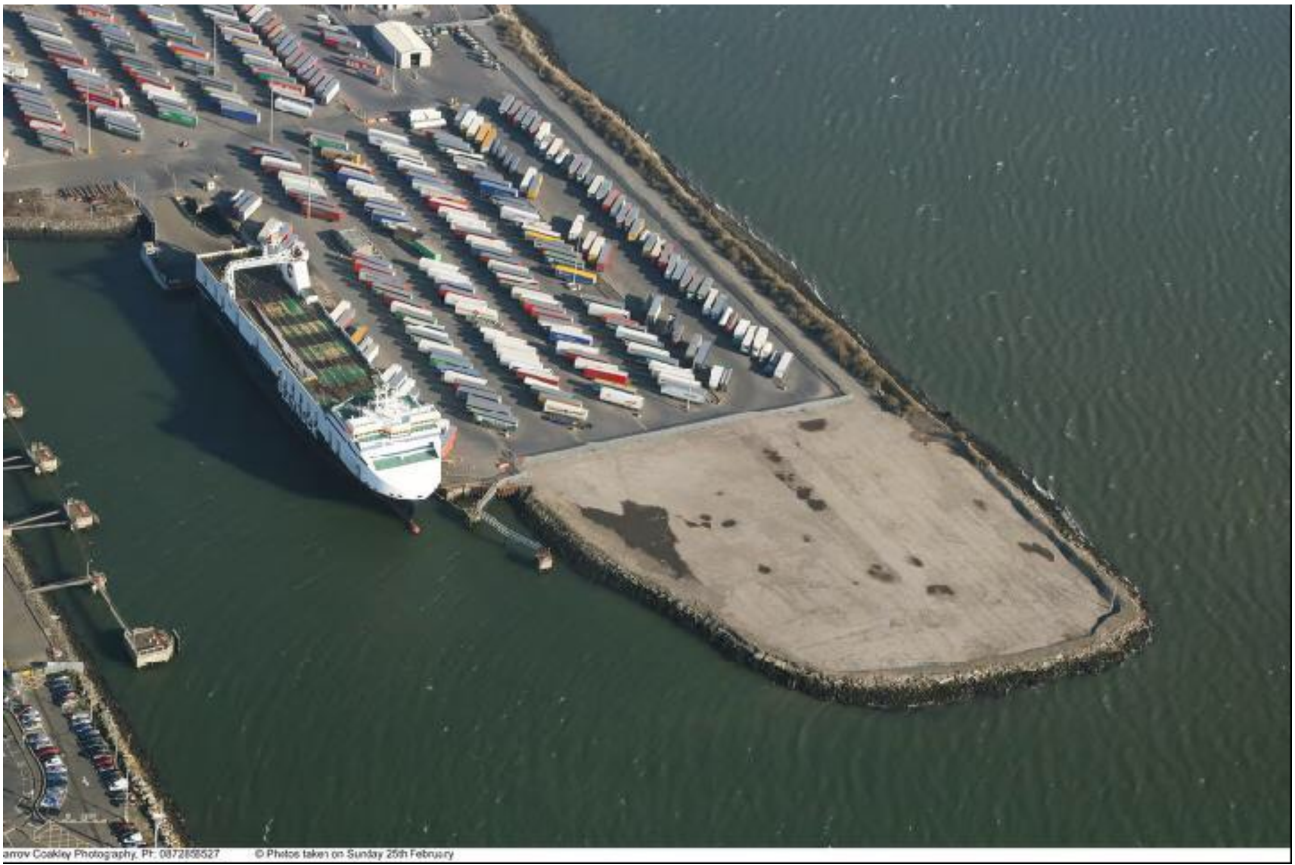


Plate 3-4 Ro-Ro activity within the development area

Ferry Terminal Buildings

There are three ferry terminal buildings located within the MP2 Project application boundary. Terminal 2 is used by Stena Line, Terminal 5 is used by Seatruck and Terminal 1 is used by Irish Ferries, with seasonal use by Isle of Man Steam Packet Company. Terminal 2 and Terminal 5 will be demolished as part of the works, with the existing Terminal 1 Building being used as a unified terminal building thereafter. The Seatruck operation at Terminal 5 will be relocated to the west of the Dublin Port Estate to a facility permitted under the ABR Project consent.

Plate 3-5 Terminal 1 Building used by Ferries

Permitted Development under the Alexandra Basin Redevelopment (ABR) Project

The ABR Project is currently at construction stage having been granted permission by ABP in July 2015 (ABP Ref. 29N.PA0034). The ABR Project includes the infilling of Basin 52/53 which currently hosts two Ro-Ro Ramps operated by Seatruck. The permission also allows for the construction of a new riverside berth at the entrance to Basin 52/53 (Berth 52).

3.1.2.1 Adjacent Land Uses

The site is bounded to the north and east by the Tolka estuary. The Tolka estuary is used for recreational purposes mostly by small sailing craft based at Clontarf. Swimming also takes place from the North Bull Wall throughout the year, including the winter season. There are no licenced aquaculture sites within the estuary. The Tolka Estuary is also of international importance due to its large populations of waterbirds.

The site is bounded to the south by the lower River Liffey (Dublin Harbour) which is the main navigation channel for Dublin Port. The Great South Wall lies outside, but in close proximity to, the boundary of the site. DPC is the authority with responsibility for the safe passage of all shipping entering and leaving the Port. No other commercial activities are permitted within the navigation channel for safety reasons. A number of events are hosted by DPC including the annual ‘Riverfest’. Accommodation is also made for sailing and boating activity based at the Poolbeg Yacht, Boat Club and Marina and Stella Maris Rowing Club.

The site is bounded to the west by Port lands with similar land uses to that within the development area.

3.1.2.2 Amenity Designations

There are a number of Natura 2000 sites designated as Special Protection Areas (SPAs) or candidate Special Areas of Conservation (cSACs) which could have connectivity with the proposed development area. The key sites are considered to be:

- South Dublin Bay and River Tolka Estuary SPA
- North Bull Island SPA
- North Dublin Bay cSAC
- South Dublin Bay cSAC
- Rockabill to Dalkey Island cSAC

The spatial configuration of these amenity sites and relationship with the proposed development is presented and assessed in Chapter 7 of this EIAR and the separate Appropriate Assessment Screening & Natura Impact Statement submitted with the application for permission.

There are no protected archaeological or industrial heritage features designated within the development area. However the Eastern Breakwater and its terminus at Pier Head which currently supports the Port's Operations Building, shown in Plate 3-6, is on the Dublin City Industrial Heritage Record and is therefore of industrial heritage interest. Pier Head formed the end of the 19th Century Eastern Breakwater which marked the end of eastern extremity of Dublin Port during that era. This Pier Head is proposed to be demolished as part of the MP2 Project. The Great South Wall which lies outside, but in close proximity, to the development area is a protected structure and National Monument and is not affected by the MP2 Project.

The spatial configuration of these amenity sites and relationship with the proposed development is presented and assessed in Chapter 14 of this EIAR.

Plate 3-6 Pier Head at the terminus of Breakwater Road and the Port's Operations Building

3.2 Proposed Development Works

This section of the EIAR describes both the proposed marine and landside structural works, and the associated dredging and infill works required to achieve the MP2 Project's objectives. A site plan of the proposed works is presented in Figure 3-3. The MP2 Project application area is delineated by a red line and the marine and landside works individually identified. The works proposed as part of the MP2 Project are summarised as follows:

- Construction of a new Ro-Ro jetty (Berth 53) for ferries up to 240m in length on an alignment north of the Port's fairway and south and parallel to the boundary of the South Dublin Bay & River Tolka SPA (004024).
- A reorientation of the already consented Berth 52 (ABP Ref. 29N.PA0034). Berth 52 is also designed to accommodate ferries up to 240m in length. The works will also comprise an amendment to the consented open dolphin structure (ABP Ref. 29N.PA0034) to create a closed berthing face at the eastern end of Berth 49.

  [Elsewhere within the ABR Project, the extension of the existing Berth 49 is already consented to also make this berth capable of accommodating ferries up to 240m in length. The combination of the ABR Project with the MP2 Project will therefore deliver three river berths all capable of accommodating ferries up to 240m in length].
- A lengthening of an existing river berth (50A) to provide the Container Freight Terminal with additional capacity to handle larger container ships. These works will include the infilling of the basin east of the now virtually redundant Oil Berth 4 on the Eastern Oil Jetty. These works will also include dredging to a standard depth of -11.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).

- 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 dredging of a berthing pocket to a standard depth of -13.0m CD at Oil Berth 3 will require stabilisation of the existing quay wall at Jetty Road. It is not proposed to use this quay wall for the berthing of vessels.
- Dredging at the proposed Berth 53 and channel widening to a standard depth of -10.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).
- Consolidation of passenger terminal buildings, demolition of redundant structures and buildings, and removal of connecting roads to increase the area of land for the transit storage of Ro-Ro freight units as a Unified Ferry Terminal (UFT). Works include reorganisation of access roads; two proposed check in areas comprising a total of 14 check lanes; proposed set down and parking area for the existing Terminal 1 building; proposed pedestrian underpass to access the existing Terminal 1 building; three proposed toilet blocks and a proposed ESB Substation. These works will comprise amendments to consented developments with planning reference numbers 3084/16 & 3638/18, and the ABR Project (ABP Ref. 29N.PA0034).
- A heritage zone adjacent to Berth 53 and the Unified Ferry Terminal set down area. This will comprise an alteration to consented development planning reference 3084/16.

3.2.1 Construction Design Considerations

The following design elements have been considered when carrying out the design of the various elements of the project:

- Maximise the potential of the existing port property in the context of the Dublin Port Masterplan 2040, reviewed 2018, through redesign of the Ferry Terminal Yards;
- Upgrade of the Eastern Oil Jetty (Oil Berths 3 and 4) and allow for the future use as a Lo-Lo berth;
- Provide sufficient water depth at each berth for the design vessels proposed;
- Minimise the impact of construction on the operation of existing berths;
- Provide a sufficiently wide channel to accommodate the piloting of vessels;
- Minimise the impact of proposed structures on existing port navigation;
- Take full cognisance of environmental constraints and where feasible provide mitigation through engineering design;
- Ensure the integrity and stability of the Great South Wall is maintained.

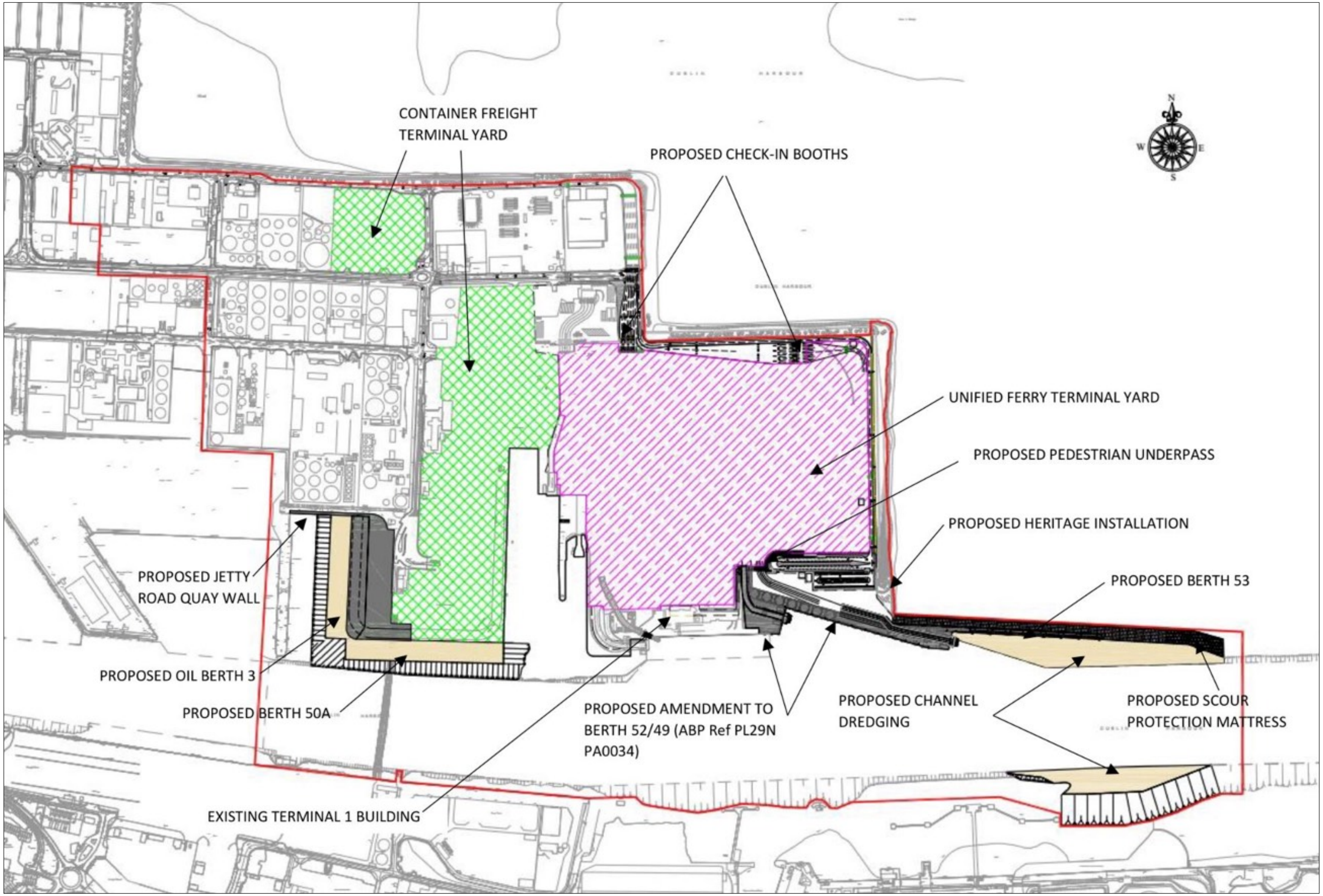


Figure 3-3 Site plan of the proposed works

3.2.2 Berth 52 /49

Berth 52 will be used predominantly for the berthing of Ro-Ro ferries. The berth will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 240m in length.

Berth 52 was granted permission under An Bord Pleanála Ref. PL29N.PA0034. As a result of the proposed development of Berth 53, permitted Berth 52 requires repositioning.

Proposed amendments to Berth 52, presented in Figure 3-4, comprise the following:

- Rotation of Berth 52 and all associated elements including a Ro-Ro jetty structure (circa 288m in length), by approximately 9 degrees (clockwise). This relatively minor reorientation allows Berth 53 connectivity with the Port lands, minimises its length and maximises the buffer between Berth 53 and the boundary of the South Dublin Bay and River Tolka SPA. The design evolution of Berth 53 is described in Chapter 4 of this EIAR. The structure comprises a combination of a steel cellular wall, steel sheet pile combi wall, and an open piled structure (at the commencement of Berth 53). The proposed combi wall will be comprised of circular piles of circa 1.6m diameter with sheet pile infill panels. These piles will be driven to a depth of circa -30m CD.
- Rotation of the proposed linkspan to Berth 52 to allow two-tier access to the Ro-Ro ferries: and, reinforced concrete bankseat to support the linkspan..
- Rotation of the proposed ramp structure to access the upper linkspan tier.
- Installation of jetty furniture including fenders, mooring bollards, handrails and an automated mooring system.
- Installation of a new power outlet for Ship to Shore Power which will be fed from the proposed substation adjacent to the proposed parking and set down area.
- Construction of a new piled quay wall structure approximately 52m in length to accommodate the linkspan structure and to provide additional operational quayside space at Berth 49. The 52m long walls will be back filled with granular fill material.

Berth 49 was granted permission under An Bord Pleanála Ref PL29N.PA0034. As a result of the proposed repositioning of Berth 52 permitted Berth 49 requires minor amendments.

Proposed amendments to Berth 49 comprise:

- Encompassing the eastern dolphins associated with Berth 49 within a new piled quay wall structure approximately 40m in length at the eastern end of Berth 49. The 40m long walls will be back filled with granular fill material.
- The overall length of Berth 49, or functionality of the berth will not be altered. Berth 49 will accommodate vessels up to 240m in length.

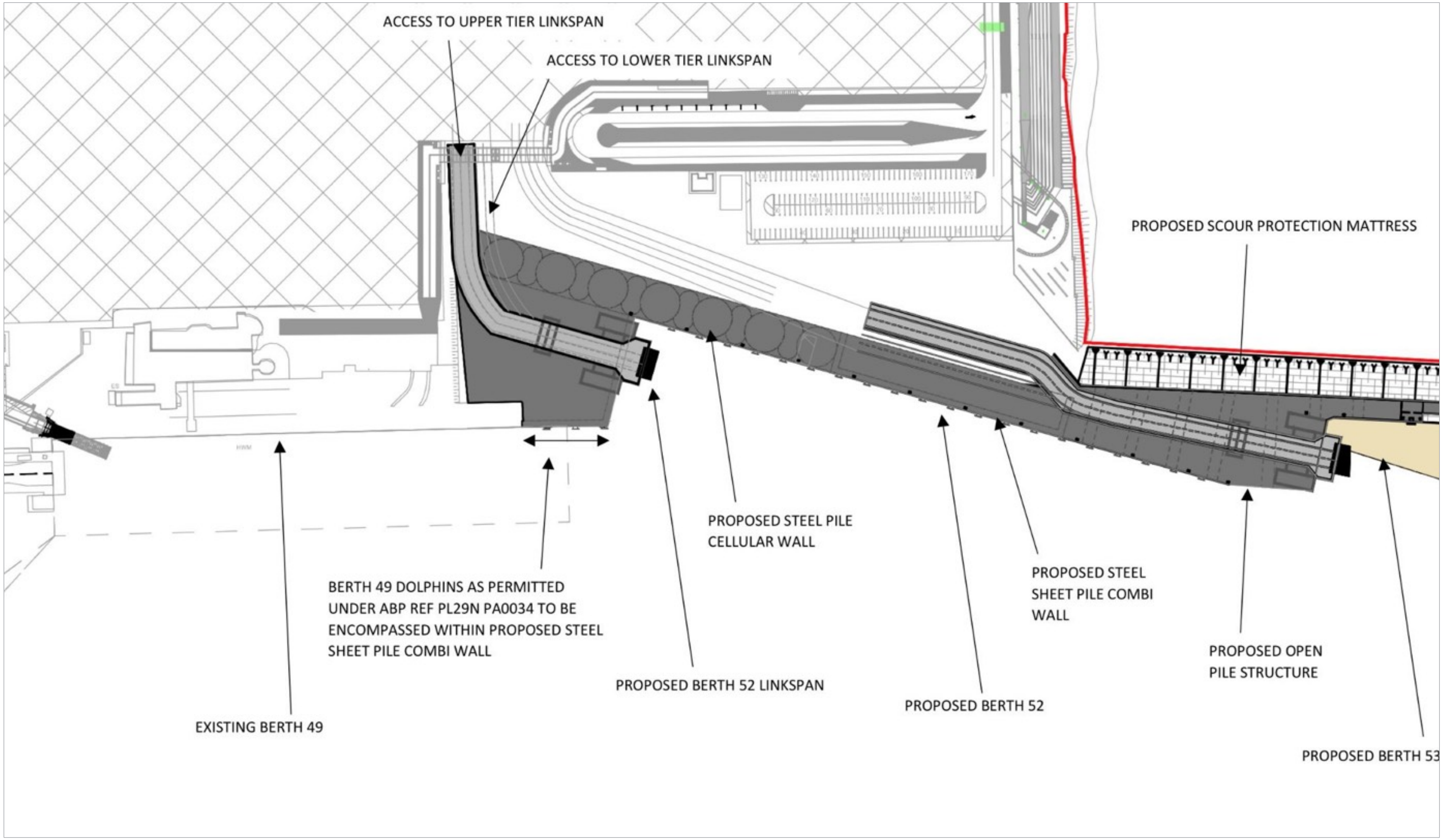


Figure 3-4 Plan View of Amendments to Proposed Berth 52 and Berth 49

3.2.3 Berth 53

Berth 53 will be used predominantly for the berthing of Ro-Ro ferries. The berth will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 240m in length.

The design of Berth 53 has been developed by an iterative process considering, *inter alia*, its functional requirements, navigational safety, impact on views (particularly from Clontarf) and its potential impact on the conservation objectives of the South Dublin Bay and River Tolka SPA. The design evolution of Berth 53 is described in Chapter 4 of this EIAR.

The proposed works at Berth 53 are presented in Figure 3-5, and will comprise:

- The construction of a new Ro-Ro jetty structure approximately 406m in length overall.
- The construction of 8 No. reinforced concrete mooring dolphins on tubular steel piles of circa 1.0m – 1.2m diameter to provide a new berthing face approximately 284m in length;
- Construction of a new linkspan structure to allow two tier access to the Ro-Ro ferries;
- Construction of a new ramp structure to access the upper linkspan tier;
- Construction of a new deck structure to allow access to the lower linkspan tier and dolphins;
- Construction of a reinforced concrete access/maintenance route to the dolphins;
- Construction of a reinforced concrete bankseat for the linkspan;
- Dredging of a berthing pocket to a standard depth of -10.0m CD;
- Installation of scour protection mattresses to provide slope stabilisation and scour protection to the dredged berthing pocket;
- Installation of a wash protection structure to the north line of the 406m jetty structure;
- Installation of jetty furniture including visual screening barriers, fenders mooring bollards, handrails and an automated mooring system.
- Installation of a power outlet for Ship to Shore Power which will be fed from the proposed substation adjacent to the proposed parking and set down area.

The mooring dolphins will be supported on a system of tubular steel piles constructed in a vertical and raking alignment. The access structures to the linkspan will be constructed of tubular steel vertical piles.

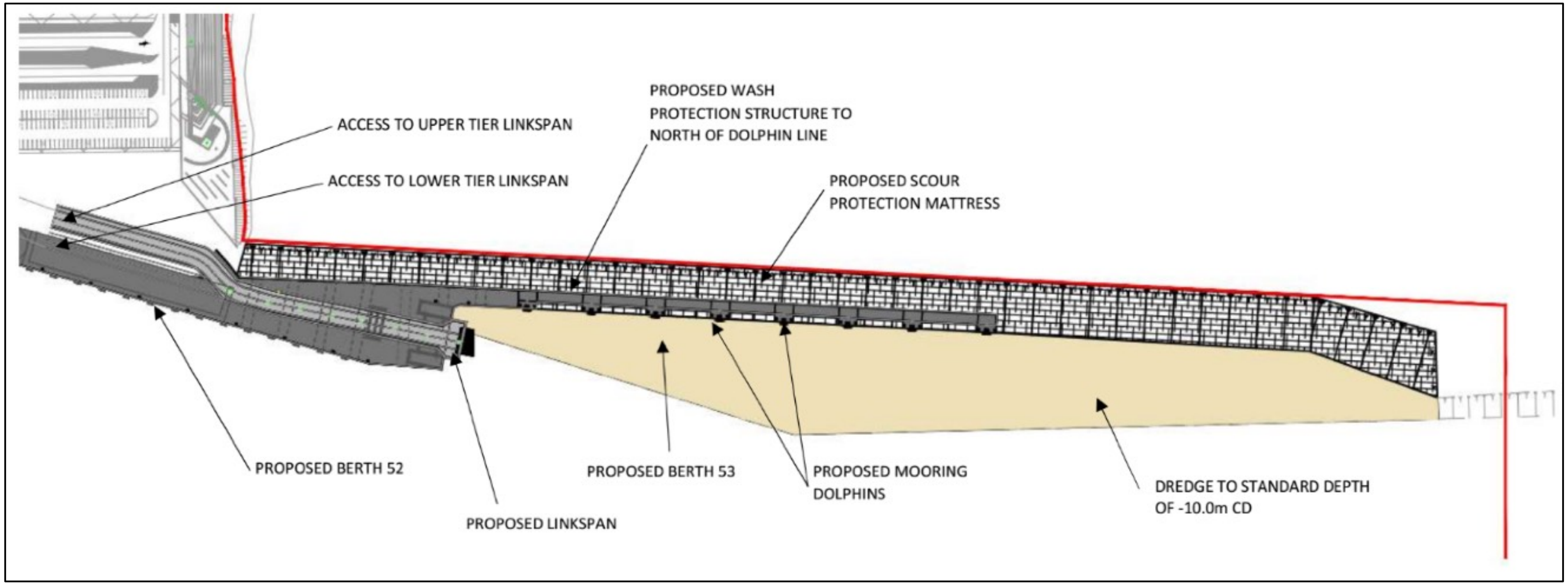


Figure 3-5 Plan view of proposed Berth 53

A schematic of the proposed wash protection structure is indicated Figure 3-6.

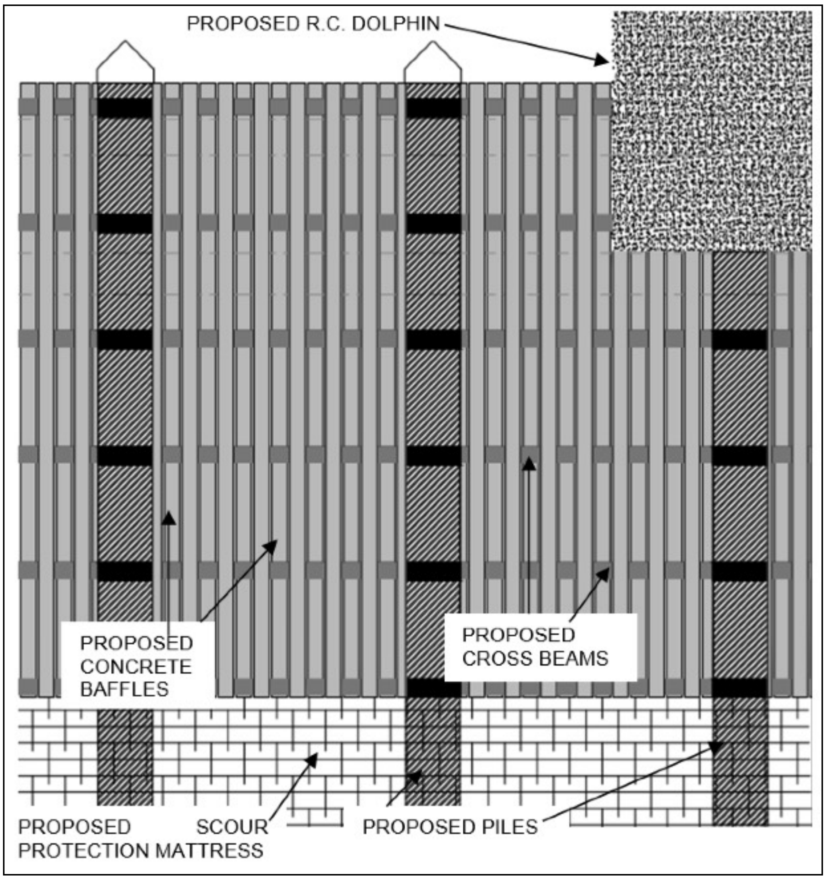


Figure 3-6 Proposed wash protection structure

A cross section through the proposed scour protection mattresses is indicated in Figure 3-7.

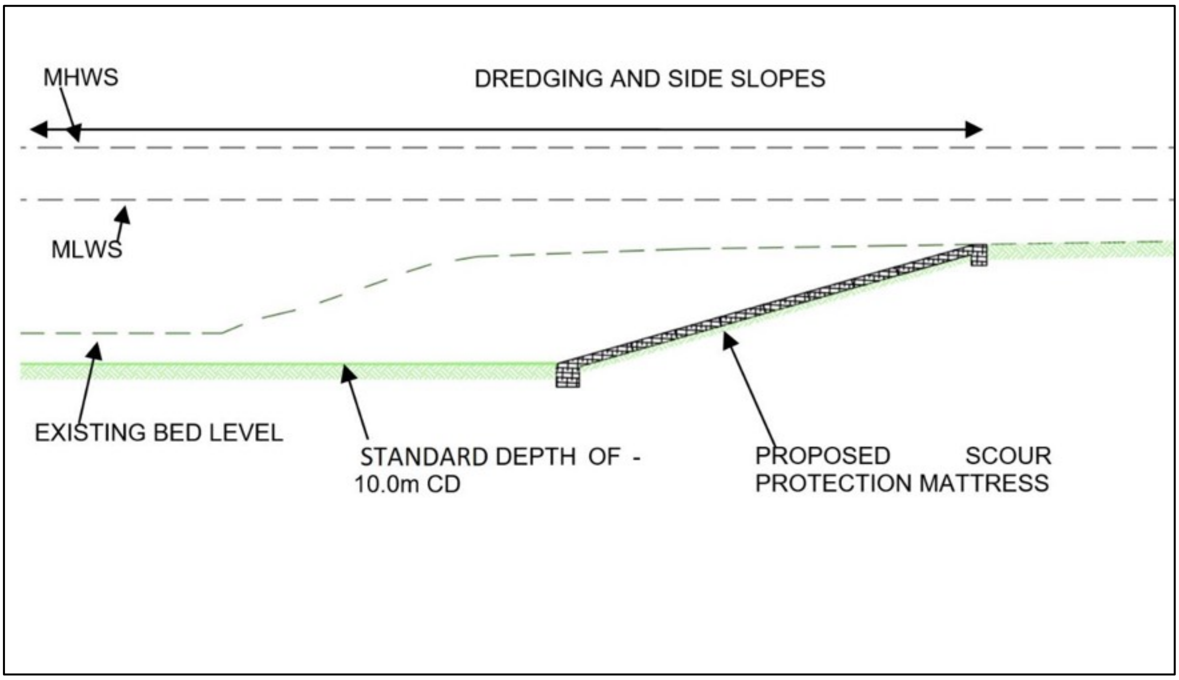


Figure 3-7 Cross section through proposed scour protection mattress

3.2.4 Berth 50A

It is proposed to extend the existing Berth 50A to provide a multi-purpose predominately Lo-Lo Container Vessel berth.

The proposed works at Berth 50A are presented in Figure 3-8 and will comprise the following:

- Demolition of the Port Operations Building and ancillary structures;
- Demolition of the Pier Head at the terminus of the 19th Century Eastern Breakwater including the salvage and storage of masonry units for future use in heritage gain projects;
- Demolition of the southern end of the Eastern Oil Jetty;
- Construction of a new steel sheet pile combi-wall which will act as the berthing face. The proposed combi wall will be comprised of circular piles of circa 1.4m diameter with sheet pile infill panels. The new section of quay wall will be approximately 125m in length, providing an overall quay length of approximately 305m;
- Installation of a sheet pile anchor wall and ties to support the combi-wall;
- Construction of a bridging structure to avoid disruption to existing 220KV High Voltage ESB Cables which run through the site, to include for temporary protection works;
- Backfilling of structure with engineering fill material and Construction & Demolition (C&D) Waste (as part of Oil Berth 3 works);
- Installation of new tubular steel piles to support the extension of the existing crane rails;
- Construction of a new reinforced concrete deck;
- Dredging of a berthing pocket to a standard depth of -11.0m CD;
- Installation of jetty furniture including crane rails, fenders, mooring bollards and emergency ladders.

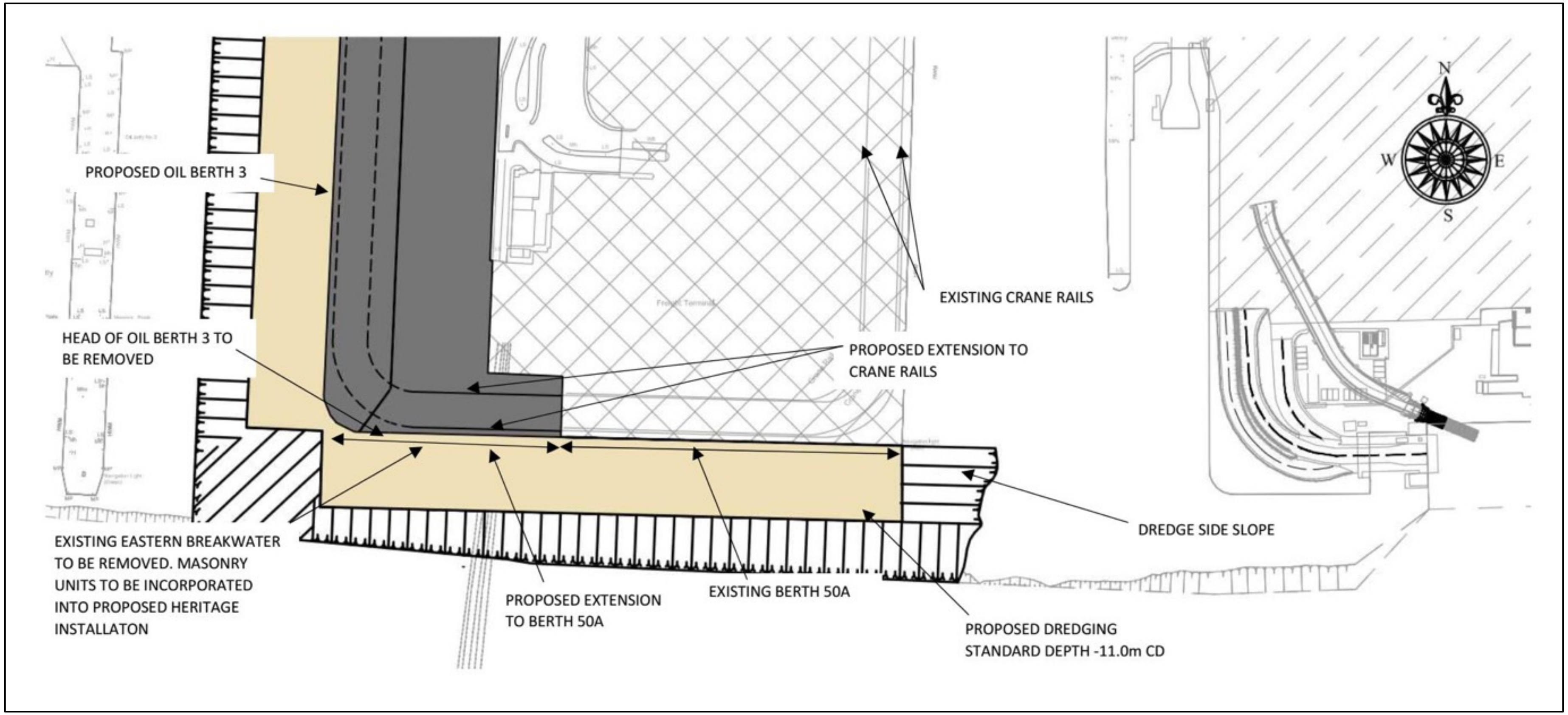


Figure 3-8 Plan view of proposed berth 50A

3.2.5 Oil Berth 3

The Eastern Oil Jetty comprises Oil Berth 3 to the west and Oil Berth 4 to the east. The proposed development will involve the removal of Oil Berth 4 and consolidating operations to Oil Berth 3. The berth will be designed as a multi-purpose structure, initially for oil tanker berthing, with a future potential use as a container vessel berth. The basin at Oil Berth 4 will be infilled to provide an additional container freight terminal storage area. The proposed layout and typical cross section are presented in Figure 3-9 and Figure 3-10.

The works will comprise the following elements:

- Temporary support of the oil berth gantry (framework) and equipment;
- Demolition of the southern end of the Eastern Oil Jetty (as per description of Berth 50A);
- Demolition of the existing pilot boat pontoon and gangway;
- Construction of a new steel sheet pile combi-wall at a minimum of 5m distance from the face of the existing. The proposed combi wall will be comprised of circular piles of circa 1.4m diameter with sheet pile infill panels Oil Berth 3. It is proposed to retain the existing structure in position throughout the works. The new quay wall will be approximately 239m long;
- Infilling of the basin at Oil Berth 4 with engineered fill material and suitable recycled Construction and Demolition (C&D) waste arising from proposed demolition works within the footprint of the MP2 Project development area. The void between the existing Oil Berth 3 and the proposed new sheet pile wall will also be filled with engineered fill material. The quantity of fill material required is approximately 145,000m^3;
- Installation of a sheet pile anchor wall and ties to support the combi-wall;
- Installation of new tubular steel piles to support the potential future extension of the crane rails;
- Construction of a new reinforced concrete deck. The new deck will have a plan area of 20,000m^2 which is an increase of 17,500m^2 over the existing deck area.;
- Construction of a circa 2m high wall as a separation boundary between the Container Freight Terminal Yard and the Oil Berth;
- Dredging of a berthing pocket to a standard depth of -13.0m CD;
- Installation of jetty furniture including Fenders (panel and corner roller fenders), mooring bollards and emergency ladders.

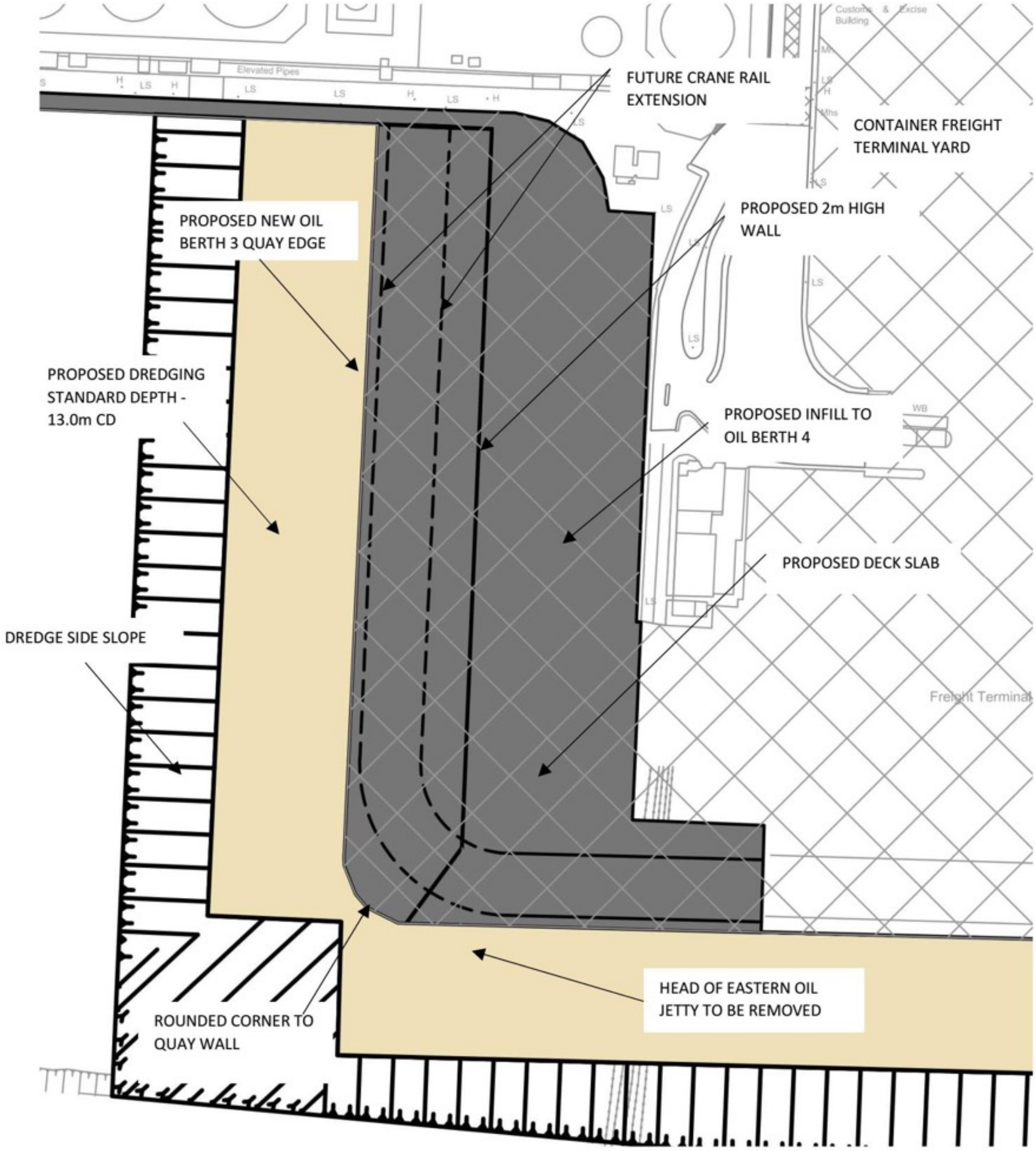


Figure 3-9 Plan view of proposed Oil Berth 3

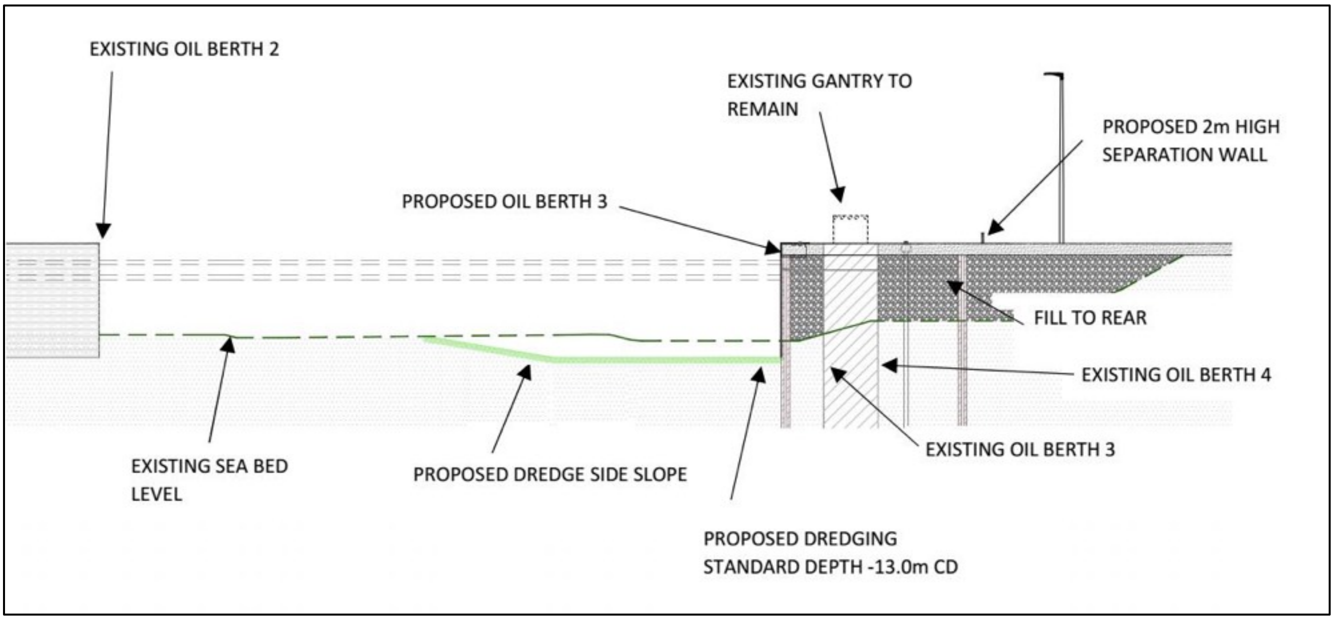


Figure 3-10 Cross section at proposed Oil Berth 3

The dredging of a berthing pocket to a standard depth of -13.0m CD at Oil Berth 3 will require stabilisation of the existing quay wall at Jetty Road. It is not proposed to use this quay wall for the berthing of vessels. The proposed layout is presented in Figure 3-11.

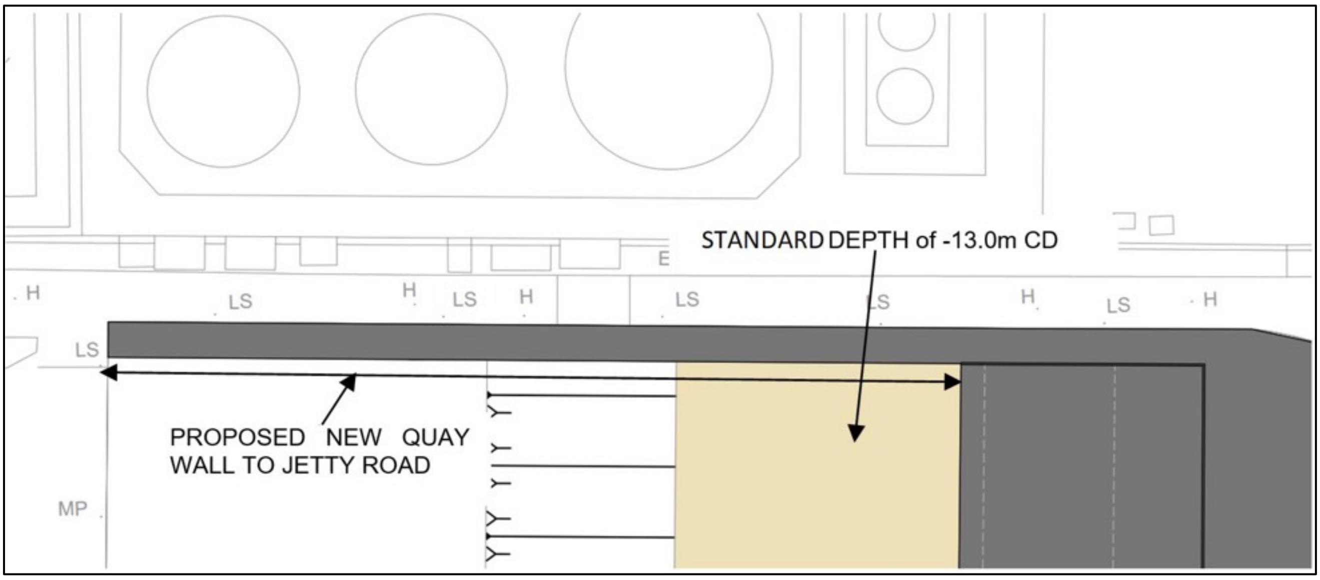


Figure 3-11 Plan of proposed Jetty Road Quay Wall

The works will comprise the following elements:

- Construction of a new steel sheet pile combi-wall 5m in front of the face of the existing Jetty Road quay wall. The proposed combi wall will be comprised of circular piles of circa 1.4m diameter with sheet pile infill panels. It is proposed to retain the existing structure in position throughout the works. The new quay wall will be approximately 120m long;
- Installation of ground anchors to stabilise the new sheet pile combi-wall. These anchors will be fixed into bedrock. This system negates the need for a sheet pile anchor wall;

- Installation of fill material behind the new wall;
- Construction of a new reinforced concrete capping beam;
- Re-decking the existing Jetty Road;
- Installation of furniture including emergency ladders and handrails.

3.2.6 Channel Widening Works

To facilitate the safe navigation and turning of vessels of up to 240m in length, and the expected increased frequency of sailings, channel widening works will be required to the south of the existing navigation channel. Widening will be carried out via dredging works. The standard depth of the channel will be -10.0m CD.

The layout design of the dredging works has been developed via an iterative process considering, amongst others, its navigational safety, proximity to proposed berths, its potential impact on the Great South Wall and its potential impact on the conservation objectives of the South Dublin Bay and River Tolka SPA. The design evolution of the dredging works is described in Chapter 4 of this EIAR.

The navigation channel has permission to be deepened from -7.8m CD to -10.0m CD under the ABR Project (ABP Ref. 29N.PA0034). The capital dredging scheme for the ABR Project commenced in October 2017 with dredging activity taking place within the navigation channel and fairway within Dublin Bay. The ABR Project capital dredging of the section of navigation channel adjacent to the proposed MP2 Project channel widening is scheduled for the winter season October 2020 – March 2021.

A layout of the proposed channel widening works is indicated in Figure 3-12. A typical cross section of the proposed works is indicated in Figure 3-13.

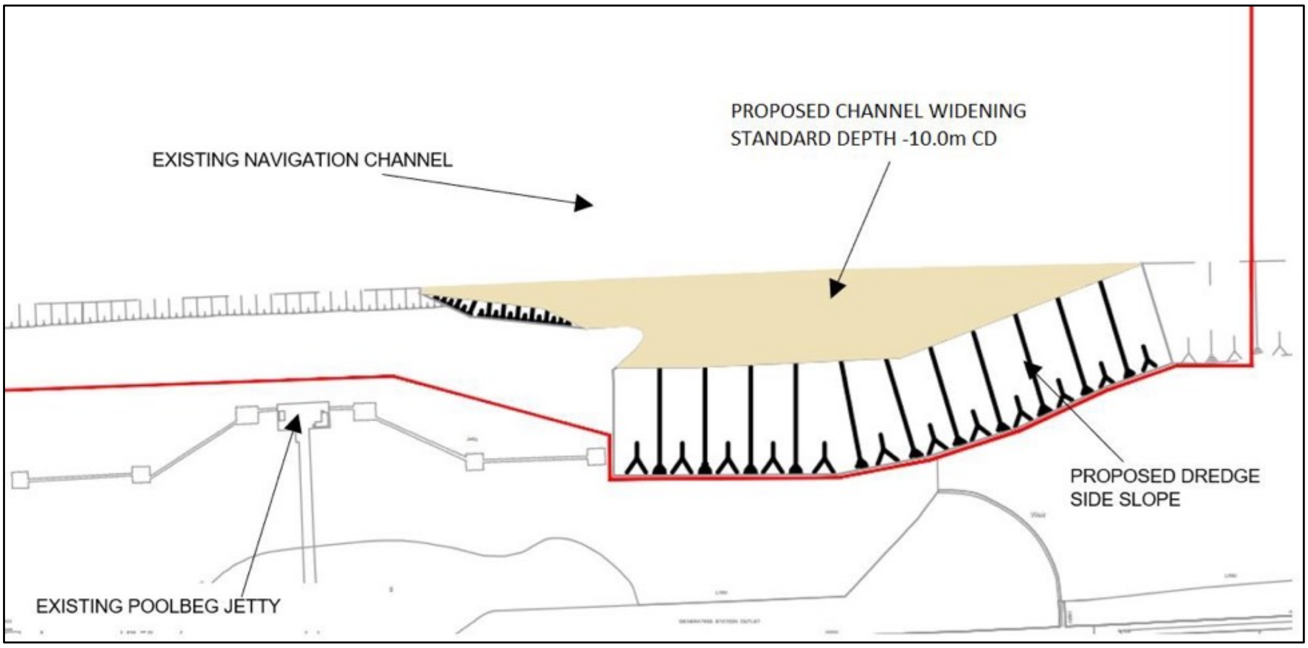


Figure 3-12 Plan view of proposed channel widening works

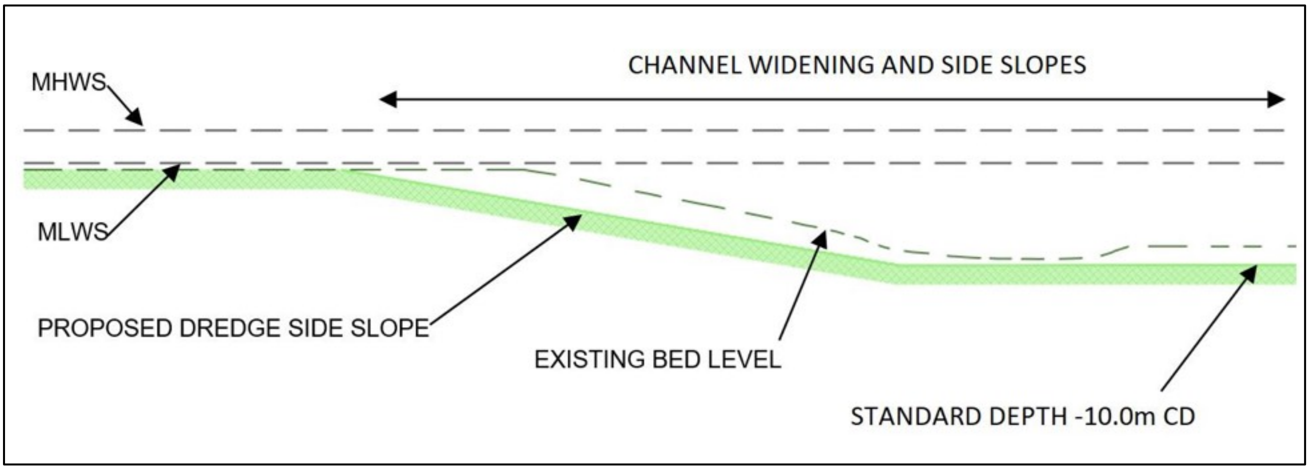


Figure 3-13 Cross section through proposed channel widening works

3.2.7 Dredging & Disposal Works

The volume of capital dredging required for each element of the works, as described in the previous sections, is tabulated in Table 3-1.

Table 3-1 Dredging Summary

Element of Work	Reference within EIAR	Standard depth	Volume
Berth 53	Section 3.2.3	-10.0m CD	159,595m^3
Channel Widening	Section 3.2.6	-10.0m CD	111,995m^3
Oil Berth 3	Section 3.2.5	-13.0m CD	83,414m^3
Berth 50A	Section 3.2.4	-11.0m CD	69,640m^3
Total Volume to be dredged			**424,644m^3**

The capital dredging works will be carried out using a trailing suction hopper dredger 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.

It is proposed to dispose of the dredged material at the licenced dump site at the entrance to Dublin Bay located to the west of the Burford Bank, presented in Figure 3-14. Alternative options considered to disposal at sea are presented in Chapter 4 of this EIAR. The suitability of the dredged material for disposal at sea is presented in Chapter 8 of this EIAR.

The loading and dumping of the dredged material will be subject to separate consents; a Foreshore Licence is required from the Department of Housing, Planning and Local Government (DHPLG) and a Dumping at Sea Permit is required from the Environmental Protection Agency (EPA).

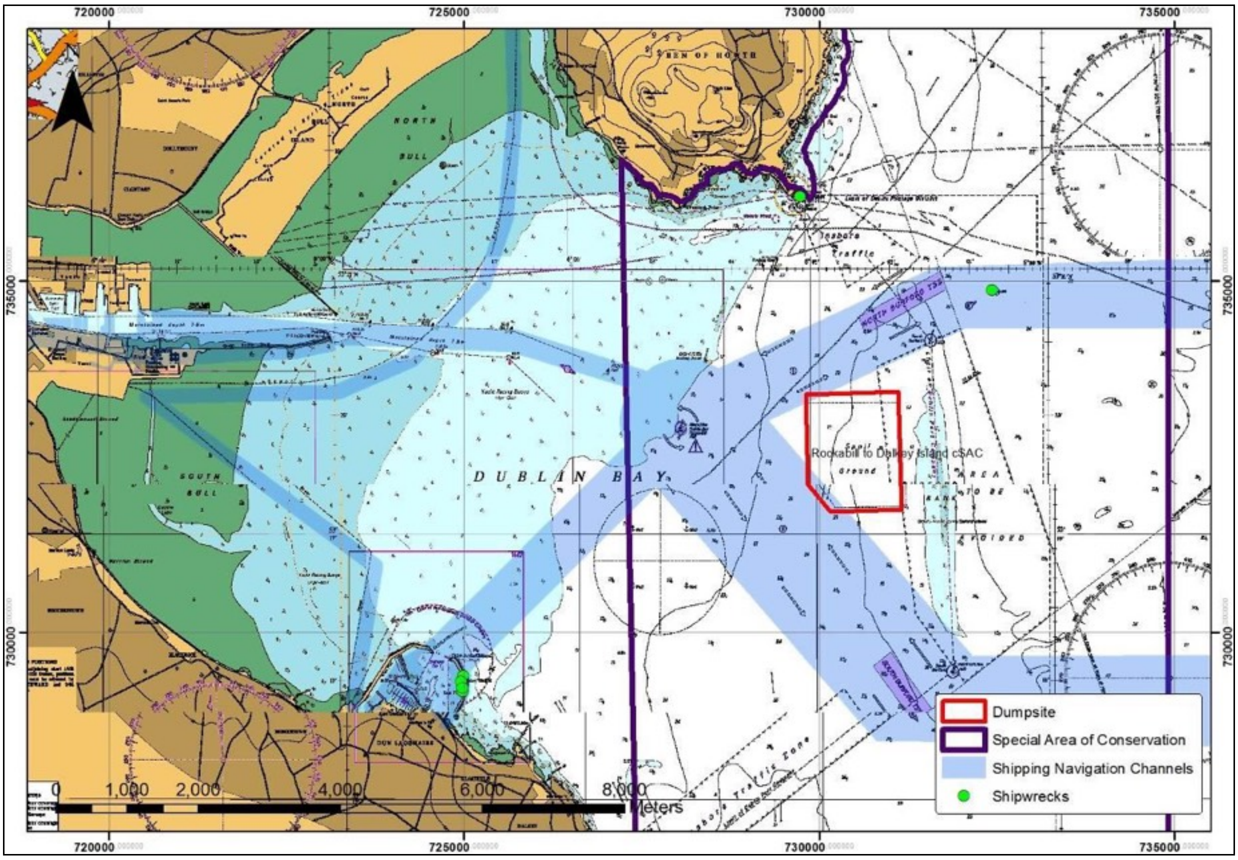


Figure 3-14 Location of licensed offshore disposal site

3.2.8 Unified Ferry Terminal

3.2.8.1 Overview

It is proposed to provide a Unified Ferry Terminal at the eastern end of the port to facilitate Irish Ferries, Stena Line, P&O and the seasonal Isle of Man service. The existing Seatruck operation in this area will be relocated to the western end of the port.

The area at the eastern end of the port currently includes facilities for traffic and passengers both within the International Ship and Port Facility Security Code (ISPS) restricted area and areas outside the restricted area where public access is possible. In order to improve efficiency and optimise the Ro-Ro yard area it is proposed to relocate all public access to the perimeter of the site leaving the internal area free for unified port operations. Upon the completion of the proposed MP2 Project this area will comprise approximately 34.4 hectares of hardstanding space (35.8ha inclusive of State Services Yard which was constructed under the Dublin Port Interim Unified Passenger Terminal [IUPT] - Project Reg. Ref. 3638/18).

The area will be flexible as the usage of the port evolves and will generally be split into staging areas for accompanied heavy goods vehicles (HGVs), accompanied cars and unaccompanied trailers. Circulation routes will be provided to route vehicles from the check in area to each staging area and from each staging area to the berths. Routes will also be provided to route vehicles from the berths back to the unaccompanied staging area and to the exit via the state services yard.

A site plan of the proposed land elements of the works is presented in Figure 3-15. A site plan indicating the operational layout of the Unified Ferry Terminal is presented in Figure 3-16

The proposed land elements of the works will not impede on the existing railway lines present within the site boundary.

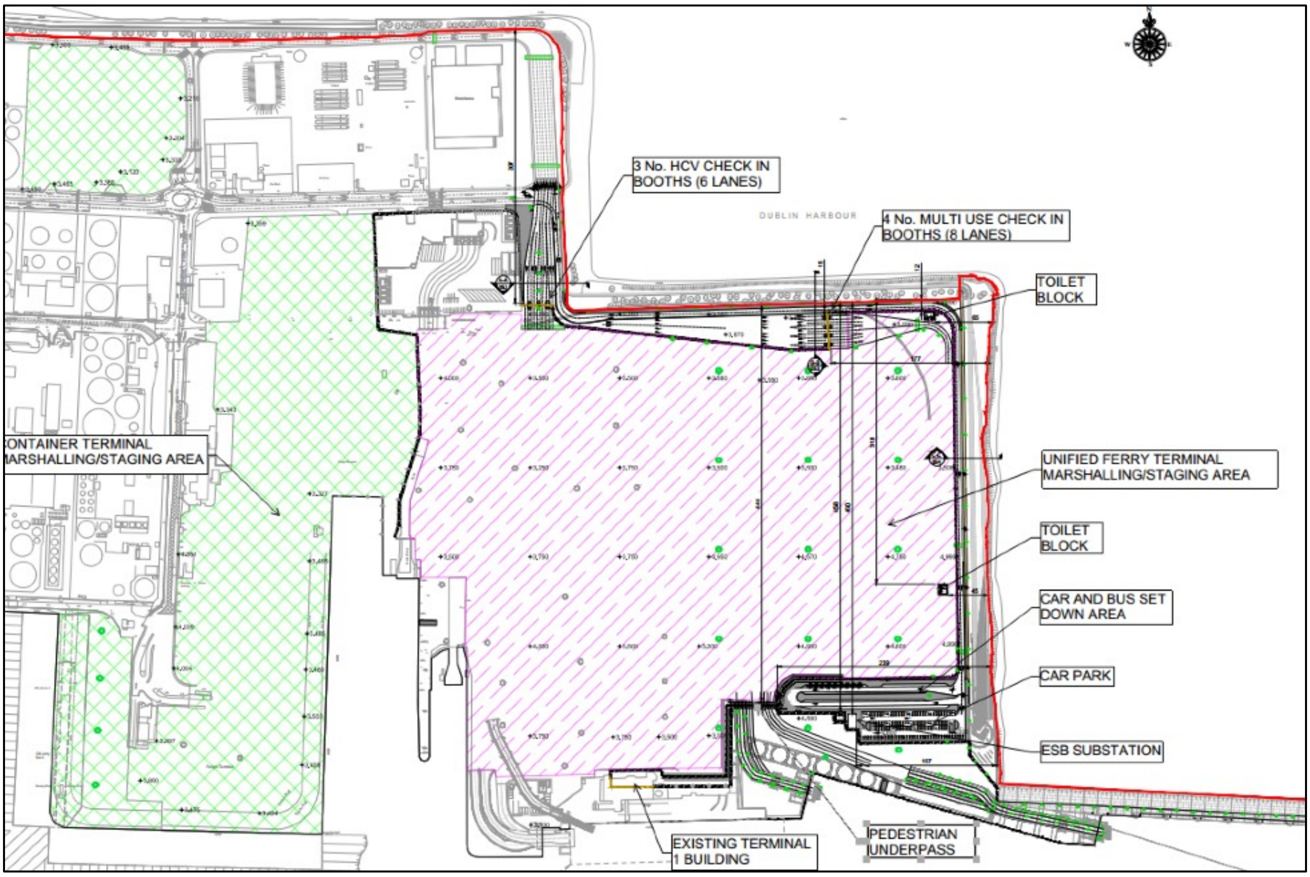


Figure 3-15 Site Plan of the proposed landside elements of the works

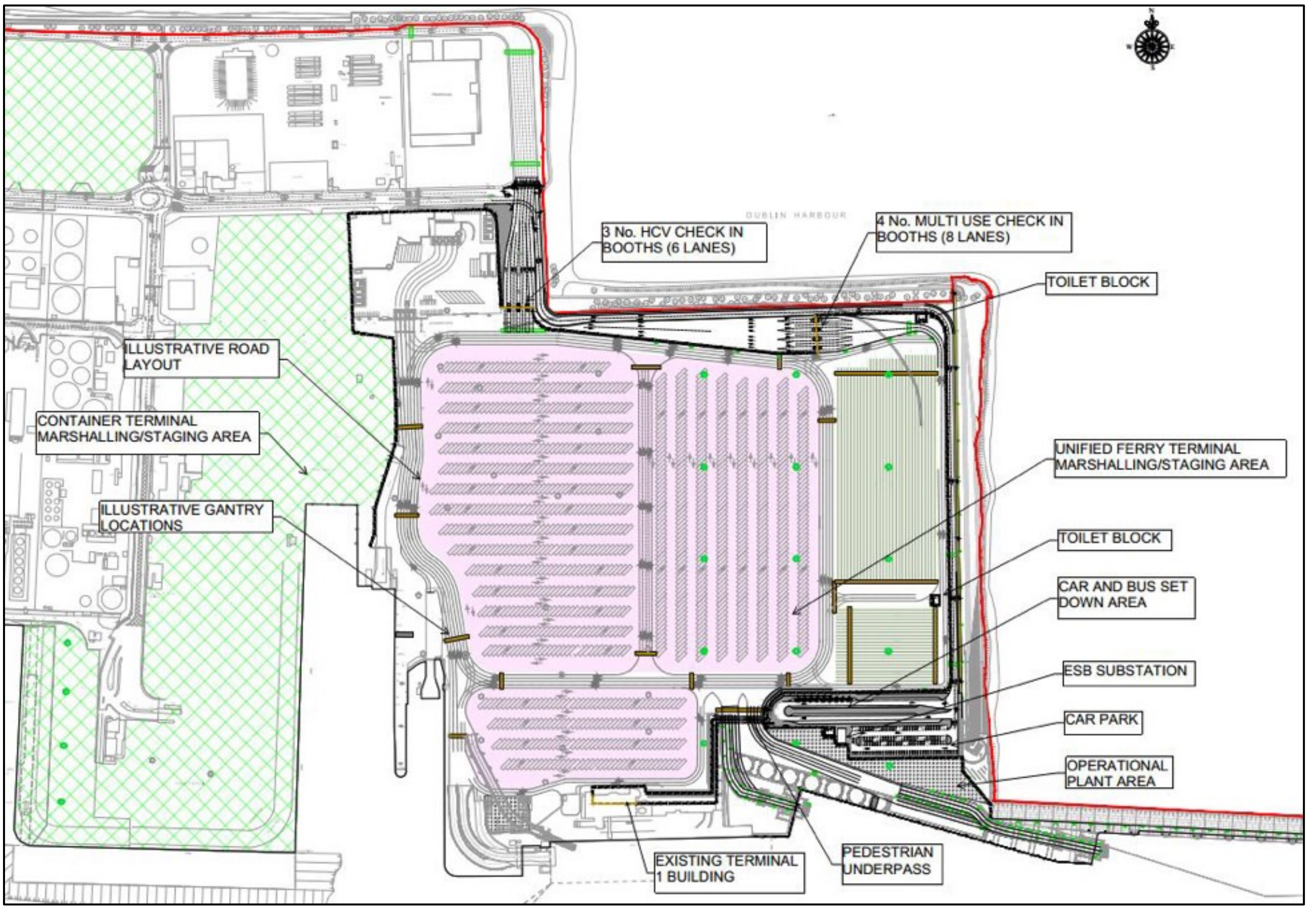


Figure 3-16 Operational Layout of the proposed Unified Ferry Terminal

3.2.8.2 Demolitions

In order to facilitate the proposed Unified Ferry Terminal [UFT] it is a requirement to demolish existing structures within the site. A number of structures are to be demolished in advance of the MP2 Project as part of other permissions.

The demolitions proposed as part of the MP2 Project are outlined below. The gross floor area of each element is provided.

- Terminal 2 Building – steel framed clad structure (1,058m^2)
- Terminal 2 Check In – prefabricated cabin units with steel frame canopy above (603m^2)
- Terminal 5 Building / Offices – modular lightweight structure (796m^2)
- Terminal 5 Check In – prefabricated cabin units, (97m^2)
- Terminal 5 Sheds (3 no.) – Steel framed clad structure with masonry walls (Shed 1 - 325m^2, Shed 2 - 162m^2, Shed 3 - 316m^2
- Terminal 5 Substations (2 no.) – masonry and concrete structure (Substation 1 - 47m^2, Substation 2 - 100m^2)
- Terminal 1 Car Check In - prefabricated cabin units (72m^2)
- Oil Berth 4 basin pontoon – steel frame (198m^2)

- Pier Head – (Overall Area 2,950m^2) Masonry blocks with material infill. Demolition includes modular lightweight port operations building (600m^2) and steel framed mast.

- Head of Oil Berth 3 – concrete / masonry jetty (275m^2)

The Proposed Demolition Plan is presented in Figure 3-17.

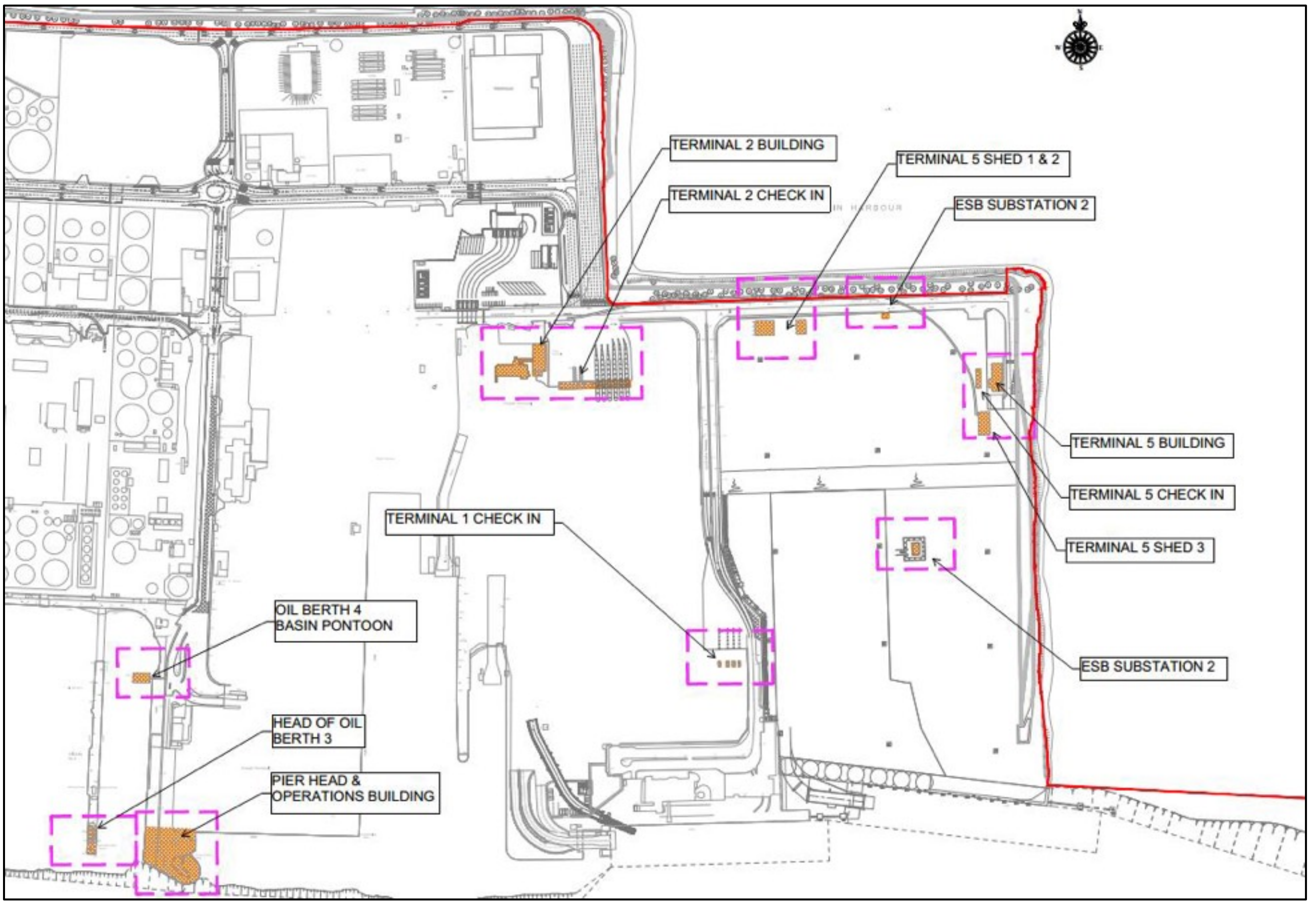


Figure 3-17 Demolition Plan

3.2.8.3 Departures

It is proposed that departing vehicles will arrive to the new Unified Ferry Terminal (UFT) via Promenade Road and the Promenade Road Extension which will be constructed as part of the Dublin Port Internal Roads Project (consented under Reg. Ref. 3084/16). A diagram of the proposed departure route is presented in Figure 3-18. As part of the Dublin Port Internal Roads Project (consented under Reg. Ref. 3084/16), there are seven southbound lanes proposed to link the Promenade Road Extension to the entrance to the UFT at Alexandra Road. There are also four north bound lanes to link arrivals from UFT to Tolka Quay Road.

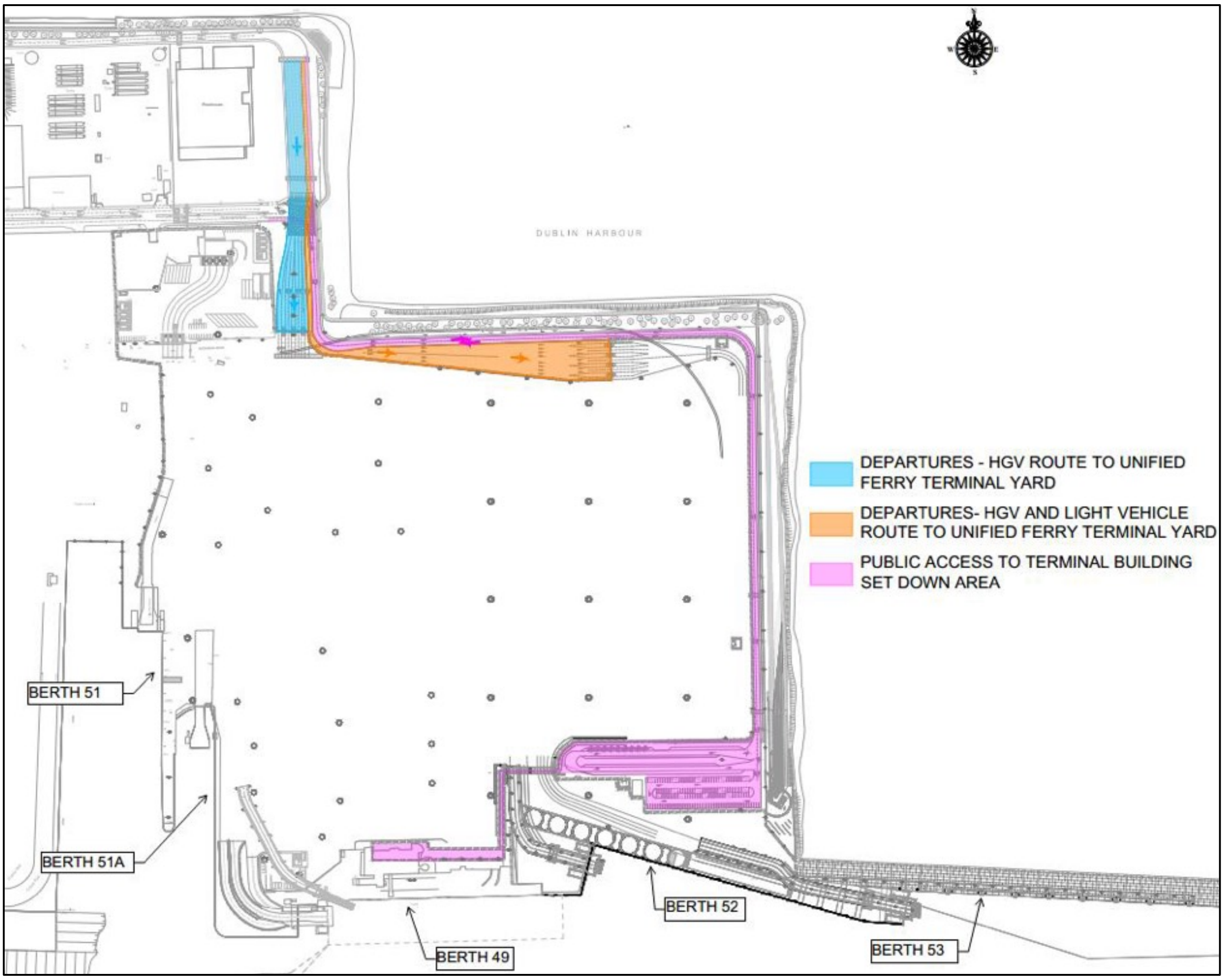


Figure 3-18 Departure Routes

At the end of Promenade Road Extension, the seven departure lanes will be separated through gantry signage with lane designations as indicated below:

- Lane 1 (eastern lane) public access to Terminal 1
- Lane 2 Access to dual use check in booths (HGV/ Light Vehicle)
- Lane 3 to 7 HGV access to check in, which will subsequently split to six check-in lanes.

In order to facilitate infrastructure for departures and public access to Terminal 1 the full width available in this area from the edge of the State Services yard to the west to the edge of the greenway to the east, is required. This will prevent installation of the four northbound arrival lanes as consented under the Internal Roads Project with traffic diverted through the State Services Yard. Arrivals is discussed further below.

<u>Heavy Goods Vehicles</u>

HGV check in will be facilitated at the proposed six lane HGV check-in facility at Alexandra Road and the proposed dual use eight lane check in facility towards the North East corner of the site. The queue lengths have been estimated based on target check in times to ensure adequate space is available in advance of the check-in booths to prevent pre-check in HGV queues from impacting on the public access to the Terminal building or light vehicle access to the dual use check in booths. As the port traffic increases, evolving technology will reduce the target check-in times to reduce the queue. Additional pre-check-in staging areas for HGVs will be provided elsewhere within the port if required. The proposed check-in areas include new double-sided check-in booths with a canopy provided above for cover. It is proposed to provide three new booths to service the six dedicated HGV check in lanes and an additional four booths to service the eight dual use lanes.

Following check-in, accompanied HGVs will be routed through internal circulation roads to a dedicated HGV pre-boarding holding area to await departure. Toilet facilities will be provided in this area and a pedestrian route to the terminal building will also be available via the proposed pedestrian underpass which will maintain all accompanied passengers within the ISPS restricted area. Once called from the holding area by the operator the HGVs will be routed through the internal circulation roads to the relevant berth for departure.

Unaccompanied HGVs will be directed through internal circulation routes to the relevant unaccompanied HGV staging area. Each HGV will be routed to the relevant set down space and drop off the HGV trailer before the HGV tractor unit will leave the port. The trailers will be collected by port tractor units and moved onto the relevant ship for departure.

Car / Tourism Vehicles

It is proposed that check-in for car / tourism vehicles will be facilitated at the new 8 lane dual use (HGV and light vehicle) check in facility at the north eastern corner of the site. The check in area will include four new booths to facilitate eight check-in lanes as discussed in HGV check-in section above. Gantry signage will be used to designate lanes and separate cars and HGVs queuing in this area. The queue lengths have been estimated for various scenarios, based on anticipated traffic, booth numbers and check in times. The design ensures that adequate space is available to facilitate the car/tourism pre-check in queue in line with the guidance on the COMAH Land Use Planning Assessment prepared for the project and discussed in Chapter 6. This requires that only a small portion of this queue (up to 10%) extends into the ‘middle risk zone’.

Following check-in, accompanied cars will be routed through the internal circulation routes to the dedicated car staging area to await departure. Toilet facilities will be provided in this area and a pedestrian route to the terminal building will also be available via the proposed pedestrian underpass which will maintain all accompanied passengers within the ISPS restricted area. Once called from the holding area by the operator the vehicles will be routed through the internal circulation roads to the relevant berth for departure.

Foot Passengers

The existing Terminal 1 will facilitate foot passengers for all berths and operators. Access to the Terminal building will be via the proposed public road which runs around the northern and eastern perimeter of the UFT outside of the ISPS Restricted Area. A cycle track is also provided in this area which links with the cycle facilities proposed under the Dublin Port Internal Roads Project (consented under Reg. Ref. 3084/16), A set down area for both cars and buses and parking facilities is provided outside the south-east corner of the UFT. Access from this point to the terminal building will be on foot with a pedestrian underpass provided to cross pedestrians beneath vehicle movements associated with Berth 52 and 53. Foot passengers will use the existing check-in facilities to cross into the ISPS restricted area within the building. Access to ships on Berth 49 will be available directly from Terminal 1 with access to vessels on other berths by bus from the building. For Berths 51 and 53 the bus will drop passengers off within the vessel and the busses will drop off at passenger walkway structures for Berths 51 and 52.

3.2.8.4 Arrivals

A new State Services facility has been constructed as part of the Interim Unified Passenger Terminal (IUPT) Project (Project Reg. Ref. 3638/18) to the north of the UFT. All vehicles using the port will continue to depart via this area where checkpoint and inspection facilities are provided for An Garda Síochána, Revenue and the Department of Agriculture, Food & Marine.

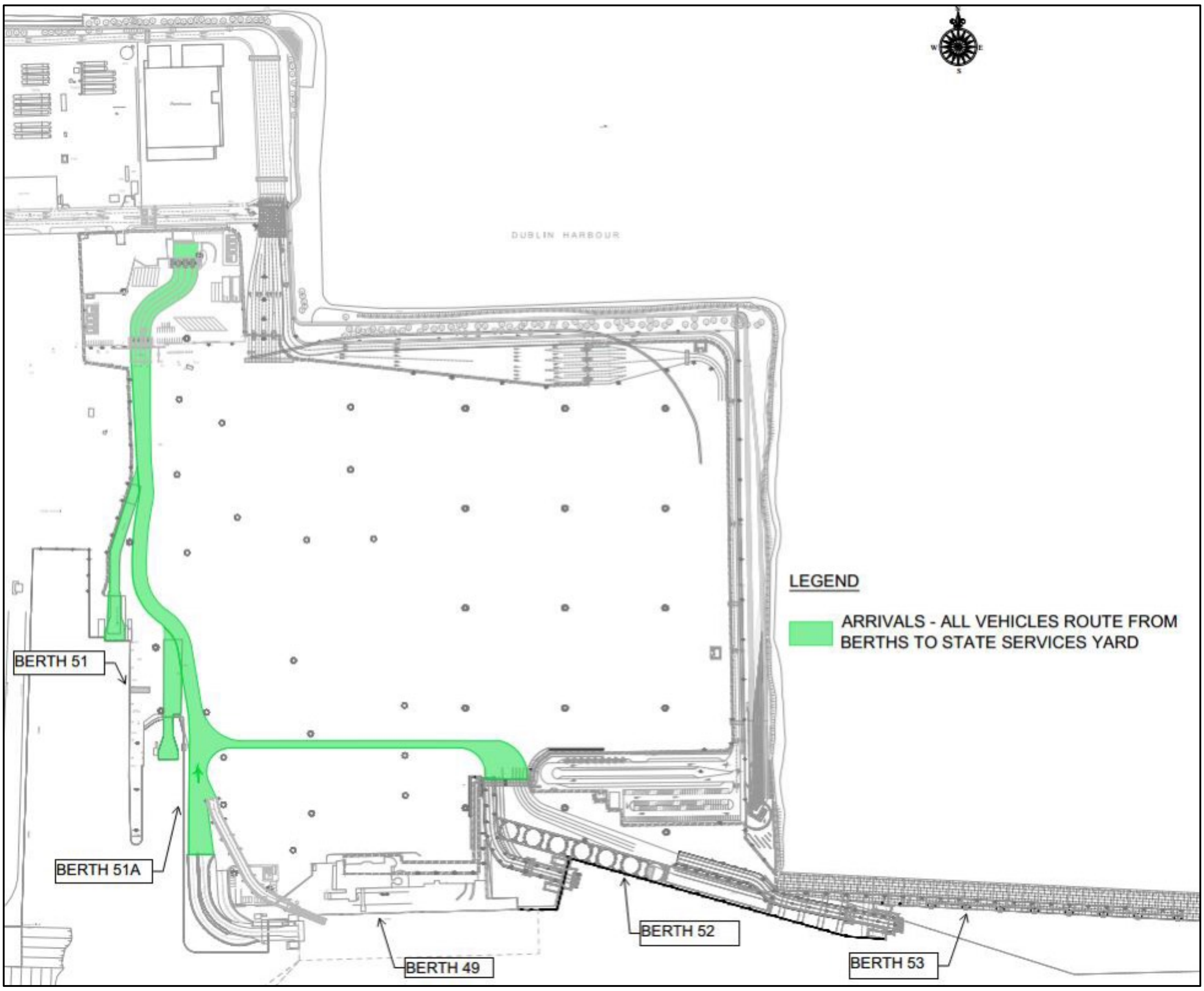


Figure 3-19 Arrival Routes

<u>Accompanied Vehicles</u>

Accompanied vehicles will be unloaded from the ships and directed through internal circulation routes to the state services yard. The operational layout of the UFT is provided which indicates how internal circulation could be provided with flexibility in mind to ensure it is possible to re-route vehicles arriving on the ships through the UFT to reach the back of any arrivals queue in the event of a delay in the state services yard. Lanes within the pre-boarding staging areas may also be used to hold arrival vehicles if required in the event of a significant delay.

Unaccompanied Units

The unaccompanied units will be unloaded by port tractors to a designated unaccompanied trailer holding area. The articulated tractors collecting the vehicles will enter the port through the HGV check in lanes and route to the relevant unaccompanied staging area and collect the relevant trailer. The HGV tractor and trailer unit will then exit via the state services yard.

3.2.8.5 Foot Passengers

Arriving foot passengers will be transported back to the terminal by bus (and walkway from Berth 49). They will exit the ISPS Restricted Area through the check point for An Garda Síochána; Revenue and the Department of Agriculture, Food & Marine using the facilities already in place in Terminal 1. They will then walk through the public side of the pedestrian underpass to access the pick-up and public transport facilities available at the set down and parking area. Vehicles departing this area will then pass along the public perimeter road on the north and east boundary of the UFT and cross the HGVs queuing pre-check-in using the proposed signalised junction before joining the main port exit route on Tolka Quay Road.

3.2.8.6 Structures

The proposed primary landside structures are as follows:

- **Heritage Installation**

  The MP2 Project includes a proposal to create a Heritage Zone, commemorating the industrial and cultural heritage of Dublin Port in the following ways:

  - The original location of Pier Head (which will be removed as part of the MP2 Project) will be recorded in inscribed text on the new quay at Berth 50A.
  - A new structure or 'Marker' will be created to denote the final entrance and exit point to the port as envisaged by the Dublin Port Masterplan 2040, reviewed 2018. The Marker will incorporate the original bell and lantern which have been salvaged for conservation from the lighthouse that once stood at the end of Breakwater Road, which demarcated the end of the port in the Victorian era. A view of the Marker is presented in Figure 3-20.
  - Accessible to the public by bridge, the Marker includes a viewing and interpretative deck to communicate the history of Pier Head, the legacy of Port Engineer Bindon Blood Stoney and the significance of the surrounding environment, providing views over the port and Dublin Bay.
  - Beneath the Marker, an informal performance space in the shape of the Breakwater 'roundel' will create a small amphitheatre defined by retained granite from Pier Head.
  - The proposal includes for a Sea Organ and Aeolian Harp, natural musical instruments which 'play' when water laps against a series of pipes and wind blows against a series of strings.
  - The Heritage Zone will converge with the end of the new 4km Greenway already planned at Dublin Port (Dublin Port Internal Road Network – Reg. Ref. 3084/16), providing newly accessible public realm for leisure and recreation purposes.

Figure 3-20 View of the Marker looking South

A full description of the proposed Heritage Installation is presented in the following reports (under separate cover) which form part of the application for permission.

- Industrial Heritage Impacts and Compensation Planning and Design Report (MOLA Architecture)
- Conservation Strategy and Industrial Heritage Appraisal (Southgate Associates).

- **Pedestrian Underpass:** A pedestrian underpass is proposed to facilitate pedestrian links to the existing Terminal Building. It is proposed that the structure will have two independent corridors to separate passengers within the ISPS restricted area, accessing the Terminal Building from the Accompanied Staging Area, from members of the public, accessing the Terminal Building from the set down and parking area. On each approach on each side of the ISPS line it is proposed to install Part M Compliant ramps and ambulant disabled stairs. The proposed pedestrian underpass plan is presented in Figure 3-21. A section through the underpass as indicated on plan is present in Figure 3-22.

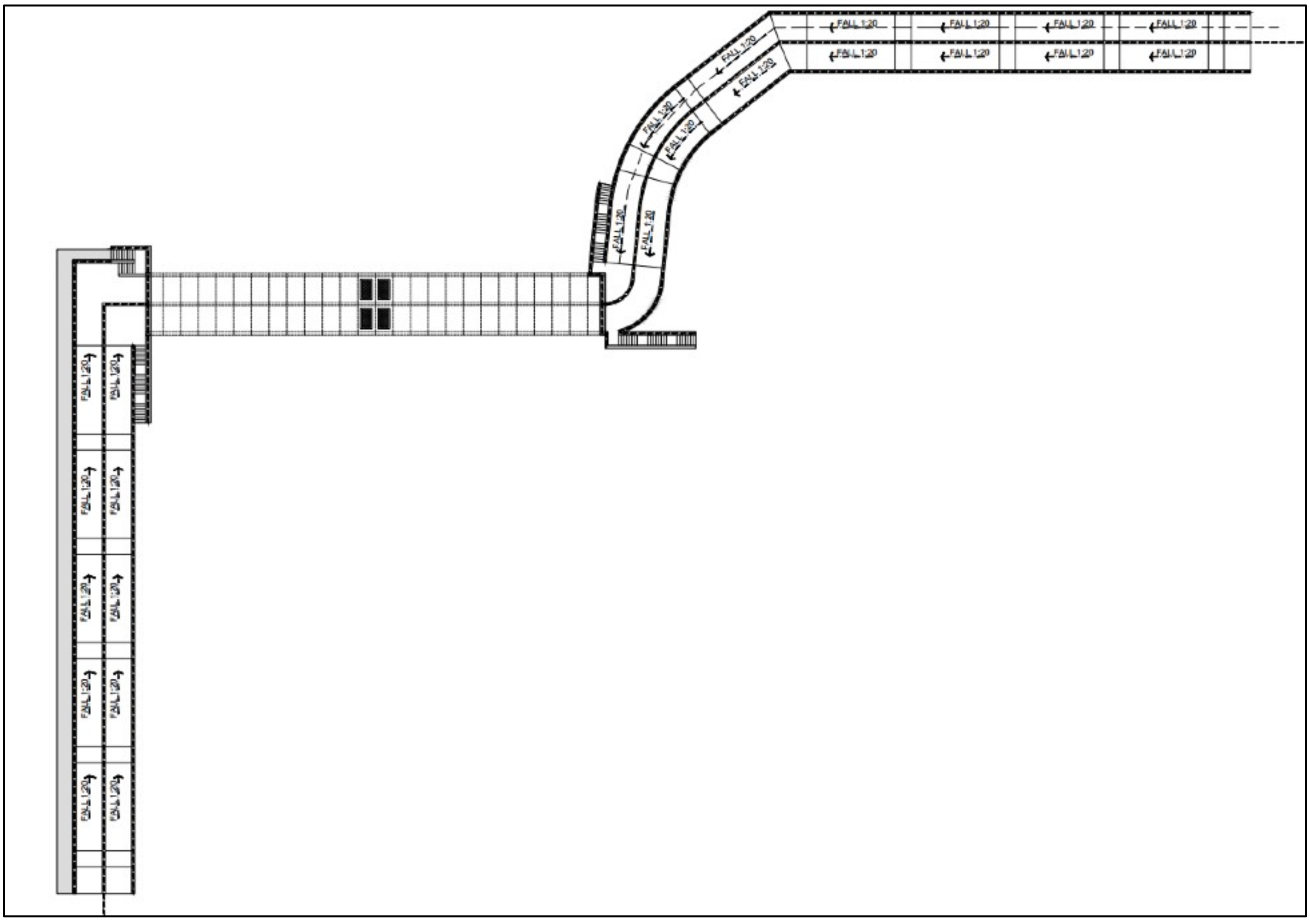


Figure 3-21 Proposed Pedestrian Underpass Plan

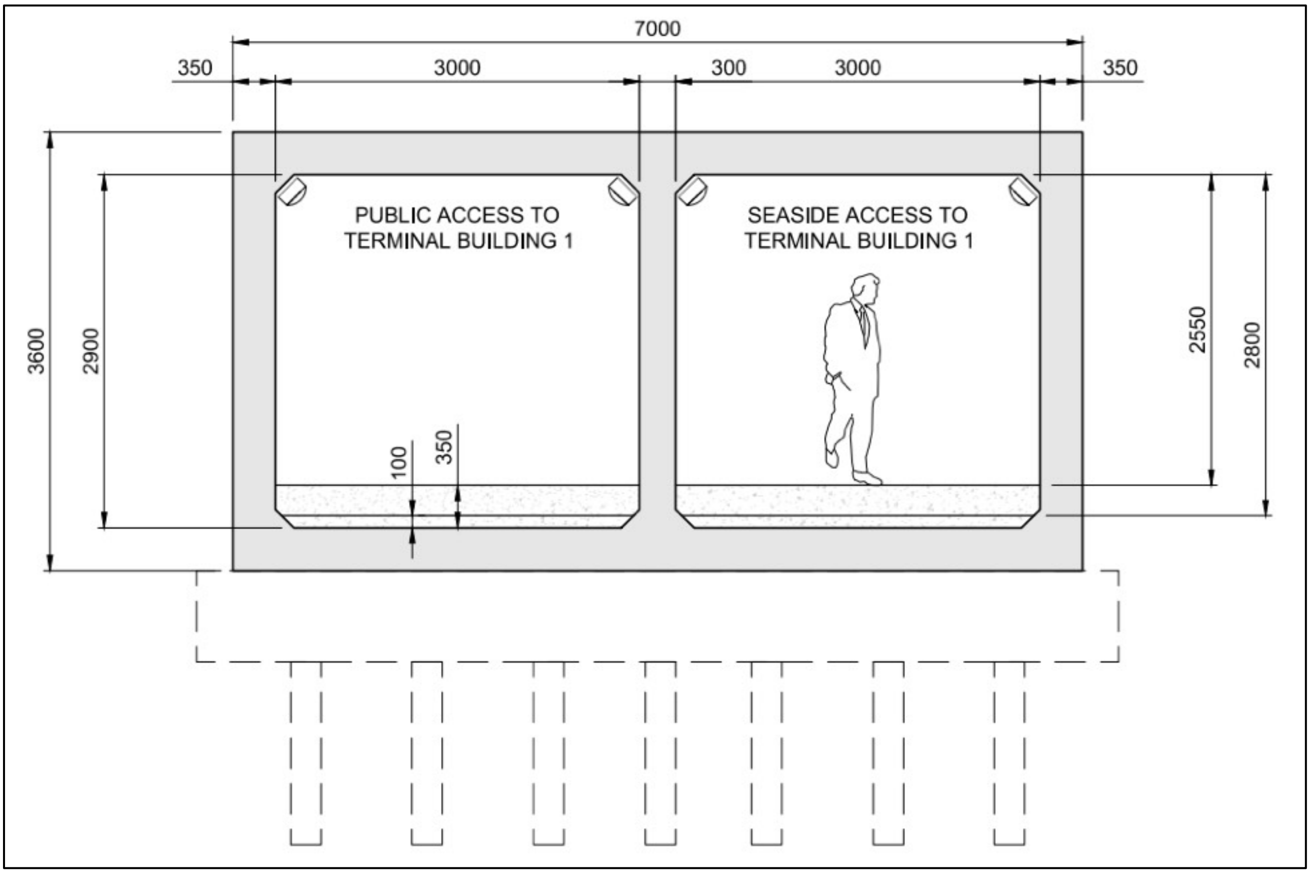


Figure 3-22: Proposed Pedestrian Underpass Section

- **Passenger Walkways:** It is proposed to provide passenger walkway plant to access Berth 51 and Berth 52. Each unit will include an ambulant disabled stairs and an enclosed high-level walkway to facilitate access to the ship. Structures are steel framed lightweight construction. The units will be rubber wheeled mobile port plan of steel framed lightweight construction.
- **Existing Passenger Terminal 1 Building:** It is proposed to retain the existing Terminal 1 Building as the Unified Ferry Terminal Building. An assessment of the building has been undertaken to consider the ability of the building to provide for the peak number of departing and arriving foot passengers. The assessment concluded that adequate capacity is available for the predicted building use. Routes to access and exits points at the building will also be adjusted to maintain separation of passengers and the public using the pedestrian underpass.
- **Toilet Blocks: –** It is proposed to install two toilet blocks within the Unified Ferry Terminal Yard to provide facilities for staff and passengers of accompanied vehicles. A third toilet block which will be accessible by the public is proposed adjacent to the Terminal Building set down and parking area.
- **Gantries:** Gantry structures are proposed to direct traffic both to and within the UFT. The structures will be steel framed construction supported on piled foundations in line with existing gantry signage located within the port. Both static and variable message signage will be installed on the gantries.
- **Lighting:** The street lighting within the UFT has been designed in accordance with CIE 140 and EN 13201-2015. It is proposed to utilise the existing and consented lighting where possible with additional High Mast Lighting (HML) and Street Lighting where required to provide required luminance and uniformity. The

locations of HML poles consented under the ABR Project have been adjusted slightly to take account of the design layout. Proposed street lighting for the development is indicated within the project drawings.

- **Security Fence:** It is proposed to install a new security fence to define the edge of the ISPS Restricted Area at the perimeter of the UFT. The boundary proposed is a 4m high steel bar railing as indicated in the project drawings.
- **Utilities:** It is not proposed to make significant adjustments to existing utilities as part of this project with individual changes required discussed below.
  - Watermain: The existing watermain network will be extended to serve Berth 52 and Berth 53. Facilities will be provided for freshwater bunkering at these berths. It has been confirmed by Irish Water through the pre-connection enquiry process that it is feasible to provide the required additional water demand to facilitate this. Refer to Appendix 5 for the Irish Water pre-connection enquiry and confirmation of feasibility letter.
  - Wastewater Drainage: A gravity sewer is proposed to link the proposed toilet blocks to the existing gravity sewer serving Terminal 5 (which is to be demolished). The existing toilet provision at Terminal 1 Building is considered adequate for the proposed use. It is not anticipated that there will be any increase in the peak wastewater discharge to the public sewer as a result of the development.
  - Stormwater Drainage: There is limited additional hardstanding area proposed within the UFT to that already in place and that consented under the ABR Project. The additional hardstanding is due to the proposed Berth 53. It is proposed to collect storm water on the new hardstanding areas in a closed system and discharge via a new silt trap and oil interceptor/separator to the outfall at Berth 52 as consented as part of the ABR Project. This approach has been agreed in principal with Dublin City Council. Refer to Appendix 5 for a record of correspondence on same.
  - Electrical: It is proposed to provide a new substation to the South East corner of the UFT to facilitate the additional power demand of the proposed UFT and to replace the loads provided by two existing substations within Terminal 5 which are proposed to be demolished. The new substation will also facilitate Shore to Ship Power (SSP) for Berth 52 and 53 to provide required hoteling power demand of berthed vessels. Each berth will be equipped with the required transformer within the new substation building which will serve as galvanic separation between harbours electric grid and the vessels electric system. The substation will link to a power outlet at Berth 52 and Berth 53 to facilitate a connection to berthed vessels. Preliminary consultations with ESB have indicated that they can provide the required level of capacity to feed this sub-station from their existing network, with MV cables uprated locally where required.
  - Communication Network: It is proposed to install ducting to link the proposed development areas back to the existing communications network within the port.

3.3 Construction Phase

3.3.1 Construction Elements

The elements of the construction phase of the MP2 project are:

Modification of the permitted Berth 52 and Berth 49 layout (ABP Ref. 29N.PA0034).to accommodate the proposed new Berth 53. Filling of the existing Berth 52/53 Basin This will include encompassing the consented Berth 49 eastern dolphins within a new quay wall structure.

- Construction of a new Ro-Ro berth – Berth 53, with dredging, scour protection mattresses and wash protection structure;
- Extension of Berth 50A by the removal of the existing Port Operations Building and Pier Head at the terminus of the 19th Century Eastern Breakwater. The proposed development will comprise an extension to Berth 50A to accommodate Lo-Lo vessels;
- Construction of new quay at Oil Berth 3 and infilling of the basin at Oil Berth 4;
- Channel dredging works;
- Dredging at Oil Berth 3 and Berth 50A to accommodate future vessels;
- Heritage Installation;
- Redevelopment and optimisation of the ferry terminal yard to include:
  - Demolition of existing buildings as indicated;
  - Construction of roads and access routes to check in areas and Terminal 1 Building;
  - Construction of two new vehicle check in areas including double sided dual booths with canopies above;
  - Construction of new car parking area and set down area for Terminal 1 Building;
  - Construction of new pedestrian underpass to access the existing Terminal 1 Building;
  - Construction of three new toilet blocks
  - Adjustment to existing utilities and drainage;
  - Construction of new substation building;
  - Installation of new ISPS security fence;
  - Installation of overhead gantries with static and variable message signage;
  - Installation of new High Mast Lighting and Street Lighting;
  - Regrading of levels from western edge of consented ABR Project infill;

3.3.2 Construction Sequence Summary

The following construction sequence summary has been separated into two elements: land phases and marine phases. The proposed project phasing plan is presented in Figure 3-23. The sequencing programme is presented in Figure 3-24.

Figure 3-23 Plan of general project phasing

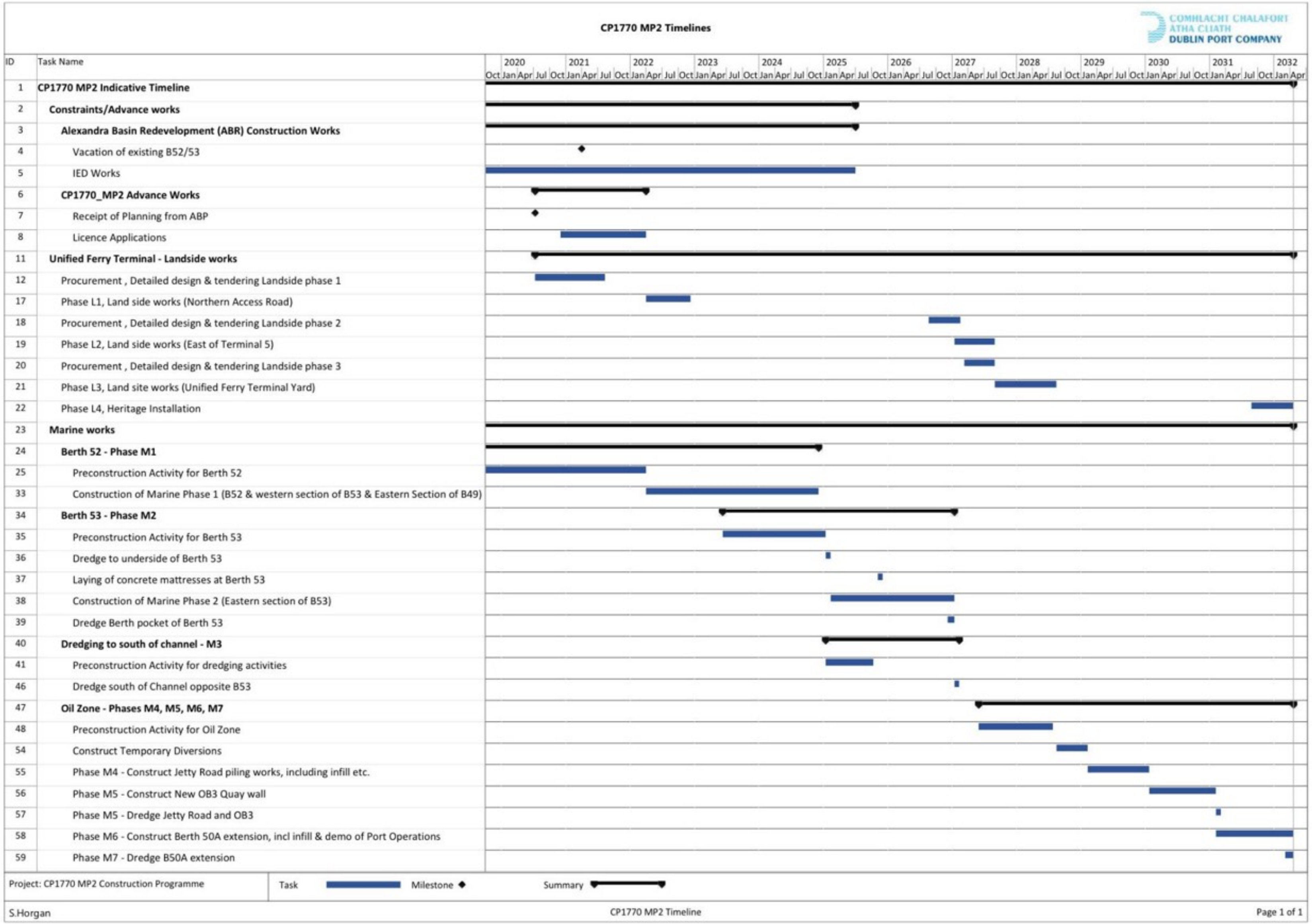


Figure 3-24 Sequencing Programme

Phase L1 – Northern Access Road

Phase L1 comprises the following:

- Demolition of: Terminal 5 Shed 1, Terminal 5 Shed 2, ESB Substation 1;
- Installation of underground services and drainage;
- Construction of new access routes, including gantry signage and street lighting, to the north side of the site and tie in with the DPC internal road network;
- Construction of Toilet Block 3
- Installation of both check-in areas for future commissioning;
- Installation of gated access to the greenway at the north east corner of the site.

The works will take approximately 6 months to complete, commencing in Q1 2022.

Phase M1 – Berth 52

Phase M1 will commence at the same time as Phase L1 (Q1 2022). It is proposed to complete the filling of the basin (ABP Ref. 29N.PA0034), by the construction of a temporary rock armour causeway to the south of the basin. The rock armour causeway will seal the basin from the main navigation channel. The causeway will then be used as the construction platform for the commencement of Phase M1.

The following works in the water are proposed:

- Construction of cellular sheet pile wall (modification from ABP permission 29N.PA0034);
- Construction of steel pile combi-walls;
- Commencement of the installation of the piles and lower deck level to Berth 53.

The following works out of the water are proposed:

- Installation of linkspan structure;
- Installation of reinforced concrete deck;
- Installation of access structure to upper tier linkspan;
- Installation of services and jetty furniture.

The works programme will be 33 months commencing in Q1 2022. Piling in the River Liffey Channel will not take place between March and May in order to avoid the main salmon smolt run. Piling on the land for the deadman walls and rear of the cellular sheet pile structures may occur in this period.

Phase M2 – Berth 53

Phase M2 will commence in Q1 2025 after Phase M1 is completed (Q1 2024). The new deck constructed for Berth 53/Phase M1 will allow construction access to Berth 53.

The following works in the water are proposed:

- Dredging of berth pocket (to a standard depth of -10.0mCD) and side slopes and disposal at sea;
- Installation of slope stabilisation mattresses;
- Installation of vertical and raking piles for the jetty deck and dolphins;
- Installation of vertical piles for wash protection structure.

The following works out of the water are proposed:

- Construction of reinforced concrete decks;
- Construction of reinforced concrete dolphins;
- Installation of steel beams and precast concrete baffles for the wash protection structure;
- Installation of reinforced concrete maintenance access road;
- Installation of linkspan structure;
- Installation of access structure to upper tier linkspan;
- Installation of services and jetty furniture.

The works programme will be 24 months, commencing in Q1 2025.

Construction works will temporarily cease at Berth 53 during extreme low Spring Tides when bird feeding habitat becomes available within the SPA immediately northward of the works.

Phase L2 – Eastern Access Road

Works at Phase L2 will commence after the filling the basin under ABP permission 29N.PA0034 and after Phase M2, i.e. Q1 2027. It will comprise the following:

- Demolition of: Terminal 5 Check In, Terminal 5 Building, Terminal 5 Shed 3;
- Installation of underground services and drainage;
- Construction of new access routes, including gantry signage and street lighting, to the east side of the site;
- Construction of an at-grade car park with designated spaces and bus and car set down area;
- Construction of Toilet Block 1
- Construction of ESB Substation;
- Installation of pedestrian underpass with ramp and stair access;

The works will take approximately 6 months to complete, commencing in Q1 2027.

Phase L3 – Unified Ferry Terminal Yard

Phase L3 will be the final phase of works at the Unified Ferry Terminal Yard. Works to the State Services Yard will have been completed as part of the Interim Unified Ferry Terminal project before the commencement of Phase L3.

It will comprise the following:

- Demolition of ESB Substation 2, Terminal 1 Check In, Terminal 2 Building, Terminal 2 Check In;
- Construction of Toilet Block 2;
- Installation of pavements in required areas (demolished buildings etc.);
- Regrading of levels at western edge of consented ABR infill;
- Installation of underground services and drainage;
- Installation of ISPS fencing;
- Installation of road markings;
- Installation of High Mast Lighting;
- Connection to the L1 and L2 road networks;
- Internal upgrade works to the existing Terminal 1 Building;

The works will take approximately 12 months to complete, commencing in Q3 2027.

Phase M3 – Channel Widening Works

Phase M3 will comprise the dredging and disposal at sea of seabed from the Liffey Channel. The dredging works will be carried out over one dumping at sea season with a programme of 1 month, commencing in Q1 2027. The works will be carried out after the dredging of Phase M2, but during the M2 primary jetty construction works. All capital dredging works will take place within the period October and March. These works will take place post Phase L1 but pre-Phases L2, L3 and L4.

Phase M4 – Jetty Road

Phase M4 will commence after the completion of Phase M3 which will have been completed in Q1 2027.

In advance of Phase M4 commencing, the bitumen importation pipelines shall be relocated to Oil Berth 01 & 02. The gas importation pipelines will remain in operation. No works will be permitted when vessels are berthed.

Phase M4 will comprise the construction of a new sheet pile combi wall at the jetty road. This element of the works will take approximately 12 months to construct, commencing in Q1 2029. The following works in the water are proposed:

- Installation of sheet pile combi-walls;
- Filling of the void between the existing wall at the Jetty Road and the proposed new wall with engineering fill;

- Filling of void between Oil Berth 4 and revetment with engineering fill;

The following works out of the water are proposed:

- Temporary diversion of the existing bitumen importation pipes;
- Installation of a temporary frame to support the existing gantry;
- Installation of sheet pile anchor walls;
- Installation of ground anchors;
- Construction of reinforced concrete decks;
- Installation of services and jetty furniture.

Phase M5 – Oil Berth 3

Phase M5 will occur after Phase M4 is completed.

Phase M5 will comprise the construction of a new steel combi sheet pile wall at Oil Berth 3. The construction works will commence in Q1 2030 and last approximately 12 months and the dredging work a further one month commencing in Q1 2031.

The following works in the water are proposed:

- Installation of sheet pile combi-walls;
- Filling of void between existing wall at Oil Berth 3 and the proposed new wall with engineering fill;
- Filling of void between Oil Berth 4 and revetment with engineering fill;
- Dredging to a standard depth of -13.0m CD and side slope and disposal at sea;

The following works out of the water are proposed:

- Temporary diversion of the existing bitumen importation pipes;
- Installation of a temporary frame to support the existing gantry;
- Removal of existing deck beams which span the concrete caissons;
- Installation of sheet pile anchor walls;
- Installation of steel bearing piles for the future crane rails;
- Construction of reinforced concrete decks;
- Installation of services and jetty furniture.

Phase M6 – Berth 50A

Phase M6 will commence after Phase M5 is completed.

Phase M6 will comprise the construction of a new sheet pile to the west end of Berth 50A. The primary construction works will last approximately 15 months, commencing in Q1 2031.

The following works in the water are proposed:

- Excavation of Pier Head at the Eastern Breakwater. All masonry units will be recorded and re-used as part of a heritage installation at the port (Phase L4). The made ground will be excavated and disposed of at a suitably licenced site;
- Excavation of the south end of the existing Oil Berth 3/4 jetty;
- Installation of sheet pile combi-walls walls;
- Fill of void between existing wall at Oil Berth 3 and the proposed new wall with engineering fill;
- Filling of void between Oil Berth 4 and revetment with engineering fill;
- Installation of ESB 220kV feeder cable bridging structure;

The following works out of the water are proposed:

- Demolition of the Port Operations Building;
- Installation of a temporary frame to support the existing gantry;
- Installation of sheet pile anchor walls;
- Installation of steel bearing piles for the future crane rails;
- Construction of reinforced concrete decks;
- Installation of services and jetty furniture;

Piling in the River Liffey Channel will not take place between March and May in order to avoid the main salmon smolt run. Piling on the land for the deadman walls and piling through the existing Eastern Breakwater may occur in this period.

Phase L4 – Heritage Installation

Phase L4 will commence mid-way through Phase M6, i.e. in Q3 2031. The works will comprise the construction of the heritage zone incorporating the masonry blocks recovered during Phase M6 and the installation of the heritage structures. The works will take 9 months to complete.

Phase M7 – Dredging of Berth 50A

Phase M7 will commence upon completion of Phase M6.

Phase M7 will comprise the dredging in front of the existing Berth 50A to a standard depth of -11.0m CD and disposal at sea of the material. This phase will commence in Q1 2032. The works will take one month to complete.

3.3.3 Construction Methodology

The following sections outline the proposed construction methodology:

Landside Structures (Phases L1 – L4)

- **Heritage Installation:** The main components of the heritage installation, comprising the 'Marker' and access bridge, will be fabricated off-site. These components will be transported and assembled on site. These elements will require precast concrete piled foundations which will be installed using the same construction techniques as the landside structures (High Mast Lighting). The other public realm elements will be built using conventional construction techniques.
- **Pedestrian Underpass:** The pedestrian underpass will be of precast concrete construction with the approach ramps and vertical circulation structures constructed of reinforced concrete. Piles will be installed, and existing material and piles will be excavated to a suitable formation level. A concrete slab / pile cap will be installed on the piles and the precast concrete underpass sections will be dropped into place above. The ground at the proposed approach ramps and stairs will be excavated with a stone base and concrete retaining walls and slabs installed to form the structure. Areas will be backfilled to finished level as the installation progresses. Note the works area is located in the vicinity of the proposed infilling works which are permitted under ABP Reg. Ref. PL29N.PA0034. Any fill material installed in the proposed underpass location to infill this area will be inert in nature to avoid excavation of contaminated material.
- **Check in Booths and Canopies:** The check in area is to be constructed of steel framed lightweight construction. The ground below will be excavated, and a stone base installed below a concrete raft foundation.
- **Passenger Walkways:** It is proposed to install passenger walkway plant to access Berth 51 and Berth 52. Each walkway will include an ambulant disabled stairs, and an enclosed high-level walkway to facilitate access to the ship. The units will be rubber wheeled mobile port plan of steel framed lightweight construction.
- **Existing Passenger Terminal Building:** The existing Passenger Terminal 1 Building will be utilised as the Unified Ferry Terminal Building to facilitate foot passenger check in and provide facilities for those in accompanied units awaiting departure. The building already has facilities for State Services to inspect foot passengers. Routes to access and exits at the building will be adjusted to maintain separation of passengers and the public using the pedestrian underpass.
- **Gantries:** Gantry structures are proposed to direct traffic both to and within the UFT. The structures will be in line with existing galvanised steel gantry signage located within the port. Gantries will be supported on piled foundations.
- **Lighting:** Additional High Mast and Street Lighting are proposed as part of the works. High Mast Lighting proposed for the new development is indicated within the project drawings. A piled foundation is proposed for High Mast Lighting with standard concrete gravity foundations proposed for regular street lighting.
- **Security Fence:** It is proposed to install a new security fence to define the edge of the ISPS Restricted Area at the perimeter of the UFT. The typical boundary proposed is a 4m high steel bar railing as indicated in the project drawings. The vertical steel posts are to be installed at regular centres in a concrete gravity foundation.

- **Utilities:** Works will involve the installation of below ground watermain, storm sewer, cabling and ducting for communication and electrical infrastructure. Works will involve excavation of relevant areas, installation of infrastructure and reinstatement of ground to required level and surface material.
- **Substation:** A new substation is proposed as part of the works. This will be of masonry construction with a concrete roof and concrete floor slab and trenches below. It will be installed on a piled foundation.
- **Toilet blocks:** Three toilet blocks are proposed as part of the development. Toilet blocks will be of traditional masonry construction with a lightweight timber roof. The ground below will be excavated, and a suitable stone base installed below a concrete raft foundation.
- **Demolitions:** In order to facilitate the proposed Unified Ferry Terminal, it is a requirement to demolish a number of existing structures within the site. Demolitions proposed to be undertaken as part of MP2 project are indicated in Figure 3-17. The construction of each structure is discussed in 3.2.8.2. All proposed demolitions will involve the dismantling in situ of all existing above ground elements and breaking out of existing bases at ground or below ground level. Waste will be segregated at source into suitable waste streams. Material will be reused on site where possible and removed off site to suitable waste facility where required.

The proposed construction areas (site compound, storage and site) are indicated in Figure 3-25, Figure 3-26, Figure 3-27 and Figure 3-28.

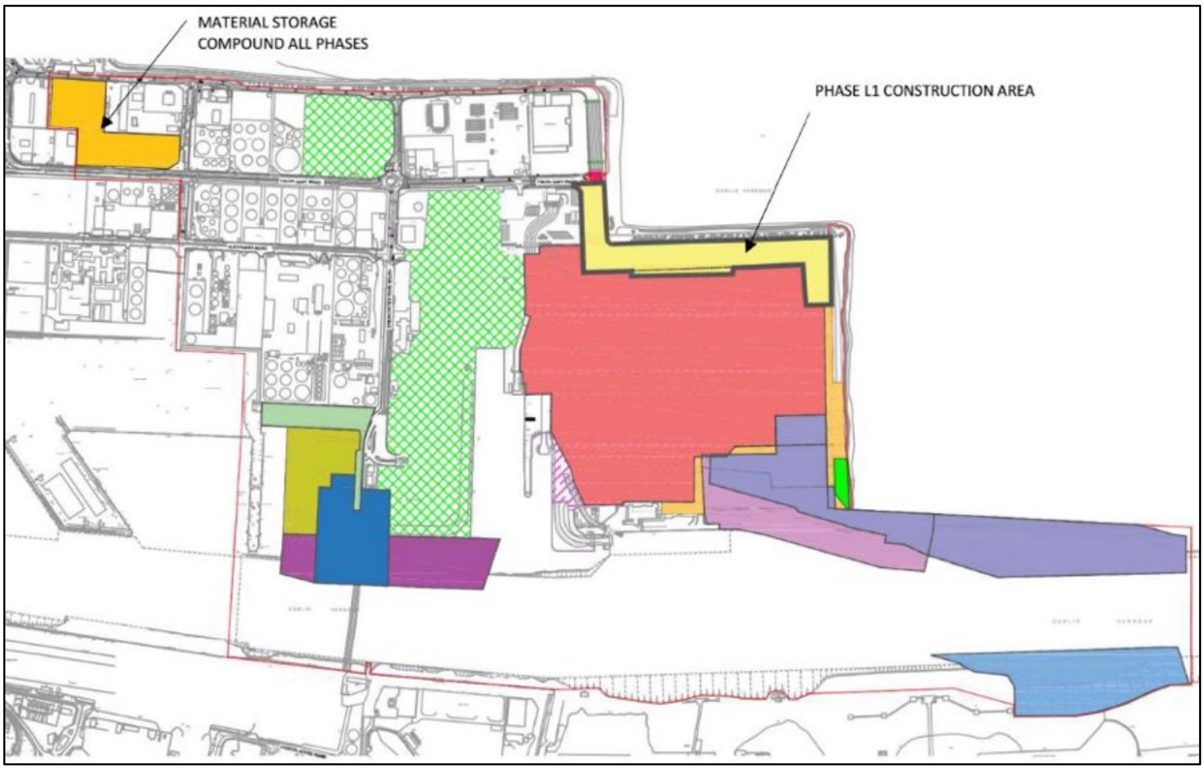


Figure 3-25 Phase L1 Construction Area

Figure 3-26 Phase L2 Construction Area

Figure 3-27 Phase L3 Construction Area

Figure 3-28 Phase L4 Construction Area

Berth 52 (Phase M1)

The construction of Berth 52 will commence after the filling of the basin (permission reference 29N.PA0034). It is proposed that a causeway constructed from clean, inert, rock will be used to seal the basin during the filling works. The causeway will then be used as a platform to commence the construction of Berth 52.

The construction of the steel sheet pile cellular wall will be the first section of the wall to be constructed. Plant will be positioned on the causeway and allow the craneage and piling of sheet piles. The cellular wall will not require a sheet pile anchor wall to be installed. The sheet piles will be driven to circa -30.0mCD. The cells will be filled with suitable granular material.

When the sheet pile cellular wall has been completed, works will commence on the sheet pile combi wall to the east. This wall will require the installation of a deadman anchor wall to restrain the berthing wall in position. The anchor wall will be driven through the existing land. The combi wall will comprise tubular steel piles with steel sheet piles driven between the piles.

When the sheet piles have been installed, reinforced concrete panels will be installed as the berthing face to the sheet piles. These panels will be precast and lowered into position by crane.

The completion of the works to the east end of Berth 52 will facilitate the commencement of the works to Berth 53. Berth 52 will effectively act as a working platform.

The proposed construction areas is indicated in Figure 3-29.

Figure 3-29 Phase M1 Construction Area

Berth 53 (Phase M2)

The dredging works to Berth 53 will take place in advance of the main construction works to the berth. The materials to be dredged will comprise of clay predominantly. This material will be dredged using a trailer suction hopper dredge or equivalent. The dredge material will be loaded into barges and disposed of at the licensed offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank. Ancillary dredging vessels such as a survey vessel and a bed leveller will be required throughout the dredging activities. All capital dredging works will take place within the period October to March.

As the dredging progresses in an eastward direction, concrete mattresses will be installed on the dredge side slopes to stabilise the slopes. The mattresses will be manufactured off site and comprise articulated concrete blocks which will adapt to the shape of the dredge side slope. Spaces will be left in the mattresses to accommodate the installation of piles for the jetty structure.

The dredging and mattress installation works will take approximately 2.5 months to complete and will be completed before the piling commences.

Piling works for the jetty structure at Berth 53 will commence at the west end, after the completion of Berth 52. The first number of piles will be installed from Berth 52. The majority of piles will require installation from barges. Three barges will be required to install the piles comprising:

1. A jack-up barge is a mobile buoyant barge/platform which is fitted with a number of moveable legs, and is capable of lifting itself above the water. For Berth 53 construction works, a jack-up barge will be fitted with a pile gate which will be used as a template to position the piles;
2. A spud leg barge is similar to a jack-up barge; however, it is not capable of lifting itself above the water. The moveable legs on this type of barge keep the barge in position, while the barge remains afloat. For Berth 53 construction works, a spud leg barge will be positioned beside the jack up barge. A crane will be positioned on the spud leg barge which will be used for installing the piles. The spud leg barge will be positioned on the south, east and north of the jack up barge;
3. A smaller support barge will be used to service the jack-up and spud-leg barges (e.g. deliver piles to the site). This will be a floating barge which will not have legs and will moor to the other barges.

Other ancillary craft (safety boat, transport vessel etc.) will also be located on site. These vessels will be similar to vessels currently operating day-to-day at the port.

Each dolphin will take approximately 1 week to pile. Piles will be driven via an impact hammer, which will operate for approximately 10-minute intervals. Each pile may take approximately 1 hour to pile. The vertical piles at the east end approach to the berth will have an approximate diameter of 1.0m, the vertical and raking piles to the dolphins will have an approximate diameter of 1.2m.

The spud leg barge will be used to crane the hollow precast dolphin superstructures on the piles. When positioned on the piles, the precast superstructures will be filled with reinforced concrete.

Precast concrete bridge beams will be installed by the crane on the spud leg barge. These will span between the dolphins. The precast bridge beams will also be filled with reinforced concrete, with voids being maintained for services. The spud leg barge will also be used for the installation of fenders and ladders.

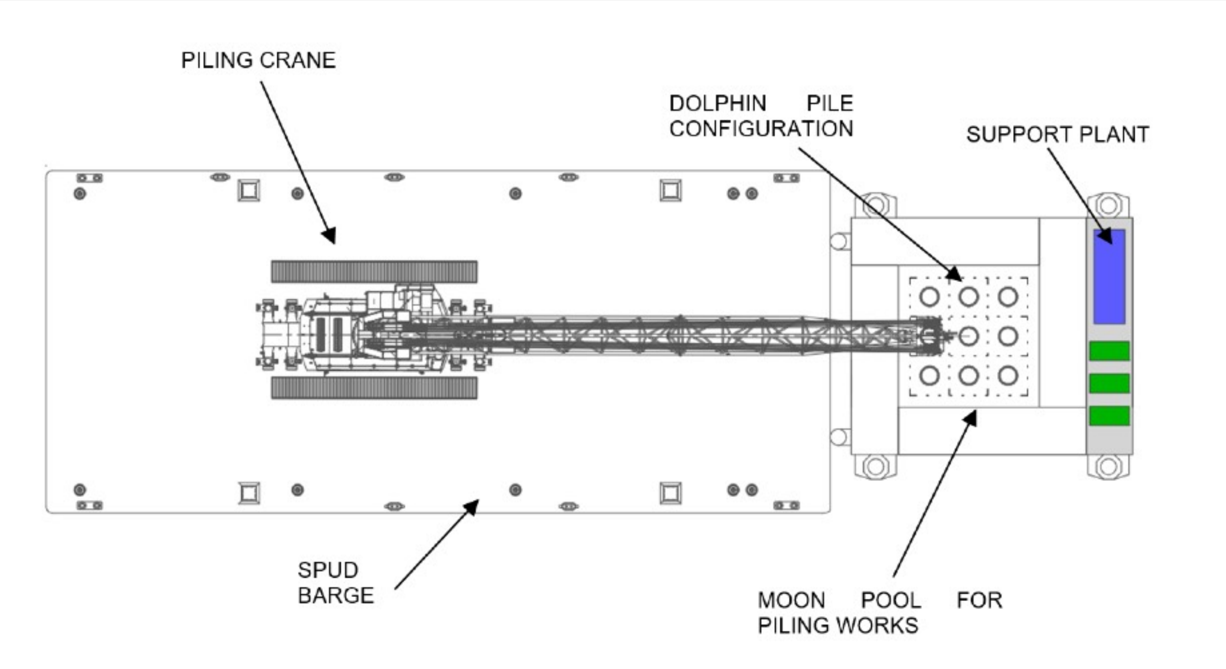


Figure 3-30 Plan of jack-up and spud-leg barge arrangement

The proposed construction area is indicated in Figure 3-31.

Figure 3-31 Phase M2 Construction Area

Channel Widening (Phase M3)

Channel widening via dredging will take place to the south of the Liffey Channel.

The materials to be dredged will comprise clays, sands and gravels. The majority of the material will be dredged using a trailer suction hopper dredge. The dredge material will be loaded into barges and disposed of at the licensed offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank. There will also be a requirement for a back-hoe dredger on site to carry out the finer elements of the dredging works. This material will be loaded into a hopper barge and disposed of at the licenced sea disposal site. The dredging will proceed from north to south, with the dredger working in a west to east direction

Ancillary dredging vessels such as a survey vessel, work boats and a bed leveller shall be required throughout the dredging activities. These vessels will be similar to vessels currently operating day-to-day at the port.

All capital dredging works will take place within the period October to March.

The proposed construction area are indicated in Figure 3-32.

Figure 3-32 Phase M3 Construction Area

Jetty Road, Oil Berth 3 and Berth 50A

Jetty Road (Phase M4)

In advance of the construction works at Oil Berth 3 and Jetty Road, the existing bitumen and gas importation pipelines will be removed from the berth and repositioned on the Western Oli Jetty.

A jack-up barge and spud leg barge will be mobilised to site for the installation of the steel sheet pile combi wall at the Jetty Road. The works will commence on the west end of Jetty Road and work in an easterly direction, dependent on the expected landing of gas. The jack-up barge will be fitted with a pile gate to ensure the accuracy of the tubular steel pile locations. The piles will be pitched and driven from the spud leg barge. The piles will be driven using a vibro hammer and impact hammer. The tubular steel piles will have a diameter of 1.4m. The piles will be driven to approximately -30m CD. Steel sheet piles will be driven between adjacent tubular steel piles. The spud barge will be used for the installation of ground anchors to retain the steel combi-wall in position. When the ground anchors are installed, the rear to the new wall will be filled with engineering fill material sourced from local quarries (refer to Section 3.3.4.) The engineering fill material will comprise crushed rock transported by road from the quarries.

Oil Berth 3 (Phase M5)

Oil Berth 3 comprises a gantry with pipelines on top of a concrete deck which spans upon concrete caissons.

The steel sheet pile combi-wall will be installed at Oil Berth 3 in the same manner as the Jetty Road. The piles will be driven using a vibro hammer and impact hammer. The tubular steel piles will have a diameter of circa 1.4m. Steel sheet piles will be driven between adjacent tubular steel piles. When the combi-wall is constructed, a frame will be installed to support the existing pipeline gantry. The deck which spans between the concrete caissons will then be removed to allow the infill behind the new wall structure, and the existing basin, with engineering fill material. When mid tide level is reached with the fill material, tubular steel piles will be installed which will support the future potential crane rail installation. The deadman anchor wall will also be installed. The deadman will be connected via tie rods to the combi-wall. Trenches will be cut in the existing deck to facilitate this. Precast concrete panels will be installed on the front of the combi-wall as a berthing face. The filling will then continue to the deck formation level, where provision will be made for the installation of services. The reinforced concrete deck will then be cast on the fill material. Quay furniture and services will then be installed.

When all the piles are installed, a back-hoe dredger will mobilise to site to dredge the berth pocket to -13.0m CD. The material will be loaded into a hopper barge and disposed of at the licensed offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank. All capital dredging works will take place within the period October to March.

A new in-situ reinforced concrete wall will be constructed on the deck to separate the Oil Berth Zone from the Container Freight Terminal yard.

The proposed construction areas are indicated in Figure 3-34.

Figure 3-33 Phase M4 Construction Area

Figure 3-34 Phase M5 Construction Area

Berth 50A (Phase M6)

The demolition of the Port Operations building, and existing mast will take place at the outset of construction works in this area.

To limit the works in the water, it is proposed to install the steel sheet pile combi wall from the existing eastern breakwater. The fill material to Oil Berth 3 will also be used as a working platform. Piles will be driven through the existing overburden and into the sea bed to an approximate level of -30m CD. The combi-wall will comprise circa 1.4m diameter tubular steel piles, with sheet piles driven between adjacent tubular piles. The driving of the deadman anchor wall will also be possible from the land.

When the piles are driven, excavation of the existing eastern breakwater can commence. The existing granite structure will be recorded and moved to the proposed heritage installation location. The existing fill material will be excavated and disposed of at the licensed offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank. This is addressed in Chapter 12.

5 No. ESB 220kV feeder cable ducts pass under the existing Eastern Breakwater. It is proposed to keep these cables in position during the works. Before the Eastern Breakwater is removed, a steel sheet pile cofferdam (approximately 50m long x 15m wide) will be constructed in the proximity of the ducts. Temporary works will be employed to brace the cofferdam and support excavations. When the cofferdam is installed, the overburden above the ducts will be excavated, exposing the ducts. They will then be encased in concrete at the location of the proposed new quay wall. The cofferdam will remain part of the permanent works where it intersects the proposed new quay wall. The void between the cofferdam, at the intersection of the new quay wall will be filled with reinforced concrete to deck level. A concrete mattress will be placed over the southern side of the ducts to act as protection from future dredging campaigns.

All works in the vicinity of the ESB 220Kv cables shall be by agreement with ESB.

The proposed construction areas are indicated in Figure 3-35.

Figure 3-35 Phase M6 Construction Area

Berth 50A Dredging (Phase M7)

Phase M7 will comprise the dredging in front of the existing and proposed Berth 50A to a standard depth of -11.0m CD and disposal at sea of the material. This phase will commence after the works at Phase M6. The dredging works will take one month to complete. All capital dredging works will take place within the period October to March.

The dredging will be carried out using a back-hoe dredger. This material will be loaded into a hopper barge and disposed of at the licensed offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank.

Ancillary dredging vessels such as a survey vessel, work boats and a bed leveller shall be required throughout the dredging activities. These vessels will be similar to vessels currently operating day-to-day at the port.

The proposed construction areas are indicated in Figure 3-36.

Figure 3-36 Phase M7 Construction Area

3.3.4 Source of Fill Material

Suitable infill material (crushed rock) will be sourced from authorised quarries and will be imported by road to fill the void at Oil Berth 4, and to fill the voids behind the proposed structures at Jetty Road and Berth 52. This material will be sourced locally within the region. Figure 3-37 shows the proximity of active crushed rock quarries in the vicinity of the Dublin Port and the proposed haul routes. Quarry facilities from which this material will be sourced will have been registered with the local authority and will have the necessary planning permission and other consents in place for the winning and haul of such material. The traffic associated with these movements is considered in Section 3.3.6.

The anticipated volumes and type of fill material required to meet the design ground levels for Dublin Port lands are set out as follows:

- Phase M1 (Berth 52)

Circa 143,357m^3 of imported material will be required. Of this, 121,374m^3 has been consented via the ABR Project (ABP Ref. 29N.PA0034). A net increase of 21,982m^3 of imported fill material will be required (equating to circa 39,567T based on a conversion of 1.8T/m^3).

- Phase M4 (Jetty Road)

Circa 3,600m^3 of imported fill material (equating to circa 6,480T based on a conversion of 1.8T/m^3)

- Phase M5 (Oil Berth 3)

Circa 145,000m^3 of imported fill material (equating to circa 261,000T based on a conversion of 1.8T/m^3).

Table 3-2 Potential List of Quarries

Quarry Name	Location	Council Licensed / Registered	Availability to Provide Required Engineering Fill	Figure 3-37 Reference	Distance to Site	Haul Route
Feltrim Quarry	Swords, Co. Dublin.	✓	✓	Feltrim	15.5km	▪ Feltrim Rd ▪ M1 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Huntstown Quarry	North Road, Finglas, Dublin 11.	✓	✓	Huntstown	19.1km	▪ R135 ▪ N2 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Rathcore Quarry	Kilsaran Build, Rathcore, Enfield, Meath.	✓	✓	Rathcore	61.0km	▪ L6226 ▪ R148 ▪ M4/N4 ▪ M50 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Allen Quarry	Kilmeague, Naas, Kildare.	✓	✓	Allen	65.8km	▪ R145 ▪ M7/N7 ▪ M50 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Shillelagh Quarries	Aghfarrell, Brittas, South County Dublin.	✓	✓	Aghfarrell	43.7km	▪ R114 ▪ N81 ▪ N82 ▪ N7 ▪ M50 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Ballinascorney Quarry	Kilsaran Build, Ballinascorney, South County Dublin.	✓	✓	Ballinascorney	43.5km	▪ R114 ▪ N81 ▪ N82 ▪ N7 ▪ M50 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd
Belgard Quarry	Fortunestown, Tallagh, Dublin.	✓	✓	Belgard	32.2km	▪ R113 ▪ R838 ▪ M50 ▪ Dublin Port Tunnel ▪ Promenade Rd ▪ Tolka Quay Rd

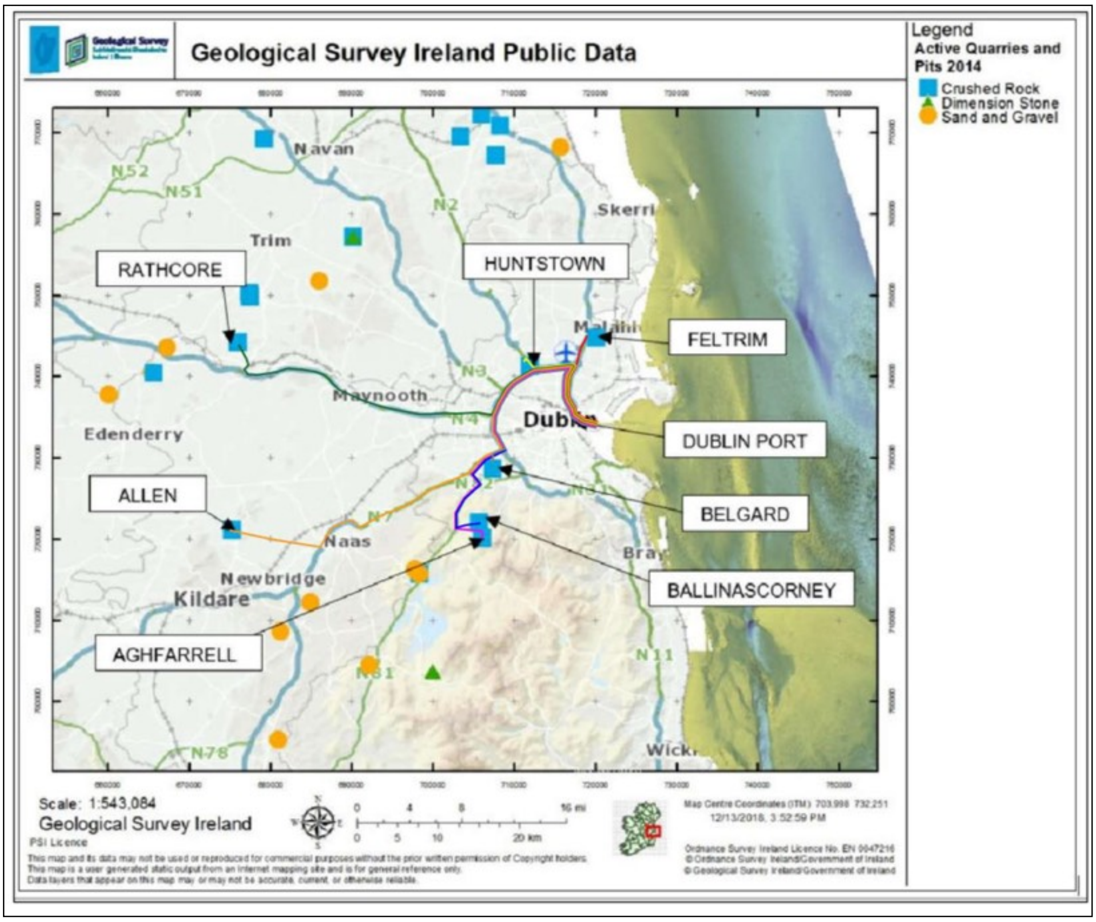


Figure 3-37 Map of active quarries in vicinity of Dublin Port (Source: GSI)

3.3.5 Working Hours

Where construction activity takes place for the redevelopment in the vicinity of residential properties, the activities will operate between the hours of 08:00 and 18:00 on Monday to Fridays, between 08:00 and 13:00 on Saturdays and there will be no activity on Sundays or Bank Holidays. Where additional or alternative working hours are required, these will be agreed in advance with Dublin City Council. Capital Dredging works are remote from residential properties and will be undertaken on 24 hour / 7 days per week basis.

3.3.6 Construction Traffic

Construction traffic will arrive and depart the port via the national road network. All HGV movements will be in compliance with the Dublin City Council HGV Management Strategy. Within the Dublin Port Estate, traffic will be routed through the existing road network to reach the proposed MP2 Project site boundary. Traffic within the proposed site will be diverted in a phased manner to ensure the existing facilities at Terminal 1 and Terminal 2 remain operational with minimal impact.

The Sequencing Programme for the MP2 Project (Figure 3-24) has been used to determine the future construction traffic on the road network. Staffing levels are also presented. The predicted daily flows split per quarter over the duration of the project are presented in Table 3-3.

Table 3-3 Predicted construction daily traffic flows

Average Daily	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4
Staff	0	0	0	0	29	43	43	41	28	28	28	54
HGV movement (1 way)	0	0	0	0	15	21	28	29	29	41	32	31
Internal HGV movement (1 way)	0	0	0	0	2	1	8	10	14	1	0	1

Average Daily	2024 Q1	2024 Q2	2024 Q3	2024 Q4	2025 Q1	2025 Q2	2025 Q3	2025 Q4	2026 Q1	2026 Q2	2026 Q3	2026 Q4
Staff	54	54	12	0	28	54	54	52	54	46	70	70
HGV movement (1 way)	29	21	3	0	6	5	5	4	5	4	4	6
Internal HGV movement (1 way)	1	2	1	0	1	1	1	1	0	1	1	0

Average Daily	2027 Q1	2027 Q2	2027 Q3	2027 Q4	2028 Q1	2028 Q2	2028 Q3	2028 Q4	2029 Q1	2029 Q2	2029 Q3	2029 Q4
Staff	57	35	21	13	13	13	6	0	28	28	32	54
HGV movement (1 way)	13	13	8	5	5	5	3	0	0	0	3	2
Internal HGV movement (1 way)	0	0	0	0	0	0	0	0	1	1	0	0

Average Daily	2030 Q1	2030 Q2	2030 Q3	2030 Q4	2031 Q1	2031 Q2	2031 Q3	2031 Q4	2032 Q1	2032 Q2	2032 Q3	2032 Q4
Staff	28	28	28	52	49	28	28	50	36	0	0	0
HGV movement (1 way)	9	0	57	40	22	2	0	7	6	0	0	0
Internal HGV movement (1 way)	2	3	1	0	0	2	1	0	0	0	0	0

The table represents a single movement (in and out) and therefore figures below should be doubled if considering how many trips to or from the port. The peak HGV traffic volume will occur Q3 2030. There will be an average daily traffic over this period of 57 HGV movements per day, based on a 5-day working week. The peak week within the proposed construction stage will be Q4 2030 where on average there will be 81 HGV movements per day. This would incorporate a peak of 17 HGV movements (in and out) per hour between 7am and 8 am.

3.3.7 Site Compounds

Site compounds are indicated in Figure 3-38. Separate compounds will be used for different phases of the works. The compounds have been sized to accommodate welfare facilities, site offices and parking, construction plant storage, and materials storage. Each compound is located in or immediately adjacent to the relevant works phase, such as to cause minimal interference to general port operations. Compounds are not required for Phase M3 & M7 as works will be carried out by dredging plant.

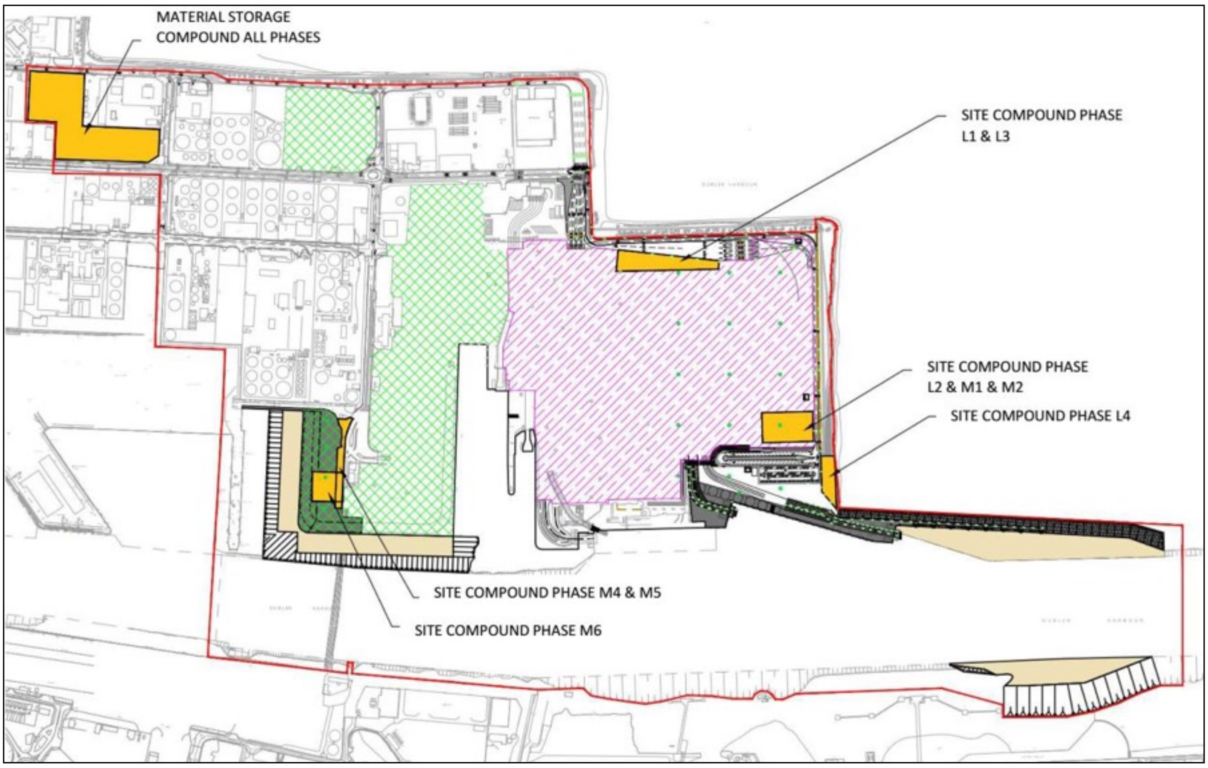


Figure 3-38 Site Compounds

3.3.8 Construction Environmental Protection Measures

Effects during construction can often be more significant than those which arise during the operational life of the project, as is the case for the MP2 Project.

A series of construction environmental protection measures for the MP2 Project were developed through the preparation of this EIAR whose primary objective is to identify the baseline environmental context of the proposed development, predict potential beneficial and/or adverse effects of the development during the construction phase and propose appropriate mitigation measures where necessary. The preparation of the environmental appraisals was guided by 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).

Detailed scoping was undertaken in respect to the MP2 Project in accordance with 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). The scoping of the MP2 Project greatly benefitted from the environmental monitoring programme which is currently in place for the construction of the ABR Project. The site-specific scientific data collected to date has been used to support the preparation of the EIAR and NIS for the MP2 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 MP2 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 MP2 Project 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.

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

- Examination of Alternatives
- Risk of Major Accidents
- Biodiversity, Flora and Fauna
- Soils, Geology and Hydrogeology
- Water Quality and Flood Risk
- Noise & Vibration
- Material Assets – Coastal Processes
- Material Assets – Traffic and Transportation
- Archaeology and Cultural Heritage
- The Landscape and Visual Impacts
- Population and Human Health
- Waste
- 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 MP2 Project. These impacts are evaluated in terms of their significance, nature and magnitude.

Integration of the engineering design team with the planning 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.

A prime example is the construction of Berth 53. This has been a key environmental consideration due to its close proximity to the South Dublin and Tolka Estuary SPA and its potential impact on views, notably from Clontarf.

Berth 53 will demarcate the most easterly development of the Dublin Port Estate. Its development will eliminate the requirement for future land reclamation within the Tolka Estuary.

Berth 53 has been designed as an open-piled structure whose footprint lies outside the boundary of the SPA. The design minimises the impact of the structure on the natural tidal flows between the Liffey channel and the Tolka estuary. As a result, there will be no significant change to the coastal processes including the morphology of the Tolka estuary. Potential changes to the feeding grounds of waterbirds at extreme low spring tides are therefore expected to be *de minimis.*

The potential impact on the SPA as a result of dredging the berthing pocket and approach channel to Berth 53 together with the use of bow thrusters used to manoeuvre vessel's to and from the berth have also been considered. Mitigation by engineering design has again been used to prevent changes to the morphology of the Tolka estuary including the use of mattresses on the side slopes of the berthing pocket to provide additional bank stability and a wash protection structure attached to the underside of the jetty to reduce flow rates arising from the bow thrusters and thereby prevent scouring.

Berth 53 has also been designed to minimise disturbance to feeding waterbirds. Visual screens have been incorporated into the design of the jetty structure and the functionality of the berth has been reduced.

Mitigation by avoidance has also been used, where possible.

Examples of mitigation by avoidance include restricting capital dredging to the winter seasons (October to March) to avoid disturbance of nesting terns and prohibiting riverside piling activity between March and May to avoid the main salmon smolt run within the River Liffey.

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 construction phase of the MP2 Project.

These include a range of noise, dust and construction traffic mitigation measures to minimise nuisance to neighbouring communities during construction.

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). Notably a trained and experienced Marine Mammal Observer (MMO) will be put in place during piling, dredging, demolition and dumping operations. The 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 and demolition works and 1,000m for piling activities.

Chapter 19 of the EIAR sets out all of the mitigation measures and monitoring programmes which will be implemented during the construction phase of the MP2 Project.

3.3.9 Construction Environmental Management

The MP2 Project construction works will be undertaken in compliance with a Construction Environmental Management Plan (CEMP) which will include all measures identified in the draft CEMP which have been brought forward from the environmental assessments undertaken during the preparation of this EIAR as well as any additional measures required pursuant to conditions of development consent. A draft CEMP has been prepared to enable a comprehensive assessment of the construction phase of the MP2 Project and forms part of the application for permission (under separate cover).

3.4 Operational Phase

The key objective of the MP2 Project is to increase the throughput of cargo and passengers by providing the infrastructure required to maximise the efficient use of existing port lands. A description of the existing port operations forms part of the application for permission (under separate cover). There are no significant changes to the existing types of operations, processes and activities (regular and occasional) proposed by the MP2 Project.

The following maintenance, pollution control and navigational measures will be implemented.

3.4.1 Maintenance

During the operational stage, maintenance of the quay/jetty structures will be minimal. Some maintenance of fenders, bollards, link spans and service infrastructure may be required. Maintenance access will be carried out from the deck of the structure.

There will be a requirement for maintenance dredging to be carried out within the berthing pockets and channel area. Future maintenance dredging will be subject to consents required by the Environmental Protection Agency (EPA) and the Department of Housing, Planning and Local Government (DHPLG).

3.4.2 Pollution Control

Storm Water

There is limited additional hardstanding area proposed as part of the project. At Berth 53 it is proposed to collect storm water from the new hardstanding areas in a closed system and discharge via a new silt trap and oil interceptor/separator to the local storm water drainage network (which is consented under the ABR Project). The consented ABR Project storm drainage network ultimately discharges to the sea at Berth 52 via a flap vale (or similar) in the quay wall. Minor modifications will be made to the drainage consented under the ABR Project to facilitate the Berth 52 realignment.

Rainfall on the new hardstanding at the infilled basin at Oil Berth 4 will be collected by a series of gullies and drains. The new network will be routed through new silt traps and oil interceptors/separators before discharge to the sea at the new the quay wall.

The methodology above was discussed and agreed in principal with Dublin City Council Drainage Department. A copy of the email correspondence is provided in Appendix 5.

Wastewater

A gravity sewer is proposed to link the proposed toilet blocks to the existing gravity sewer serving Terminal 5 (which is to be demolished). The existing toilet provision at Terminal 1 Building is considered adequate for the proposed use. The existing network servicing the unified ferry terminal discharges via a series of gravity sewers and pumping stations to the main public foul network outside the Dublin Port Estate.

It is not anticipated that there will be any increase in the peak wastewater discharge to the public sewer as a result of the development.

Waste Disposal from Vessels

All waste from berthed vessels will be disposed of in accordance with the Dublin Port Ship's Waste Management Plan contained in Appendix 17-1. The storage of waste at the berth will not be permitted. Waste will be collected directly by a licensed waste disposal contractor.

Disposal from vessels directly into the water at the berth, Liffey Channel, or Dublin Bay is strictly prohibited.

Ship to Shore Power

Ship to Shore Power facilities are provided for vessels on Berth 52 and Berth 53 to provide required hoteling load for vessels. This will allow engines to be turned off when vessels are berthed.

3.4.3 Navigation

Vessel Speed Limit

The development will not impact upon the navigation speed limit enforceable within the harbour.

Navigation Charts

The proposed development will require updating of the appropriate navigation charts for the area. This will be done through consultation with the United Kingdom Hydrographic Office.

Radar and GPS

Impacts on radar are not envisaged. Global Positioning System navigation charts will be updated based on updates to Navigation Charts.

VHF & Communication

Impacts on VHF radio and other communication systems are not envisaged.

Marine Notices

Marine Notices will be issued to alert the general public of the proposed changes to the port.

Vessel Manoeuvring

The dredging works will improve navigability on the approach to Dublin Port.

3.5 Description of the risk of accidents having regard to substances and technologies used

The risk of accidents can arise during both the construction and operational stages of the MP2 Project. There are no substances or technologies being proposed that are not considered ‘normal’ either by the construction industry or by Port operations.

The development is within the vicinity of several establishments that fall within the scope of the *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations*, 2015 (the COMAH Regulations), in particular the Calor establishment and the Indaver establishment, to the west of the development on the northern side of Tolka Quay Road. In light of the nature of the activities that will take place at the MP2 Project site, and the nature of the surrounding environment, the most significant risks of major accidents and disasters are associated with the COMAH establishments.

The assessment of the risk of major accidents and disasters is presented in Chapter 6 of the EIAR which concludes that, from a COMAH perspective, the potential direct and indirect risks arising from the MP2 Project satisfy the Health and Safety Authority’s COMAH land use planning guidance. It also concludes that other, non-COMAH direct and indirect major accident and disaster risks arising from the MP2 Project are not significantly different from the current risks.

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 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.

3.6 Project change and decommissioning

Following completion of the construction phase of the works, temporary works required to facilitate the construction of the permanent works will be removed from site. The temporary works include the use of large items such as marine jack-up barges and pile guides which will be dismantled and removed from site by sea and road respectively. Temporary works requiring the use of temporary piles have been designed to be incorporated into the permanent works, negating the need to remove them.

There are no plans proposed for the decommissioning of the permanent marine elements of the MP2 Project given the nature of the Port development which can be considered as 'permanent works'.

The landside elements of the unified ferry terminal aspect of the MP2 Project have been designed to allow maximum flexibility because its use will be a function of customer requirements which may change over time (accompanied Ro-Ro versus unaccompanied Ro-Ro versus passenger vehicles). Flexibility is also required as a result of the uncertainty of land requirements by the State Agencies as a result of Brexit. To provide this flexibility the proposed landside structures have been limited to entrance booths, signage gantries, lighting, toilet blocks, pedestrian underpass, substation, fencing and other works required for the safe movement of freight and passengers. Any changes to the landside layout which may be required, including the decommissioning of signage gantries, will be the subject of subsequent planning consent and appropriate mitigation can be applied to those consents.

3.7 Other related projects and potential for ex-situ effects

3.7.1 Planning History Relevant to the Proposed Development

3.7.1.1 Subject Site

Planning history relevant to the MP2 Project is outlined below with the approximate location of each planning reference illustrated on Figure 3-39.

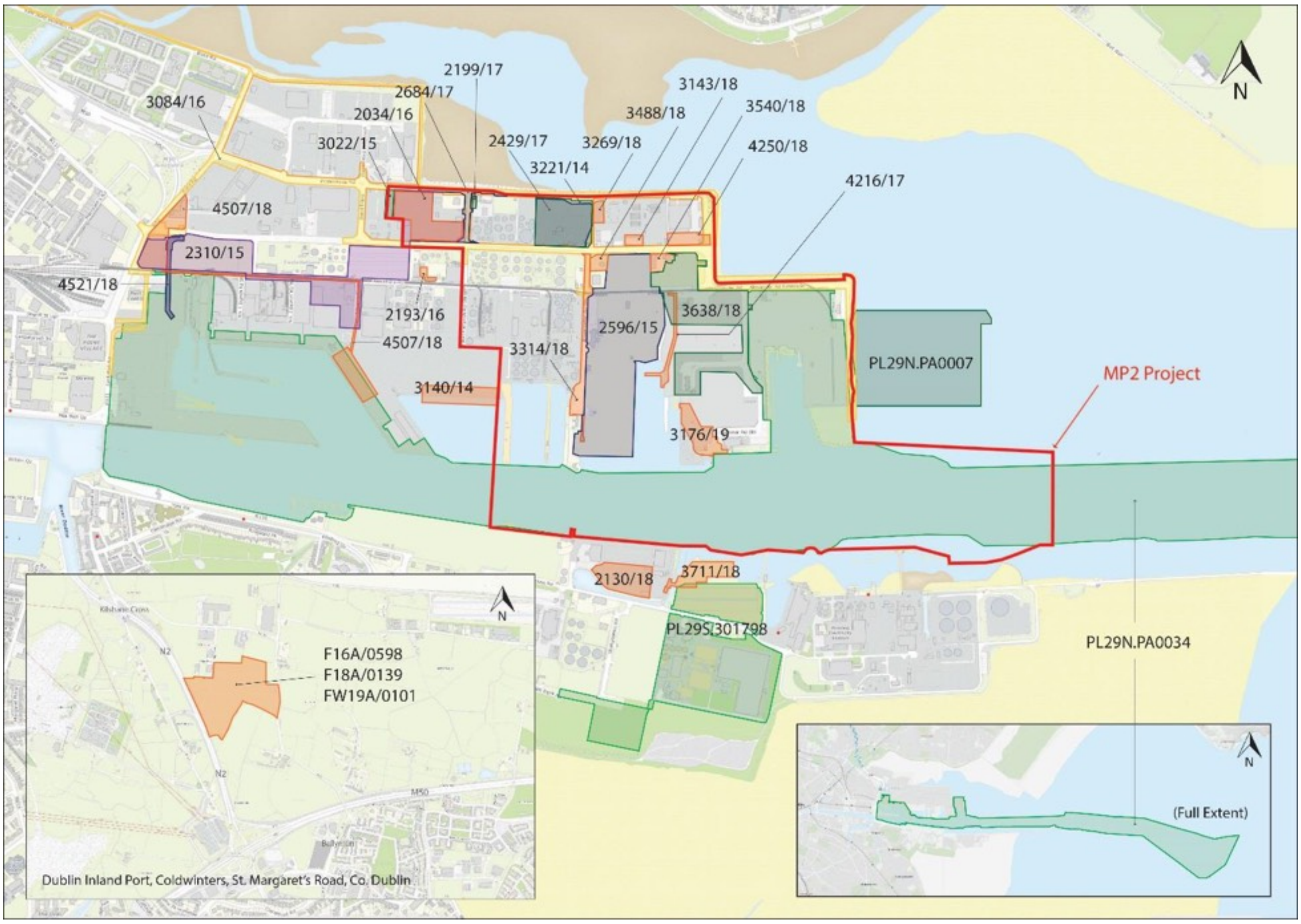


Figure 3-39 Planning History Relevant to the MP2 Project

3.7.1.2 Dublin Gateway Project – PL29N.PA0007

Dublin Port Company (DPC) sought planning permission under Ref. PL 29N.PA0007, a Strategic Infrastructure Development (SID), for the Gateway Project, which consisted of an extension of 21 hectares of landfill to the east of the port to provide for both additional open container storage, handling areas, new quayside facilities and berth. The application was refused permission by An Bord Pleanála (the Board) in 2010 for the following reason:

"The proposed development is partly within the South Dublin Bay and River Tolka Estuary proposed Special Protection Area (pSPA), designated under the Birds Directive. On the basis of the submissions made in relation to the proposed development, it is considered that

a) The significance of the permanent loss of wetland habitat from the pSPA arising from the proposed development has not been clearly or adequately established,

b) the full extent of long-term changes to the morphology, sediment regime and consequent impacts on the benthic food resource within the Tolka Estuary as a result of hydrodynamic changes generated by the proposed development has not been adequately established, and

c) *the significance of the development site for use by bird species that are qualifying interests for the pSPA has not been clearly established, and*

d) *the significance of the permanent loss of the benthic food resource as a result of the proposed development has not been adequately established.*

Accordingly, the Board is not satisfied that the proposed development would not adversely affect the integrity of the South Dublin Bay and River Tolka Estuary pSPA and is not satisfied that it would not adversely affect the natural heritage of Dublin Bay, contrary to the proper planning and sustainable development of the area."

3.7.1.3 Alexandra Basin Redevelopment - PL29N.PA0034

DPC was granted planning permission subject to conditions, on 8th July 2015, under Section 37E of the Planning and Development Act 2000, as amended, for the redevelopment of Alexandra Basin, Berths 52 and 53 and dredging of the channel of the River Liffey together with associated works in Dublin Port. Elements of the proposed development can be summarised as follows:

Alexandra Basin:

- The infilling of graving Dock No. 2 having an area of 6,055m^2;
- The excavation and restoration of historic Graving Dock No. 1;
- The demolition of the bulk jetty having an area of 3,200m^2;
- A section of North Wall Quay extension having an area of 21,700m^2;
- Extension of Alexandra Quay West of 130m in length;
- New 273 m long Ro-Ro jetty and provision of three Ro-Ro ramps; and
- The dredging of: 470,000m^2 of contaminated material to a depth of -10.0m Chart Datum (CD) over an area of 194,000m^2 within the redeveloped Alexandra Basin and its remediation.

Berth 52 and 53:

- The demolition of existing berths 52 and 53;
- Jetty at Berth 52 having an area of 500m^2;
- Concrete Dolphin at Berth 53 having an area of 500m^2;
- The construction of:
  - A new river berth at Berths 52/53, 300m long;
  - New 75m mooring jetty at new river berth;
  - New 40m long mooring jetty to extend existing berth 49, 50m long;
- The infilling of the Terminal 5 Ro-Ro basin, an area of 45,650m^2;
- Raising of existing levels by 1.4 m over an area of 95,000m^2; and

- Dredging of new river berth to -10.0m CD.

Liffey Channel:

- Construction of a marina protection structure to a height of +7.0m CD and a length of 220m on the south side of the river channel. Dredging of the shipping channel to a depth of -10m CD from a point 55m to the east of the East link bridge, to a location in the vicinity of Dublin Bay, a total distance of 10,320m.

This approval is now being implemented.

3.7.1.4 Topaz – Reg. Ref. 3221/14

Topaz Energy Ltd was granted planning permission on 14th November 2014 for the development will consist of modifications to previously approved planning permission, Reference 3171/12. The modifications will consist of the following: 1. Re-designation of Tank 6 (T406) to store Jet A 1/Kerosene instead of Ethanol; 2. Re-designation of Tanks 7 and 8 (T407 and T408) to store ethanol instead of unleaded gasoline (ULG); 3. Tanks 1, 2, 3, 4, 5 and 6 to be located in one Bund instead of two bunds; 4. Tanks 7, 8 and 9 to be double-skin tanks with a single bund wall instead of single-skin tanks with two bund walls; 5. Deletion of the 3m high secondary containment (inner) concrete wall around Tanks 7, 8 and 9; 6. Reduction of the height of the tertiary containment concrete walls of the bunds and of the perimeter walls from 3 metres to 2 metres. There will also be palisade fencing on the boundary. These changes will reduce the storage capacity for Class I liquids by approximately 30 %. The total storage capacity of all hydrocarbons will be unchanged. The development will be an Upper Tier Seveso site and comes within the meaning of Part 11 of the planning regulations.

3.7.1.5 1 Branch Road North – Reg. Ref. 2310/15

DPC was granted planning permission on 8th July 2015 for the development will consist of the erection of new fencing fixed to the existing boundary walls to bring the overall height of the boundaries to 4 metres, the erection of new 4 metre high fences in place of existing defective or inadequate fencing and walls, the erection of new replacement gates to a height of 4 metres, the erection of 16 no. 30 metre high lighting masts and luminaries, the incorporation of 3 Branch Road South (a private road) into the adjoining quayside goods handling area, the construction of new re-enforced concrete surfacing and new replacement drainage and water supply system and associated ancillary works.

3.7.1.6 Vehicular and Pedestrian Entrances off Breakwater Road South - Reg. Ref. 2596/15

DPC was granted planning permission on 10th July 2015 for relocation of the existing vehicular and pedestrian entrances off Breakwater Road South to a new location off Breakwater Road South, alterations to the existing layout of the road.

This permission has been implemented by the DPC.

3.7.1.7 Promenade Road – Reg. Ref. 3022/15

DPC was granted planning permission on 4th September 2015 for the development will consist of: (a) the removal of a vehicular gate fronting Promenade Road , Dublin Port, Dublin 3 and replacement with new 4 metre high fence. (b) the erection of new 4 metre high fences in place of defective or inadequate fencing on three sides of the site. (c) the incorporation of the site into the adjacent site located to the east and (d) the construction of new re-enforced concrete surfacing and new replacement drainage and water system and associated ancillary works.

3.7.1.8 2 Branch Road North Reg. Ref. 2034/16

DPC was granted planning permission on 13th April 2016 for retention of development for alterations to previously granted permissions under P.A. Reg. Ref. 2310/15 and P.A. Reg. Ref. 3022/15and consists of: (a) On the Promenade Road frontage: a 4 metre-high fence and a 9m wide roller access gate. (b) On the eastern side: added fencing to the existing boundary wall to bring it to an overall height of 4 metres. (c) On the No.2 Branch z\oad frontage: a 9m wide roller access gate and 4 metre-high fence. (e) On the western side: a 4 metre-high fence

3.7.1.9 Dublin Port Internal Road Network – Reg. Ref. 3084/16

DPC was granted planning permission on 14th December 2016 for works to the port's private internal road network which includes works on public roads at East Wall Road, Bond Road and Alfie Byrne Road. The development includes *inter alia*:

- Construction of new roads and enhancements to existing roads within the Dublin Port estate north of River Liffey;
- Construction of enhanced landscaping and amenity route along the northern boundary;
- Construction of new pedestrian and cycle overbridge at Promenade Road;
- Construction of access ramps to pedestrian and cycle overbridge at Promenade Road;
- Construction of new pedestrian and cycle underpass at Promenade Road;
- Construction of 11 no. new signage gantries;
- Ancillary construction works, including site clearance, demolitions, earthworks, pavement construction, construction of verges, modifications to accesses, construction of new and amended drainage services, diversion and installation of utility services, installation of road markings and signs and accommodation works;
- Works to existing boundaries and construction of new boundaries; and
- Construction of minor works to the junctions of East Wall Road with Tolka Quay Road and East Wall Road with Alexandra Road.

An amendment to this planning permission was granted under Reg. Ref. 2684/17 in July 2017.

This permission is now being implemented.

3.7.1.10 Tedcastle Operations building and Substation Reg. Ref. 2199/17

Tedcastles Oil Products were granted planning permission on 18th August 2017 for the construction of a two-storey operations building of 432m^2, an ESB substation of 21.8m^2 with ancillary transformer and generator and site clearance works. The ground floor of the proposed operations building of 216m^2 will accommodate welfare facilities, supervisors control room, conference room, electric switch room and stores. The first floor of 216m^2 will contain the company offices. These and any associated development and works to be undertaken at Yard 1, Promenade Road, Parish of Saint Thomas, Dublin Port, Dublin 1, which is a SEVESO site.

3.7.1.11 Demolition of buildings and Provision of Yard - Reg. Ref. 2429/17

DPC was granted planning permission on 11th September 2017 for the demolition of 3 no. existing buildings comprising a blockwork structure of c. 283m^2, a temporary modular structure of c. 303m^2 and a portal frame shed building of c. 112m^2 and removal of all structural and infrastructural elements, vegetation, plinths, fences etc. A new concrete surface treatment is to be provided across entire site. The new yard facility includes CCTV, new lighting and new approx. 4m high security fence to northern, eastern and southern (Tolka Quay Road) boundaries. The development also includes the closure of the existing (eastern) vehicular entrance and widening of the existing western entrance to provide a 12m sliding gate on Tolka Quay Road.

This permission is now being implemented.

3.7.1.12 Floating Dock Section Reg. Ref. 4216/17

DPC was granted planning permission on 16th February 2018 for floating dock sections (pontoons) with an area of c.321m^2, access walkway and removal of internal structural and infrastructural elements including vegetation, plinths, fences and bollards; new access roadway. The pontoon shall provide enhanced docking facilities for tug boats operating in the port.

This permission has been implemented.

3.7.1.13 Vehicle service/maintenance facility and office accommodation - Reg. Ref. 3143/18

DPC was granted planning permission on 31st August 2018 for the construction of a vehicle service/maintenance facility and office accommodation contained in one building (approx. 946m^2) incorporating vehicle service/maintenance bays, a two storey office area of 260m^2 with offices, meeting/training room, canteen and changing area, toilets, building signage. Associated site works including fencing, 55 no. car parking spaces, reconfiguration and widening of existing entrances/exits and connection to existing services on Tolka Quay Road. The proposed development shall facilitate the consolidation of Calor activities within the Port lands.

This application has not yet been implemented.

3.7.1.14 Calor Office Site Reg. Ref. 3540/18

DPC was granted planning permission on 18th October 2018 for the demolition of a single storey office buildings (785m^2); demolition of a maintenance shed building (840 m^2); demolition of reinforced concrete bund and steel tank (42m^2); demolition of boiler room building (25m^2); demolition of sections of northern boundary wall, and all associated general site clearance. The development also includes: Construction of new hard surface including underground drainage infrastructure; new 2.4m palisade security fence on sections of northern and western boundary, and the upgrade of the existing access to provide a 12m wide sliding gate access on Tolka Quay Road.

This application has not yet been implemented.

3.7.1.15 Dublin Ferryport Terminals Access - Reg. Ref. 3314/18

DPC was granted planning permission on 18th September 2018 for the upgrade of access to the Dublin Port Operations Centre and the Dublin Ferryport Terminals (DFT), including; re-alignment of traffic lanes and modification of Alexandra Road and Tolka Quay Road junctions; provision of Optical Character Recognition system to include traffic lights, camera, barriers and gantry; DFT check points with associated barriers, kiosks and traffic signals and; associated site works including fencing, gates underground drainage and electricity infrastructure.

This application is being implemented.

3.7.1.16 Demolition of Calor Offices and Provision of Yard - Reg. Ref. 3540/18

DPC was granted planning permission on 18th October 2018 for the demolition of a single storey office building (785m^2); maintenance shed building (840m^2); reinforced concrete bund and steel tank (42m^2); boiler room building; and all associated general site clearance. The development also comprises hard surfacing to provide a yard for storage across the extent of the site. The proposed development shall facilitate the consolidation of Calor activities within the Port lands.

This permission has been implemented.

3.7.1.17 Yard Upgrade - Reg. Ref. 3269/18

DPC was granted planning permission on 6th November 2018 for the removal of plinths, fences and vegetation etc; new pavement construction including underground drainage and electricity infrastructure; 2 no. CCTV poles (18m high); new lighting (including 2 no. lighting columns 30m high and 10 no. lighting columns 12m high); new 4m high security fence on western and southern boundaries; new 7.2m high fire wall on the eastern boundary and; a 5m sliding gate as fire access on the south eastern corner of the site. All development to take place on a site approx. 0.3 hectares. The application is for a 10 year planning permission. The development is located on a Former Calor Site, Breakwater Road North, Dublin Port, Dublin 1.

This permission has not yet been implemented.

3.7.1.18 Asahi Demolition and Provision of Yard - Reg. Ref. 3488/18

DPC was granted planning permission on 14th November 2018 for the demolition of a redundant storage tank including associated pipework and general site clearance. The area is to be hard surfaced to provide a yard for storage across the extent of the site. CCTV poles, new lighting and a new 4m high security fence on all boundaries is proposed. The development also includes the closure of the existing site access and provision of a 12m wide sliding gate access on Breakwater Road North.

This development has not yet commenced.

3.7.1.19 Interim Unified Passenger Terminal - Reg. Ref. 3638/18

DPC was granted planning permission on 15th January 2019 for the upgrade of Terminal 1 and 2 facilities including consolidated vehicle check-in facilities and revised stacking and circulation arrangements. The proposed development also includes the provision of State Services facility for control and inspections of passengers and freight comprising:

- 2 no. Inspection Sheds
- 2 no. State Service office blocks
- 5 no. Immigration Control Booths
- 24 no. staff car parking spaces;
- 18 no. HGV parking spaces;
- 20 no. car parking spaces;
- Control Point with Canopy and gates (7.7m high) and 4 no. gateways;
- New 4 lane egress onto Tolka Quay Road.

This permission is being implemented.

3.7.1.20 ESB Substation Demolition and Construction - Reg. Ref. 4250/18

DPC was granted planning permission on 6th June 2019 for the demolition of an existing ESB Substation (approx. 25m^2 and 3.2m height), general site clearance, and construction of new ESB Substation building (approx. 40m^2 and 3.1m height) at Crosbie's Yard, Dublin Port.

This development has not yet commenced.

3.7.1.21 Berth 49 Approach and Ramp - Reg. Ref. 3176/19

DPC submitted a planning application on 4th June 2019 for the development of an additional approach and ramp in addition to office and staff facilities building at Berth 49. This is currently being assessed by Dublin City Council.

3.7.2 Developments in the Surrounding Area

There are a number of existing and/or approved projects in the vicinity of the subject site which may have potential to interact with the proposed MP2 Project. These are also indicated on Figure 3-38.

3.7.2.1 Ship to Shore Gantry - Reg. Ref. 3140/14

DPC was granted planning permission in 2014 for a ship to shore (STS) gantry crane and all ancillary works. The permission has been implemented.

3.7.2.2 Lagan Bitumen site – Reg. Ref. 2193/16

Doyle Shipping Group was granted planning permission on 11th May 2016 for the refurbishment of an existing 5-storey office building including new external facade insulation and cladding system, elevation alterations, roof plant and roof plant screening, building mounted signage, demolition of an existing one storey side extension and sundry associated works

3.7.2.3 Pigeon House Road- Reg. Ref. 2130/18

Hammond Lane Metal Company Ltd was granted planning permission on 30th March 2018 for the demolition of existing two-storey administration building (534m^2); construction of a new two-storey building (563m^2)

containing an administration area, staff facilities and a non-ferrous metals recovery area; 2 no. 18m long weighbridges; 1 no. dry wheelwash; car parking; all associated site development works all on a site of 1.79 Ha. This application relates to a development which comprises an activity for which an Industrial Emissions License under Part IV of the EPA 1992 (as amended) is required.

3.7.2.4 Ringsend Wastewater Treatment Plant – PL 29S.301798

Irish Water submitted a planning application for strategic infrastructure development to the Board seeking permission to further progress the upgrade of the Ringsend Wastewater Treatment Plant (WwTP) on 6th June 2018. The application sought permission for works required to facilitate the use of Aerobic Granular Sludge (AGS) technology, to omit the previously permitted long sea outfall tunnel and to upgrade the sludge treatment facilities at Ringsend, Dublin 4, and to provide for a Regional Biosolids Storage Facility in Newtown, Dublin 11. The Board granted permission for the proposed development on the 24th April 2019.

The proposed development at Ringsend is to the south of the MP2 Project site boundary, south of the River Liffey.

3.7.2.5 Cruise Ship Turnaround Facilities - Reg. Ref. 4507/18

DPC was granted temporary planning permission on the 25th April 2019 for 5 years for facilities to cater for cruise ship operators to include: a marquee (c. 2,250m^2) 8m in height, 300 car parking spaces, bus and car drop off area, fencing 2m in height, mini-roundabout, 6m access off Tolka Quay Road and all associated site development works at Tolka Quay Road; and; a marquee (c.1750m^2) c.8m in height at Ocean Pier.

The permission has been implemented.

3.7.2.6 Terminal 4 Bridge - Reg. Ref. 4521/18

DPC was granted planning permission on the 10th May 2019 for a 150m long, 13m wide two lane vehicular bridge with access ramps over Alexandra Road connecting the CDL yard and Terminal 4, associated lighting columns of up to 8m in height and all associated site development works.

The subject site is to the west of the MP2 Project site boundary. This permission has not yet been implemented.

3.7.2.7 Berth 47A Pigeon House Road- Reg. Ref. 3711/18

DPC are seeking planning permission for development that will consist of: construction of a bridge to span the existing cooling water outfall channel, adjacent to Pigeon House Road; construction of a new junction opposite the entrance to the Ecocem Ireland Plant; hard surfacing; site drainage and outfall; the use of lands for the storage of port-related maintenance and service equipment, construction project materials, contractor's site compound and project cargo; amendments to boundaries; and all associated services and site development works. This is currently being assessed by Dublin City Council.

3.7.2.8 Dublin Inland Port – Reg Refs. F16A/0598, F18A/0139 and FW19A/101

Fingal County Council granted planning permission to DPC on 23rd April 2017 at Coldwinters, St Margaret's, County Dublin for development of a 40m access road off Maple Avenue; a gated entrance incorporating two large feature walls of 6m in height; installation of a landmark container sculpture at the new entrance; the erection of a 3m palisade security boundary fence; signage; and new external lighting. Fingal County Council granted planning permission to DPC on 25th January 2019 for development for an extension to internal access road from Maple Avenue with associated works including public lighting and the development of 2 no. plots generally for industrial, warehouse, storage and logistic use. DPC applied for planning permission to Fingal County Council in June 2019 for the development of Plot 8 for storage and logistic use comprising stacked shipping container storage and ancillary uses. This planning application is currently being assessed by Fingal County Council.

3.7.3 Planning Order - SI 57 of 2019

In February 2019, the Minster for Public Expenditure and Reform, in advance of the impending withdrawal and/or the withdrawal of the United Kingdom from the European Union on 29th March 2019, made the Planning and Development Act 2000, Section 181(2)(a) Order No. 1, 2019 [S.I. No. 57 of 2019]. Pursuant to that Order, the provisions of the Planning and Development Act 2000, and the provisions of Part 9 of the Planning and Development Regulations, 2001 shall not apply to the development being carried out on behalf of the Minister by the Office of Public Works.

The locations and descriptions of the development are set out in the schedule included within the order. The order relates to development on the following sites:

- Former Crosbie's Yard at Crosbies Yard, Tolka Quay Road, Dublin Port, Dublin 1, DO1 K7T3.
- Former Storecon site at Tolka Quay Road (site bounded by 1 Branch Road South to the east and by Promenade Road to the north), Dublin Port, Dublin 1, DO1 AH31.

Both of these sites are located within the application boundary for the proposed MP2 development. It should be noted that the MP2 Project does not encompass or propose development at the former Crosbie's Yard site, however, temporary works are proposed at the Former Storecon site, i.e., those lands are proposed to be used as a temporary construction compound when the site is not occupied by the Office of Public Works.

4 ASSESSMENT OF ALTERNATIVES

4.1 Introduction

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 MP2 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.

The DHPLG Guidelines state that the EIA Directive requires that an EIAR includes *"a description of the reasonable alternatives studied ….. which are relevant to the project and its specific characteristics".* This *"must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment ….. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment ….. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. A 'mini-EIA' is not required for each alternative studied."*

Assessment of alternatives includes consideration of the avoidance, prevention, reduction, or offsetting of adverse environmental effects, which may be described at a number of levels including:

- those assessed at plan stage (which the EU guidance states *"it would likely be unnecessary to consider them again")* and
- those assessed at design stage (which the EU guidance describes as *"alternatives or variants of Project components in order to mitigate significant environmental impacts that emerge during assessment"*).

The MP2 Project is a key element of the infrastructural development of Dublin Port which is being developed in accordance with the Dublin Port Company's Masterplan to increase its capacity to 77.2m gross tonnes by 2040. The MP2 Project aligns with the Masterplan's fundamental approach of maximising the utilisation of Dublin Port's brownfield lands rather than seeking to build new additional Port facilities at a greenfield location to deliver this increased capacity. The MP2 Project is one of, at least three, major Strategic Infrastructure Development projects to deliver the Port's Masterplan.

- The first project, (the Alexandra Basin Redevelopment (ABR) Project, which has development consent (29N.PA0034) with construction currently progressing) focussed on:
  - Works at Alexandra Basin West including construction of new quays and jetties, remediation of contamination on the bed of the basin, capital dredging to deepen the basin and to achieve the specified depths of -10m Chart Datum (CD) at the new berths.
  - Infilling of the Basin at Berths 52 & 53 and construction of a new river berth with a double tiered Ro-Ro ramp.
  - Deepening of the fairway and approach to Dublin Port to increase the standard depth from -7.8m CD to -10.0m CD.
- The second (the MP2 Project) will deliver additional cargo capacity for both the Ro-Ro and Lo-Lo modes and passenger ferries, completing the strategic works in the northern Port.
- The final project(s) will address the capacity needs to be delivered by the southern Port; the timescale for these developments is associated with infrastructural upgrades of the road network (the Southern Port Access Route (SPAR)).

The principal focus of the MP2 Project is to complete the development of a single unified Ro-Ro ferry terminal to cater for a combination of traffics on multi-purpose ferries such as Irish Ferries (*Ulysses*, *W.B. Yeats*), Stena Line (*Stena Adventurer* and *Superfast X*) and P&O Ferries (*Norbank*, *Norbay* and *European Endeavour*) providing services to ports in Britain and, increasingly, to ports in France.

The works proposed in the MP2 Project are shown in Figure 1.4 and comprise a number of elements:

- Construction of a new Ro-Ro jetty (Berth 53) for ferries up to 240m in length on an alignment north of the Port's fairway and south and parallel to the boundary of the South Dublin Bay & River Tolka SPA (004024).
- A reorientation of the already consented Berth 52 (ABP Ref. 29N.PA0034). Berth 52 is also designed to accommodate ferries up to 240m in length. The works will also comprise an amendment to the consented open dolphin structure (ABP Ref. 29N.PA0034) to create a closed berthing face at the eastern end of Berth 49.

  [Elsewhere within the ABR Project, the extension of the existing Berth 49 is already consented to also make this berth capable of accommodating ferries up to 240m in length. The combination of the ABR Project with the MP2 Project will therefore deliver three river berths all capable of accommodating ferries up to 240m in length].
- A lengthening of an existing river berth (50A) to provide the Container Freight Terminal with additional capacity to handle larger container ships. These works will include the infilling of the basin east of the now

virtually redundant Oil Berth 4 on the Eastern Oil Jetty. These works will also include dredging to a standard depth of -11.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).

- 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 dredging of a berthing pocket to a standard depth of -13.0m CD at Oil Berth 3 will require stabilisation of the existing quay wall at Jetty Road. It is not proposed to use this quay wall for the berthing of vessels.
- Dredging at the proposed Berth 53 and channel widening to a standard depth of -10.0m CD which is a proposed amendment to the channel dredging as permitted under the ABR Project (ABP Ref. 29N.PA0034).
- Consolidation of passenger terminal buildings, demolition of redundant structures and buildings, and removal of connecting roads to increase the area of land for the transit storage of Ro-Ro freight units as a Unified Ferry Terminal (UFT). Works include reorganisation of access roads; two proposed check in areas comprising a total of 14 check lanes; proposed set down and parking area for the existing Terminal 1 building; proposed pedestrian underpass to access the existing Terminal 1 building; three proposed toilet blocks and a proposed ESB Substation. These works will comprise amendments to consented developments with planning reference numbers 3084/16 & 3638/18, and the ABR Project (ABP Ref. 29N.PA0034).
- A heritage zone adjacent to Berth 53 and the Unified Ferry Terminal set down area. This will comprise an alteration to consented development planning reference 3084/16.

This chapter of the EIAR examines the ‘alternatives’ that have been considered at a plan / strategic level (in the preparation of Dublin Port’s Masterplan, reviewed 2018) and at detailed, technical level in the design stage evolution of the MP2 Project.

The strategic assessment of alternatives considered at Masterplan level was conducted in accordance with the pertinent SEA Directive and its supporting guidance. This level of assessment addressed reasonable and feasible alternatives mainly with regard to the location, size and scale of these alternatives.

The assessment of detailed alternatives during the project-level design evolution process considers primarily the design and technology alternatives and variants with due regard to their location, size and scale.

This chapter should be read in conjunction with Chapter 2 ‘Need for the MP2 Project’ as this provides the statement of need and land-use planning support for the MP2 Project, having regard to international, national, regional and local policy and objectives. Chapter 3 ‘Project Description’ is also pertinent as it describes the proposed development and provides information on the project site, design, size and other relevant features.

4.2 Examination of Strategic Alternative Options

4.2.1 Strategic Level Options - Links to Masterplan

Dublin Port Company conducted a review of its Masterplan 2012 following the grant of permission for the ABR project. As part of this plan level assessment process, alternative development options for the Port were considered with regard to their feasibility and reasonableness. These strategic options included retaining the existing Masterplan strategy.

The increased levels of Ro-Ro throughput in Area C and of Lo-Lo throughput in Area D will result in Dublin Port's throughput per unit of land area increasing to almost 250,000 tonnes per hectare per annum by 2040. Construction of the MP2 Project is concluded to be an essential step in achieving this ambitious objective.

During the preparation and review of the Masterplan, detailed consideration was given to Dublin Port's ultimate capacity and how this could be achieved alongside the Port's current activities. This mainly addressed the location, size and scale of the alternatives. A suite of assessments was undertaken and presented for public consultation in order to establish the strategic needs for the MP2 Project to be taken forward to this more detailed planning phase.

The MP2 Project would implement the reviewed Masterplan's fundamental approach of providing capacity in Dublin Port for the 77.2m gross tonnes projected by 2040. This would be achieved by maximising the utilisation of Dublin Port's brownfield lands, rather than seeking to expand eastwards into Dublin Bay to build new additional Port facilities at a greenfield location. The assessment process, in support of the Masterplan review, identified that this the most feasible and reasonable approach, and therefore the most sustainable approach. The primary reason for the decision to select this alternative over the original Masterplan is the avoidance of direct adverse significant environmental impact on the designated SPA within the Tolka Estuary.

The SEA for the Dublin Port Masterplan 2040, reviewed 2018 was prepared in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive), as transposed into Irish law by the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 [S.I. 435/2004] and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 [S.I. 436/2004], and their recent amendments of European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 [S.I. 200/2011] and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 [S.I. 201/2011]. All relevant SEA resources and guidance prepared by the EPA were taken into account in the development of the Masterplan Review, including the SEA Pack, the SEA Process Checklist, Developing and Assessing Alternatives in SEA, the SEA Spatial Information Sources and the Synthesis Report on developing an SEA Methodology for Plans and Programmes in Ireland.

4.2.1.1 Description of Strategic Alternative Scenarios

During the preparation of the Dublin Port Masterplan 2040, reviewed 2018, consideration of alternative options to the planning of the Port's future were considered at a strategic level. This process has informed the consideration of alternatives in the preparation of the MP2 Project. A number of potential scenarios were assessed yielding a full range of potential options as follows:

- No Port Expansion:

  - No port expansion. (This particular option represents the strategic 'do-nothing' scenario).
- Optimise Main Port Lands:
  - Optimise throughput of existing facilities
  - Optimise throughput of existing facilities and increase berthage in North Port lands
  - Optimise throughput of existing facilities and increase berthage in North Port and South Port lands
- Optimise Main Port Lands and Increase Port Lands:
  - Rationalise existing facilities, increase berthage in the North Port and South Port lands, improve road infrastructure and infill adjacent to Port (part of Tolka Estuary). (This particular option represents the implementation of the Masterplan 2012 which addresses the scenario of "The Evolution of the Environment in the Absence of the Masterplan 2040").
  - Rationalise facilities, increase berthage in North Port and South Port lands, improve road infrastructure and develop Inland Port.
  - Rationalise facilities, increase berthage in North Port and South Port lands, improve road infrastructure and develop additional Coastal Port Facility external to Dublin Port.

The potential strategic options were assessed against a technical requirement in the first instance. The target for expansion is to achieve a throughput of 77.2m gross tonnes by 2040 (the predicted cargo volumes by this year). This value is utilised as a pass/fail criteria to screen and short list the options. A technical assessment is used to determine the growth that any potential option can accommodate.

It was determined that only those potential options involving optimising the main port lands and increasing port lands would be capable to delivering the required capacity to meet growth projection. This sub-set of potential options which passed the capacity test were then subjected to further technical, environmental and social assessment.

The basis for comparison of alternative options was to determine if they were technically feasible within the timescale of capacity demand, environmentally sustainable and socially acceptable.

Option 1: This option, which comprised rationalising existing facilities, increasing berthage in the North Port and South Port lands, improving road infrastructure and infilling adjacent to Port (part of Tolka Estuary), was screened out on environmental grounds. This was on the basis of its potential impact on the designated SPA, whilst a viable alternative of utilising addition lands at an Inland Port for certain suitable activities had been identified, this potential impact was thus assessed to be avoidable. However this potential option, as established by the original masterplan, represented a strategic scenario in the absence of a plan and was therefore retained in the analysis to provide a reference point against which other options could be assessed.

Option 2: This option comprised rationalising facilities, increasing berthage in North Port and South Port lands, improving road infrastructure and developing an Inland Port (to provide capacity for non-core port activity and thus support the Dublin Port minimum dwell time initiative). This option satisfied the further technical, environmental and social criteria. It presents the preferred option identified by the Masterplan review process and the MP2 Project forms a significant element of this option.

The potential option of rationalising facilities, increasing berthage in North Port and South Port lands, improving road infrastructure and developing additional Coastal Port Facility external to Dublin Port was not considered to be achievable within the timescale of the capacity demands. This option was therefore not considered further as a means of achieving the required Port capacity to 2040.

The findings of the comparison of alternative strategic options that prepare for potential further future growth in port demand, are summarised in Figure 4-1. Further detail on these two options and their short, medium and long term impacts are summarised in the following section.

The MP2 Project is an integral part of the Masterplan and its comparison as part of Options 1 and 2 is described within the following sections.

Table 4-1 Details of how the Options were identified in Technical Assessment

Long List of Options	Achieves Throughput of 77.2m Tonnes (Technical Screening – Pass/Fail)	Achieve Throughput of 77.2m Tonnes (Technical Screening – Reasoning)	Short list of Reasonable Options	Short Description
No Port Expansion				
No port expansion	Fail	Does not provide adequate expansion	No further Port Expansion once projects through the planning process are completed	The existing port lands continue the present day/*status quo* operations and facility use, the ABR development, and other smaller projects (DPC internal roads, demolitions and associated upgrade works, and yards upgrades) which have been approved and are under construction form part of this regime.
Optimise Main Port Lands				
Optimise throughput of existing facilities	Fail	Does not provide adequate expansion	Not Applicable	Increased capacity is provided by relatively minor improvements to the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites.
Optimise throughput of existing facilities and increase berthage in North Port lands	Fail	Does not provide adequate expansion	Not Applicable	Increased capacity is provided by an additional eastern jetty and further quay development within the North Port area alongside relatively minor improvements to the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites.
Optimise throughput of existing facilities and increase berthage in North Port and South Port lands	Fail	Does not provide adequate expansion	Not Applicable	Increased capacity is provided by an additional eastern jetty and further quay development within the North Port area and development of new quays within the South Port lands, alongside relatively minor improvements to the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites, using existing road infrastructure linkages.
Optimise Main Port Lands and Increase Port Lands				

Rationalise existing facilities, increase berthage in the North Port and South Port lands, improve road infrastructure and infill adjacent to Port (part of Tolka Estuary).	Fail	Provides adequate expansion, however, the Art 6(4) process of the Habitats Directive (IROPI) would require no better alternative to exist (regardless of cost)	Not Applicable OPTION 1	Increased capacity is provided by infilling adjacent to the North Port lands (part of Tolka Estuary) and development of quays within the North Port and South Port lands, alongside rationalisation/relocation of the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites, using enhanced road infrastructure linkages including new bridge across the River Liffey.
Rationalise facilities, increase berthage in North Port and South Port lands, improve road infrastructure and develop Inland Port.	Pass	Provides adequate expansion, within 2040 timescale	Rationalise facilities, increase berthage in North Port & South Port lands, improve road infrastructure & develop Inland Port. OPTION 2	Increased capacity is provided by the creation of a new Dublin Inland Port, and development of quays within the North Port and South Port lands, alongside rationalisation/relocation of the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites and enhancing road infrastructure linkages including new bridge across the River Liffey.
Rationalise facilities, increase berthage in North Port and South Port lands, improve road infrastructure and develop additional Coastal Port Facility external to Dublin Port.	Fail	Provides adequate expansion, but not technically feasible within 2040 timescale and inconsistent with current national Ports Policy	Not Applicable	Increased capacity is provided by developing an additional coastal facility, and development of quays within the North Port and South Port lands, alongside rationalisation/relocation of the existing operations and facilities, towards maximising efficiencies and capacity use of brownfield sites and enhancing road infrastructure linkages including new bridge across the River Liffey.

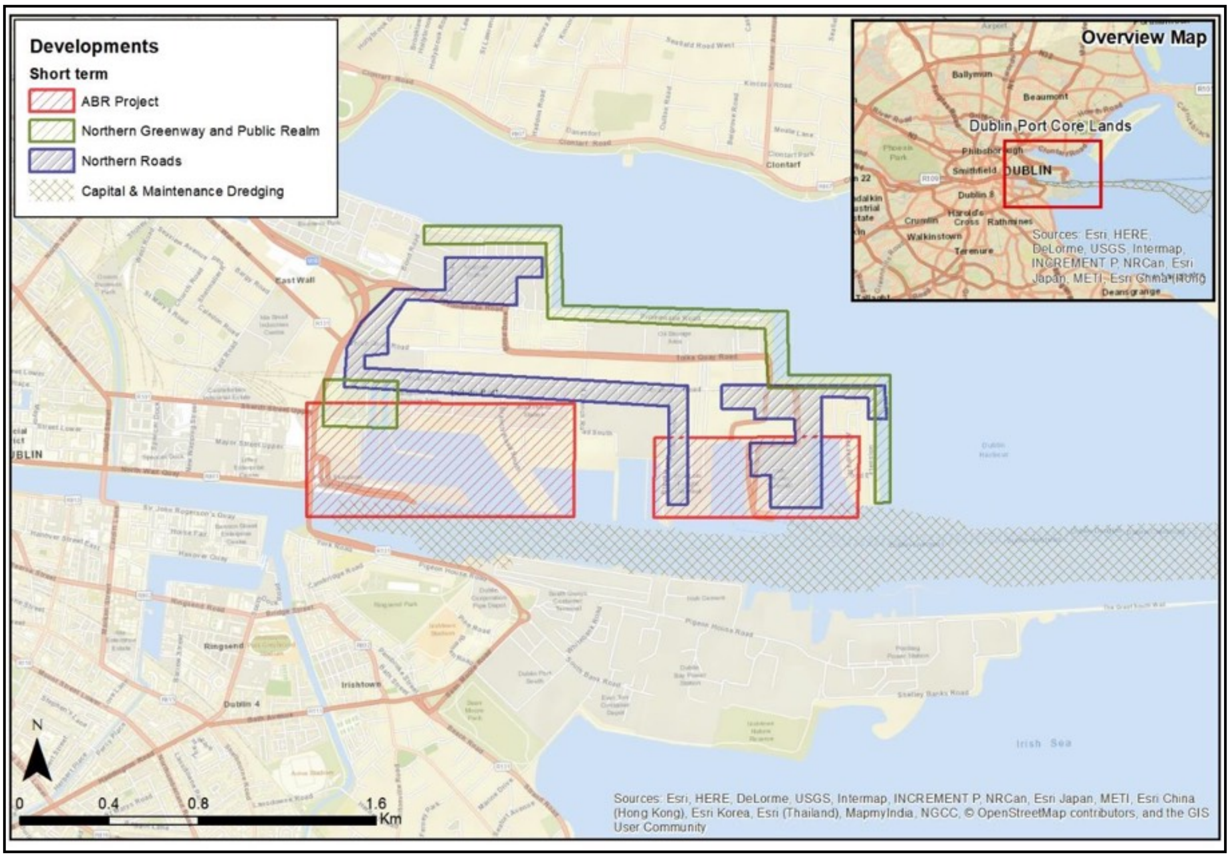


Figure 4-1 Strategic Option One Short Term

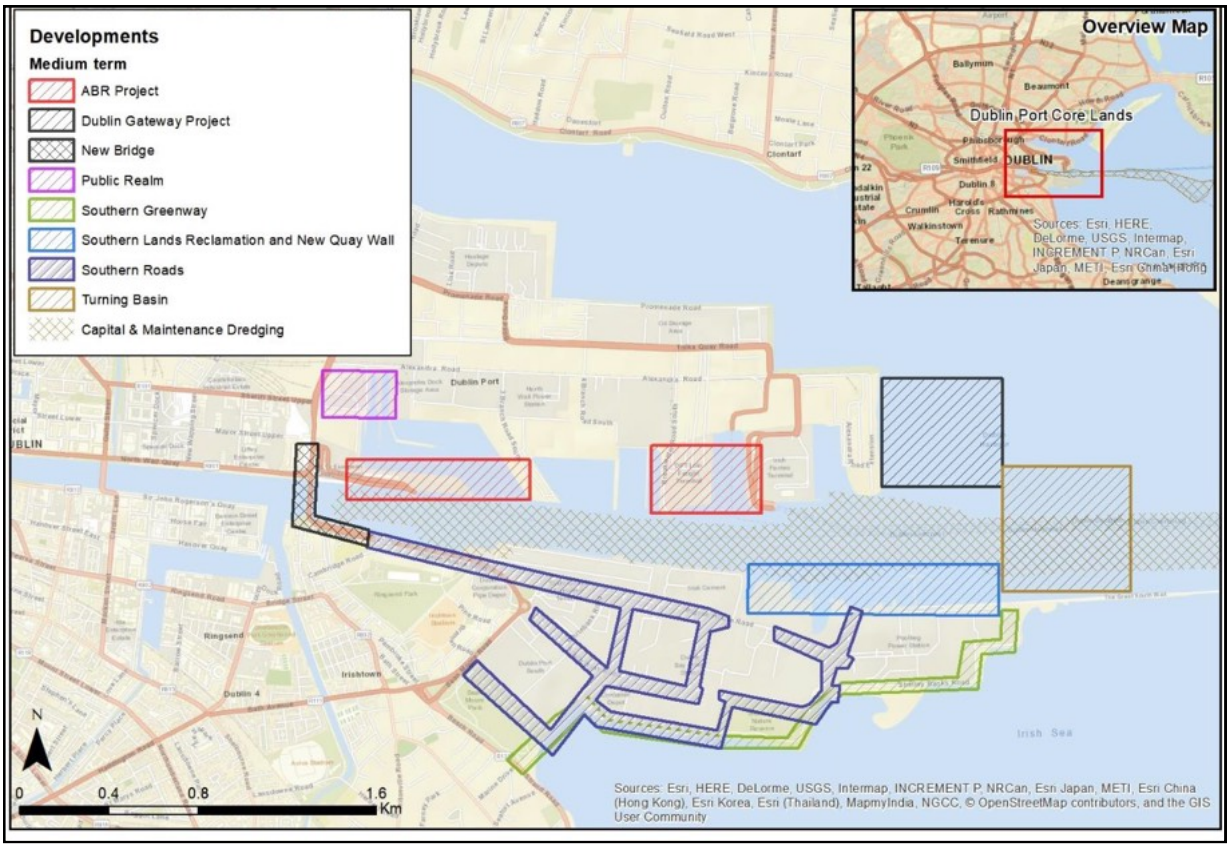


Figure 4-2 Strategic Option One Medium Term

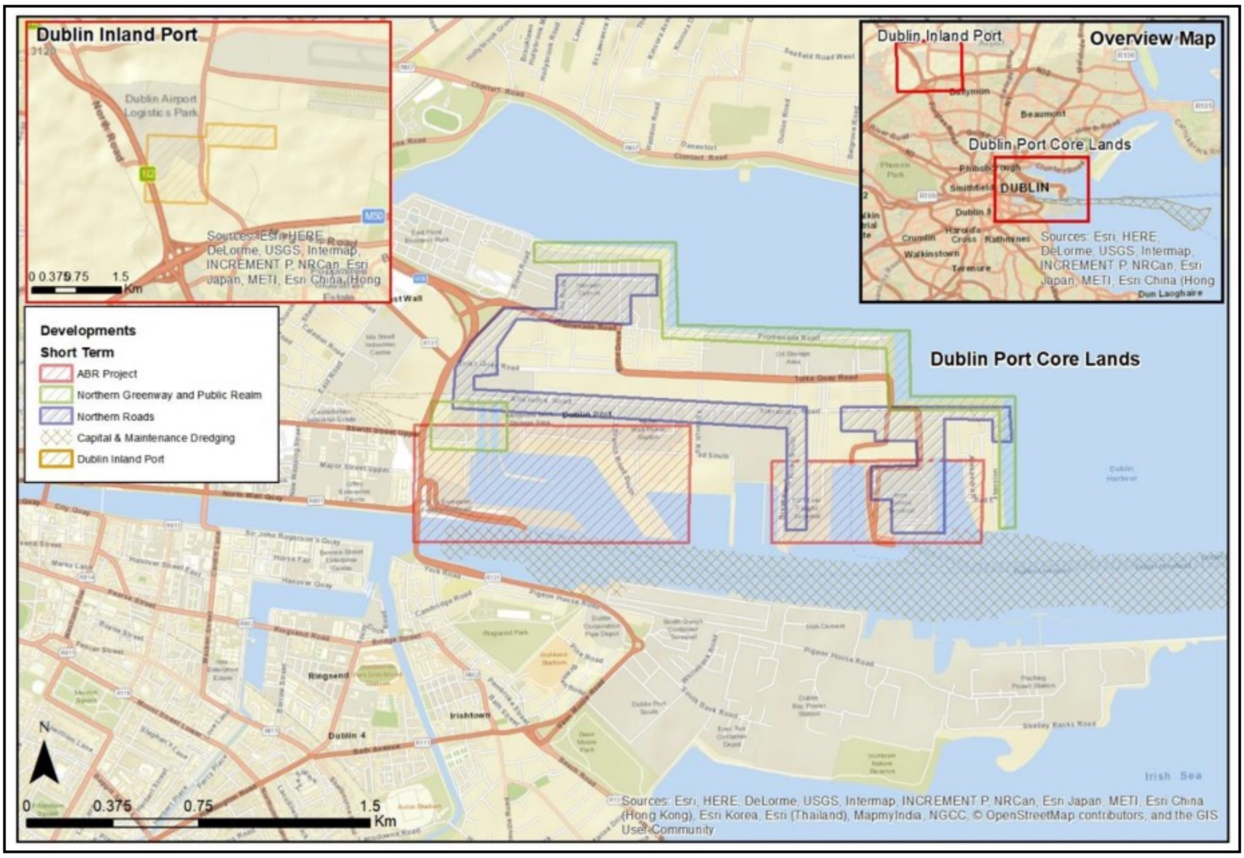


Figure 4-3 Strategic Option Two Short Term

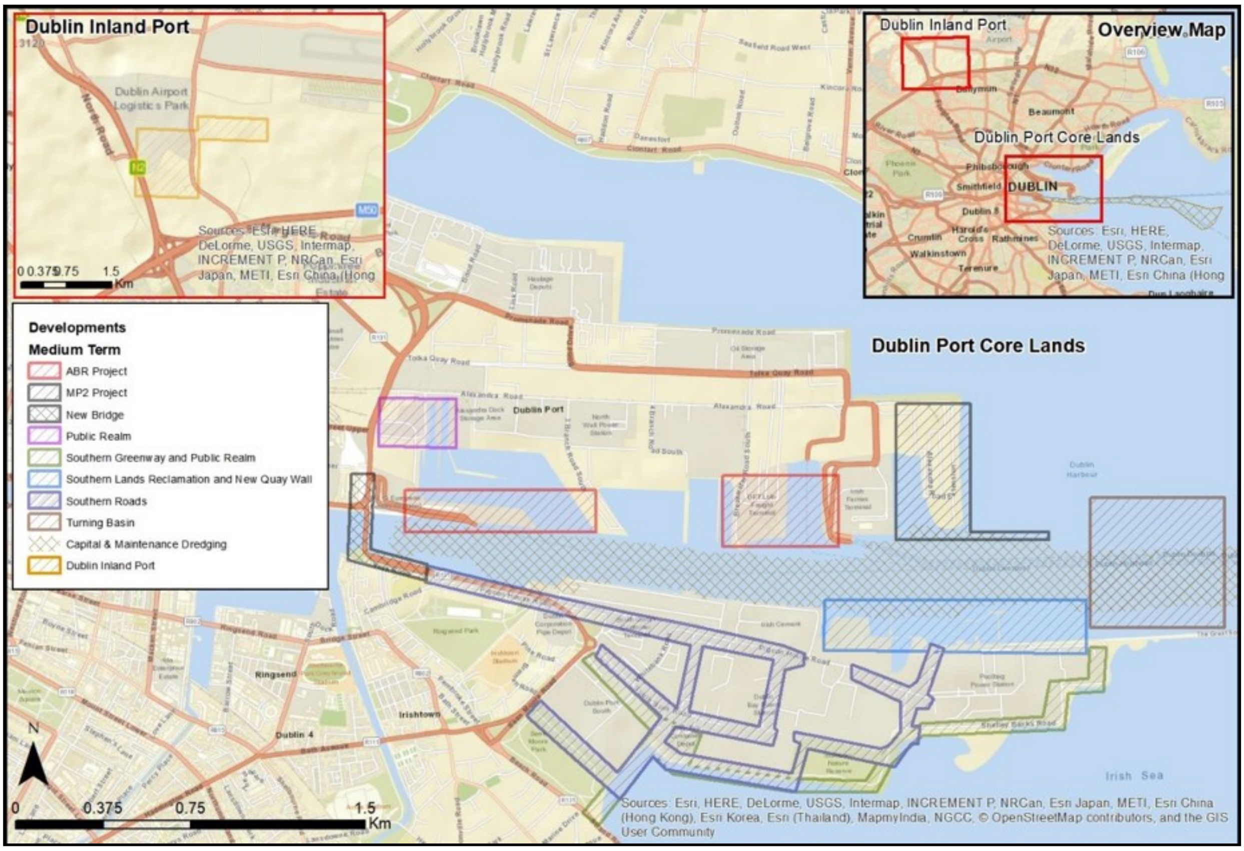


Figure 4-4 Strategic Option Two Medium Term

4.2.1.2 Option 1: Dublin Port Masterplan 2012

Prior to the review of the Dublin Port Masterplan in 2018, the major Strategic Infrastructure Development projects outlined in the first iteration of the Dublin Port Masterplan 2012 were considered for development. Under Option 1, these developments were envisaged to progress in the short (2017 – 2021), medium (2021 – 2031) and long (2031 - 2040) term. The development projects within the timescales are described with maps of the areas to be developed illustrated in Figure 4-1 and Figure 4-2. Port operations would have been ongoing in tandem with the proposed developments throughout the period of the Masterplan.

Short Term: 2017 – 2021:

Developments within the short term timescale of the Dublin Port Masterplan 2012 were to be concentrated within the Northern Port Lands. Construction of the ABR Project continues throughout this time. In summary the main proposed developments were:

- Development of the ABR Project including infilling of Berths 52/53 and the development of Alexandra Basin West. Non-ABR related development within the Alexandra Basin West will include the development of a new bulk solid conveyor system and partial demolition of existing buildings to extend Ocean Pier multi-purpose area.
- Commencement of a capital dredging programme to deepen the Alexandra Basin West and navigation channel to a standard depth of -10 m CD as part of the ABR Project.
- Construction of public realm and greenway.
- Construction of revised road network in Northern Port Lands.

Medium Term: 2021 – 2031

Development within the first five years (2021-2026) of the medium term was concentrated within the Northern Port Lands. Development within the last five years (2026-2031) of the medium term was concentrated in the Southern Port Lands. The completion of the ABR Project and the Dublin Gateway Project takes place in the medium term. In summary the main proposed developments were:

- Completion of the capital dredging programme as part of the ABR Project.
- Completion of the ABR Project with the demolition of North Quay Wall.
- Completion of the Dublin Gateway Project including an eastward extension of approximately 21 ha, development of two new river berths and development of a multi-user check in area for Ro-Ro traffic. This development will provide a new Ro-Ro facility in the Northern Port Lands.
- Public realm works including the conservation of a graving dock and pump house in Northern Port Lands, and the provision of the North Quay Wall Light House and Stoney Blocks interpretative zone.
- Development of a bridge over the River Liffey and upgrading of the road network in the Southern Port Lands. Reclaiming of 12.6 ha for development of a multi-purpose berth in front of the Poolbeg Power Station. Development of new quay wall and berth directly west of reclaimed land for bulk solid.
- Extension/upgrade of Southern Greenway.

Long Term: 2031+

All Dublin Port Masterplan development were to be completed by the long term stage, with infrastructure at the Port capable of handling a throughput of 60 million tonnes per annum. This infrastructure is capable of handling the required throughput of Dublin Port until 2032.

4.2.1.3 Option 2: Dublin Port Masterplan 2040

With the implementation of the Masterplan 2040, (Option 2), the Strategic Infrastructure Development projects outlined in the Masterplan 2040 would take place in the same timescales as in Option 1. The development projects within the timescales are described below with a map of the area to be developed illustrated in Figure 4-3 and Figure 4-4. Port operations would be ongoing in tandem with proposed developments throughout the timescale of the Masterplan 2040.

Short Term: 2017 – 2021

Development within the short term timescale of the Masterplan 2040 were to be concentrated within the Northern Port Lands, with the exception of the Dublin Inland Port. Construction of the ABR Project continues throughout the short term. In summary the main proposed developments were:

- Development of the ABR Project including infilling of Berths 52/53, development of a new river berth and the development of Alexandra Basin West. Non-ABR related development within the Alexandra Basin West will include the development of a new bulk solid conveyor system and partial demolition of existing buildings to extend Ocean Pier multi-purpose area.
- Commencement of a capital dredging programme to deepen the Alexandra Basin West and navigation channel to a standard depth of -10 m CD as part of the ABR Project.
- Construction of public realm and greenway.
- Construction of revised road network in Northern Lands.
- Development of the Dublin Inland Port including the construction of roads, buildings and yards, and the relocation of non-core users to Dublin Inland Port.

Medium Term: 2021 – 2031

Development within the first five years (2021-2026) of the medium term would be concentrated within the Northern Port Lands. Development within the last five years (2026-2031) of the medium term would be concentrated in the Southern Port Lands. The completion of the ABR Project and the MP2 Project within the medium term are two milestone infrastructure project completions which would allow for growth to be accommodated. In summary the main proposed developments were:

- Completion of the capital dredging programme as part of the ABR Project.
- Completion of the ABR Project i.e. demolition of North Quay Wall and development of washwall on southern side of Liffey.
- Completion of the MP2 Project i.e. construction and operation of a unified ferry terminal (UFT) and neighbouring container terminal (see Chapter 2 Project Description).

- Public realm works including the conservation of a graving dock and pump house in Northern Port Lands, and the provision of the North Quay Wall Light House and Stoney Blocks interpretative zone.
- Development of the SPAR (requiring construction of a bridge over the River Liffey and partial infill of the southern foreshore of the Inner Liffey Channel) and upgrading the road network in the Southern Port Lands. Reclaiming and redevelopment of 13.8 ha for deepwater Lo-Lo and multi-purpose berths, relocating Lo-Lo operations east towards Poolbeg Power Station away from the Poolbeg SDZ West scheme. This relocation will allow for development of Ro-Ro operations adjacent to the Poolbeg SDZ West scheme.
- Extension/upgrade of Southern Greenway, reopening of section of Great South Wall adjacent to ESB generating station as public realm and allocation of 4 ha public realm to create buffer between Southern Port Lands and the Poolbeg SDZ West scheme.
- Development of the Dublin Inland Port including the construction of roads, buildings, yards and a road juncture, and the relocation of non-core users to Dublin Inland Port to support the Dublin Port dwell time initiative.

Long Term: 2031+

Within the last nine years of the Masterplan only small plots on the Northern Lands currently utilised by the Bulk Liquid may be acquired and redeveloped for unitised freight. The infrastructure in place at this juncture would allow for the throughput of 77.2m gross tonnes per annum, equating to a growth rate of 3.3% per year.

4.2.1.4 Summary of Strategic Option Assessment

The main differences in potential environmental impacts between the two options were assessed at strategic level during review of the Masterplan. These are summarised as follows with regard to SEA environmental issues and taking mitigation into account:

- Option 1 proposed to infill 21 ha of land, part of which located within the South Dublin Bay and River Tolka Estuary SPA. The omission of this element within Option 2 results in long term positive impacts to the designated and undesignated biodiversity of this area, with no loss in their habitat, and an improvement in the landscape of the Dublin Bay Biosphere with no eastward extension of land.
- Option 2 proposed development of Dublin Inland Port alongside the MP2 Project. The potential environmental impacts resulting from Option 2 are likely to be less than those arising from Option 1 which included the Dublin Gateway Project. No designated biodiversity sites are likely to be significantly affected, and the natural landscape designated in the Dublin Bay Biosphere remains unaltered.
- Option 2 proposes to relocate Lo-Lo operations on southern lands away from the Ringsend SDZ and Poolbeg SDZ. This is likely to result in medium and long term reductions in noise and vibration impacts to the area and to the local community.
- Option 2 proposes to develop the SPAR link with the aim of keeping port traffic within the Port Estate. This is likely to reduce long term impacts on the public road network, thereby reducing negative impacts to material assets, and reduce long term disturbance impacts and air emissions to the local communities.

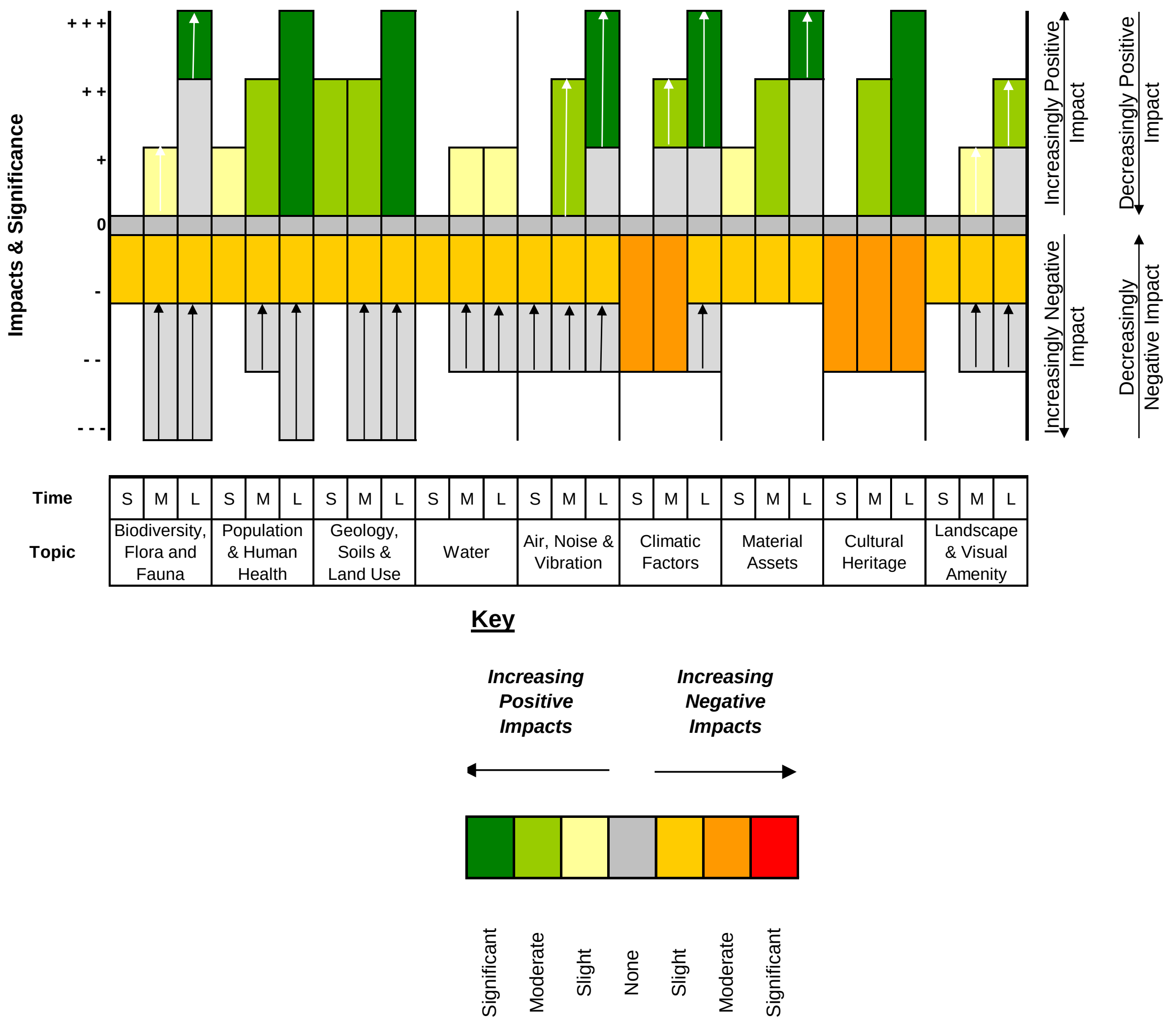
- Option 2 proposes to install shore-side electricity facilities at new berths. This will result in permanent reductions in local air emissions, reducing negative air, noise and climatic factor impacts associated with port operations.
- Option 2 proposes to design future development for flood risk and climate change. This is likely to reduce negative impacts resulting from flooding to material assets owned by DPC in the long term, and improve climatic factor and water impacts.
- Option 2 proposes to reopen a section of the Great South Wall as public realm and allocate 4 ha public realm. These will result in an increase of social amenity areas available to the local communities, and an improvement of the landscape in the medium and long term with areas of public realm blocking views of industrial port activity.
- Option 2 proposes to design screening for the greenways and public realm areas to ensure views of industrial port activity are partially blocked to the public, resulting in benefits to the landscape in the medium and long term.
- Option 2 proposes to design screening into the greenways to ensure the public and the industrial port activity is partially blocked to the waterbird species in the South Dublin Bay and River Tolka Estuary SPA, resulting in benefits to the biodiversity in the medium and long term through reduced disturbance.
- The NIS concluded that the loss of the tern dolphins in the South Dublin Bay and River Tolka Estuary SPA can only go ahead if certain conditions are met at the detailed project level to maintain the integrity of the SPA. As a result, this process is likely to decrease the potential negative impacts to biodiversity in the medium and long term.

A comparison of the potential positive and negative scores that have been generated from the mitigated assessment of these strategic options is presented in Table 4-2. Option 1 (Masterplan 2012 implementation) is taken as the base case for comparison with Option 2 (the Masterplan Reviewed 2018): the comparative arrows show increases in positive impact and reductions in negative impact. In all cases Option 2 is either equal to, or better, than Option 1 with regard to the environmental topics.

Table 4-2 Comparison of Strategic Options by SEA Environmental Issue

Environmental Topic	Short Term Difference	Medium Term Difference	Long Term Difference
Biodiversity, Flora & Fauna	0 / 0	+2 / +1	+2 / +1
Population & Human Health	0 / 0	+1 / 0	+2 / 0
Geology, Soils and Landuse	0 / 0	+2 / 0	+2 / 0
Water	0 / 0	+1 / 0	+1 / 0
Air, Noise & Vibration	+1 / 0	+1 / +2	+1 / +2
Climatic Factors	0 / 0	0 / +1	+1 / +2
Material Assets & Infrastructure	0 / 0	0 / 0	0 / +1
Cultural, Architectural & Archaeological Heritage	0 / 0	0 / 0	0 / 0
Landscape & Visual Amenity	0 / 0	+1 / +1	+1 / +1

Comparison of Options



The implementation of Option 2 will result in a greater number of positive impacts when compared to the impacts resulting from Option 1. The medium and long term impacts to biodiversity, flora and fauna are likely to increase to slight and moderate impacts, respectively, with screening designed into the greenway developments. The long term impacts to biodiversity, flora and fauna are likely to increase from moderately positive to significantly positive with the exclusion of the Dublin Gateway Project. The medium and long term significant negative impacts to biodiversity, flora and fauna are likely to decrease to slight negative impacts with the removal of the tern dolphin going ahead only in the case that the integrity of the South Dublin Bay and River Tolka Estuary SPA is not impacted. The medium and long term negative impacts to the population and human health are likely to reduce to slight negative impacts with less noise disturbance and air emissions to the local communities. The significant negative medium and long term impacts to geology, soils and landuse are likely to reduce to slight negative impacts with the omission of the Dublin Gateway Project in Option 2. The moderate negative medium and long term impacts to water are likely to reduce to slight negative impacts, with improvements in flood risk management at Dublin Port. Air, noise and vibration impacts are likely to permanently reduce to slight negative impacts with the instalment of shore-side electricity facilities, and are likely to become moderately positive in the medium term and significantly positive in the long term with the creation of public realm, development of the SPAR link and the relocation of Lo-Lo operations away from the local communities. There is likely to be an overall improvement in climatic factor impacts in the medium and long term with the instalment of shore-side electricity facilities and the inclusion of management for flood risk into all future development at the Port. Medium and long term negative impacts to the overall landscape are likely to improve with the omission of the Dublin Gateway Project, the inclusion of greater public realm in Option 2 and the inclusion of screening into the design of greenways and public realm areas. Overall Option 2 is a more sustainable development programme which allows for the achievement of the required 77.2m gross tonnes throughput per annum.

The MP2 Project is a key element of the Masterplan's 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 this is the most feasible and sustainable approach available to the Port within the project's timescale.

The increased levels of Ro-Ro throughput in Area C and of Lo-Lo throughput in Area D will result in Dublin Port's throughput per unit of land area increasing to almost 250,000 tonnes per hectare per annum by 2040. Construction of the MP2 Project is concluded to be an essential step in achieving this ambitious objective.

During the development of the Masterplan it was identified that consolidation of the passenger ferry facilities and cargo shipments would allow optimisation of land-use for these water-side port activities. Such facilities need access to berths and must therefore be located accordingly. The use of existing access and facilities also supports the location selected at the north port's eastern extent. This setting is consistent with the Masterplan's strategic objectives (particularly in relation to **Port Functions, Investment and Growth and Movement and Access)** and therefore represents the most suitable land-use for this portion of Dublin Port.

4.2.1.5 Strategic Differences in Impact between Option 1 and Option 2

The development options arising from the Masterplan 2040 allow for a throughput of 77.2 million gross tonnes per annum by 2040, in comparison to the 60 million tonnes resulting from the development projects outlined in the Dublin Port Masterplan 2012. In order to achieve this increased throughout, DPC have purchased greenfield lands at Coldwinters, close to the M50 and Dublin Port Tunnel, referred to as Dublin Inland Port. This increase in DPC-owned land has meant that the need to infill 21 ha of area as part of the Dublin Gateway Project (included in the Dublin Port Masterplan 2012) is redundant. Instead, the MP2 Project will act as an alternative use for the eastern end of the Northern Port Lands. With regard to strategic environmental impact the main difference is that Option 2 avoids a direct adverse significant environmental impact on the SPA of the Tolka Estuary by utilising the Inland Port lands.

Greater development of the Southern Port Lands will arise from the Masterplan 2040 in comparison to the Dublin Port Masterplan 2012. This development will include infill of the southern foreshore of the Inner Liffey Channel, reclamation of a slightly greater area (1.2 ha) in front of the Poolbeg Power Station, relocation of Lo-Lo operations east and allocation of 4 ha public realm.

The strategic level assessment has been conducted in accordance with relevant SEA policy and guidance and therefore has not needed to be revisited within the EIAR process.

The selected strategic alternative (Option 2), incorporates an MP2 Project which implements the reviewed Masterplan's fundamental approach of providing capacity in Dublin Port for the 77.2 million gross tonnes projected by 2040 by maximising the utilisation of Dublin Port's brownfield lands and new additional inland Port facilities (rather than seeking to expand eastwards into Dublin Bay).

The assessment process, in support of the Masterplan review, identified that this is the most feasible and reasonable approach, and therefore the most sustainable approach. The primary reason for the decision to select this alternative over the original Masterplan is the avoidance of direct adverse significant environmental impact on the designated SPA within the Tolka Estuary.

The following section provides more detailed assessment of the alternative configurations of the MP2 Project facilities and detailed assessment of alternatives for construction and operational elements. These alternatives primarily address design and technology assessments at detailed design evolution level with due consideration of location, scale and size.

4.3 Project Level Options – Alternative Engineering Design / Layouts and Technology

4.3.1 Detailed Design Evolution

This section of the EIAR describes the project level evolution of the design for both the proposed marine and landside structural works, and the associated dredging and infill works required to achieve the MP2 Project's objectives. The alternatives considered within this evolution process are identified and assessed at project level.

A site location and the existing layout of the relevant areas of the port are described in detail in Chapter 3 'Project Description' and summarised in Figure 4-5 (replicated from Chapter 3 for ease of reference). The proposed marine and landside structural works, and the associated dredging and infill works required to achieve the MP2 Project's objectives are also described in detail in Chapter 3 'Project Description' and similarly are summarised in Figure 4-6.

The MP2 Project design evolution was carried out by ABL, supported by navigational and morphological studies and in consultation with the environmental team. The following design elements have been considered when carrying out the design of the various elements of the project:

- Maximise the potential of the existing port property in the context of the Dublin Port Masterplan 2040, reviewed 2018, through redesign of the Ferry Terminal Yards;
- Upgrade of the Eastern Oil Jetty (Oil Berths 3 and 4) and allow for the future use as a Lo-Lo berth;
- Provide sufficient water depth at each berth for the design vessels proposed;
- Minimise the impact of construction on the operation of existing berths;
- Provide a sufficiently wide channel to accommodate the piloting of vessels;
- Minimise the impact of proposed structures on existing port navigation;
- Take full cognisance of environmental constraints and where feasible provide mitigation through engineering design;
- Ensure the integrity and stability of the Great South Wall is maintained.

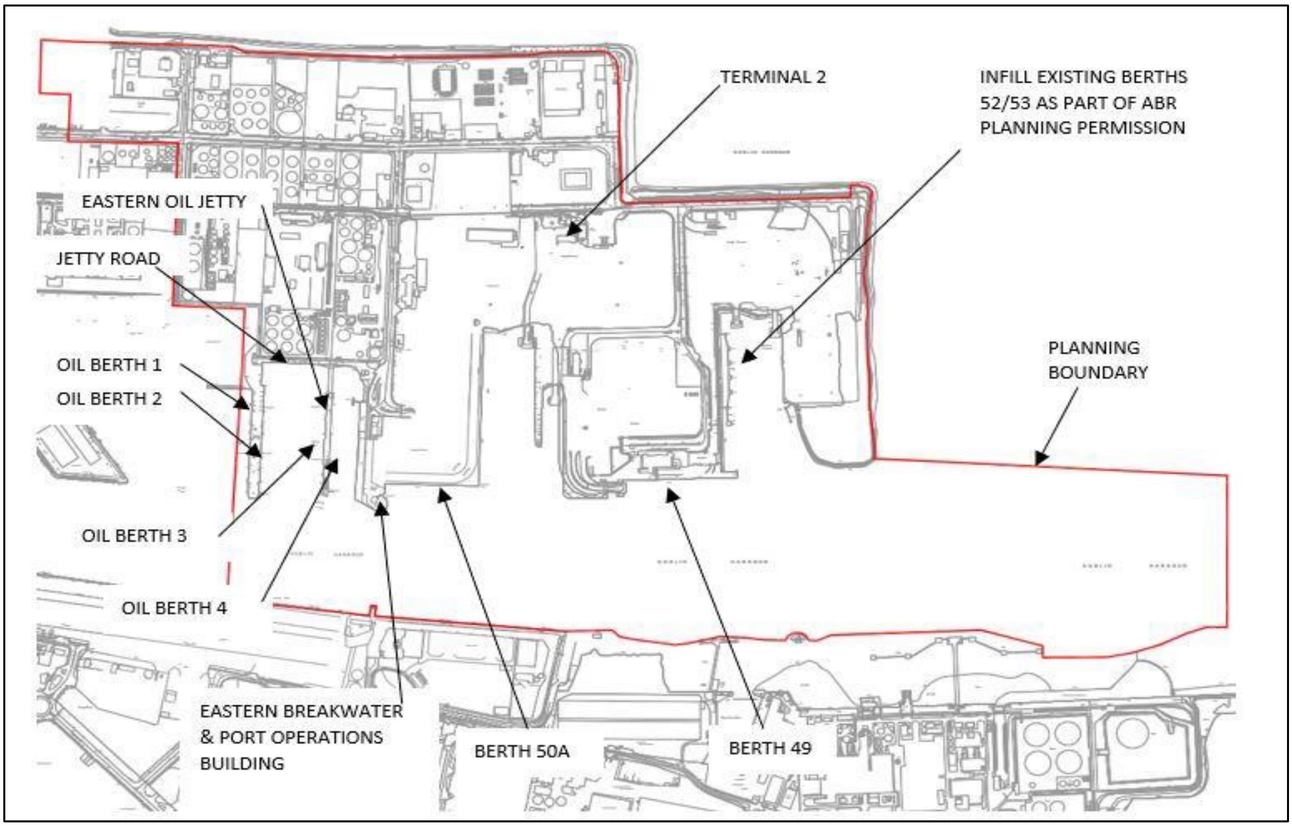


Figure 4-5 Existing Port Layout

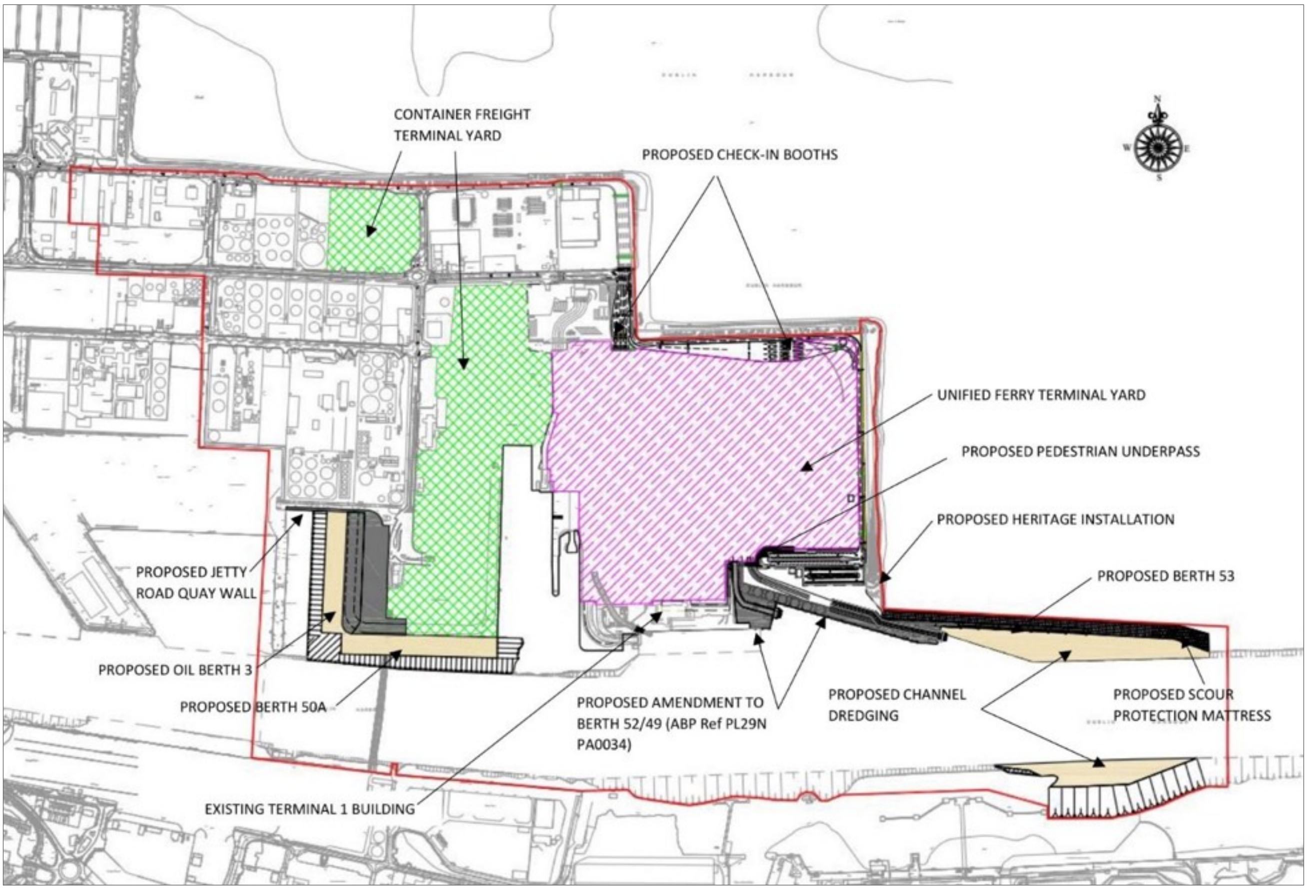


Figure 4-6 Proposed Site Layout

4.3.2 Design Evolution – Methodology

The design team's approach to developing and progressing the scheme design was based on examining layouts of key infrastructure elements that avoided or minimised any adverse environmental impacts while meeting the requirements of the project brief. This design process and evolution was informed by expert inputs, navigation simulation and morphological modelling to refine the design layouts.

The various design iterations were informed by a number of key factors such as:

- Compliance with project brief;
- Location of element;
- Scale and size;
- Form of construction;
- Construction methodology;
- Project phasing;
- Environmental impacts;
- Operational impacts (Land & marine).

A description of the project's technical, detailed design level, evolution is detailed for each of the key infrastructure elements as identified during the development of the Masterplan.

- Construction of a new Ro-Ro jetty (Berth 53);
- Reorientation of the already consented Berth 52 / 49;
- Lengthening of an existing river berth (50A);
- Infilling of Oil Berth 4 and redeveloping Oil Berth 3;
- Channel widening to the south of the Liffey Channel to a standard depth of -10.0m CD.
- Consolidation of RoRo facilities and passenger terminal buildings into a Unified Ferry Terminal, including demolition and other associated landside works including a heritage zone.

There is a strong relationship between Berths 49, 52 and 53 and vessel manoeuvrability. This interrelationship required that all these elements were examined both separately and in combination in order to also determine the needs of the associated widening and disposal activities.

This design process and evolution, for each of the infrastructure elements, examined the design progression in comparison to a do-nothing scenario. The do-nothing scenario described existing port activity or activity that incorporates previously consented development, in particular Berth 52.

This do-nothing scenario in respect of the MP2 Project, is described in accordance Commission Guidelines on the preparation of EIAR and section 3.4.2 the EPA Guidelines 2017 as follows:

- Under the do-nothing scenario, as described in the Port Rationale, Dublin Port is currently experiencing of increased growth trends. Initiatives to optimise existing operations and throughput have already been implemented in order to maximise the Port’s capacity using the existing facilities. Rapid economic post-recession recovery, increasing population and an increase in patterns of trade between Dublin and Continental Europe have created a need for port expansion to cater for increasing demand. The various infrastructure elements within the MP2 Project all integrate to provide a second tranche (after the ABR Project) of the additional capacity required to cater for the trend in projected demand of 77.2m gross tonnes by 2040. This is specifically achieved by the MP2 Project elements providing the necessary additional facilities and maximising land-use to increase throughput.
- The key environmental factors associated with the do-nothing scenario are used as the baseline case of the comparison of design progressions for each infrastructure element. This is detailed for the specific environs of each of the infrastructure elements in Sections 4.3.3 - 4.3.10 respectively.
- These assessments also take account of previously consented projects, in particular the ABR Project, in the environs of each infrastructure element.
- In the do-nothing scenario, the existing usage of these brownfield areas continues and the capacity of Dublin Port to accommodate Ro-Ro vessels would be limited. Berth 52 / 49 would be constructed, as consented within the ABR project. The do-nothing scenario is largely representative of existing activities already taking place within this location, therefore this scenario will not impact upon the environmental factors at the site. However, the absence of the MP2 Project 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, would undermine the Port’s ability to contribute towards achieving the sustainable transport objectives of National Port Policy. 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 also further hinder the growth of the Port's existing vessel operators and prohibit any potential for new operators from residing at the Port.

4.3.3 Berth 53 – Design Progression

The location, layout, size and form of construction of Berth 53 progressed over a period of time. The design progression included the following design stages.

- Do-nothing Scenario (No berthing structure)
- Design Progression One
- Design Progression Two
- Design Progression Three
- Design Progression Four (Final design)

4.3.3.1 Do-nothing Scenario (No berthing structure)

Figure 4-7 shows the existing site layout in the proximity of the proposed Berth 53 structure. A new berth facility is required to accommodate the design vessel identified in the Port's Masterplan and is therefore an integral part of the MP2 Project. In the absence of this berth, the capacity of Dublin Port to accommodate Ro-Ro vessels would be limited. 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, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

Additionally, the absence of Berth 53 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.

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there would be no impact upon these as a result of the absence of Berth 53.

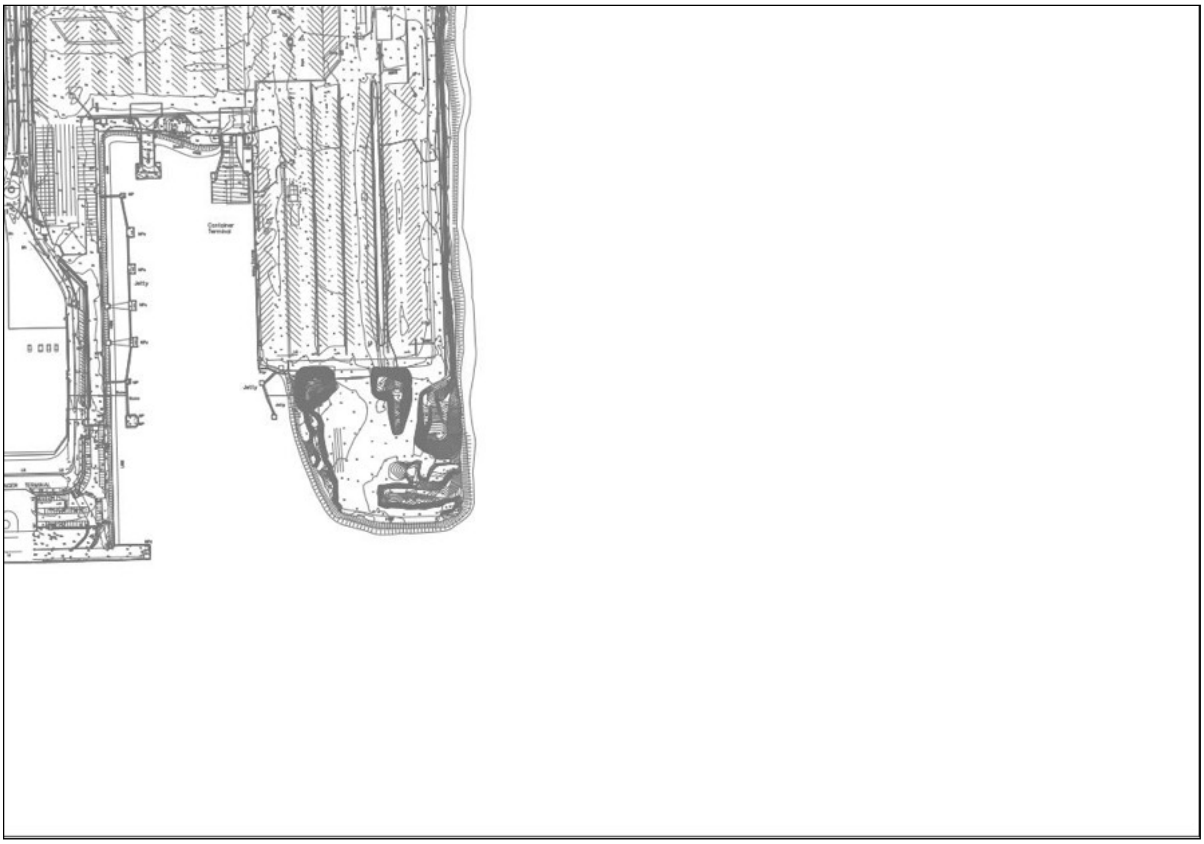


Figure 4-7 Existing Layout

4.3.3.2 Design Progression One

Due to the interaction in berthing facilities, the Berth 52 quay/jetty structure was added to the site plan to identify the physical constraint imposed by this previously consented structure and the SPA Boundary (Figure 4-8). Initial unconstrained layouts were based on the outputs from preliminary navigation simulation modelling in October 2017 (undertaken by HR Wallingford and presented in Appendix 4). Both of these initial layouts were located within the SPA (Figure 4-9).

Based on a review of the functional requirements of the project brief, a preliminary Berth 53 structure was designed along the southern boundary of the SPA. This multi-purpose use structure was comprised of a solid quay wall (Circa 330m) supporting a reinforced concrete deck. The design included public access along the northern side of the pier leading to a public realm space at the easternmost point of the structure (Figure 4-10).

Preliminary feedback from the morphological modelling process (undertaken by RPS and presented in Chapter 12), determined that a solid walled quay structure would have a potential impact on the seabed levels within the SPA due to the proposed structure causing changes to the tidal/river flow within the proximity of the proposed jetty. The predicted impact on the SPA was a loss of 2.15ha of habitat. Consequently, this design layout was ruled out due to environmental impacts and an alternative design was progressed to avoid habitat loss within the SPA.

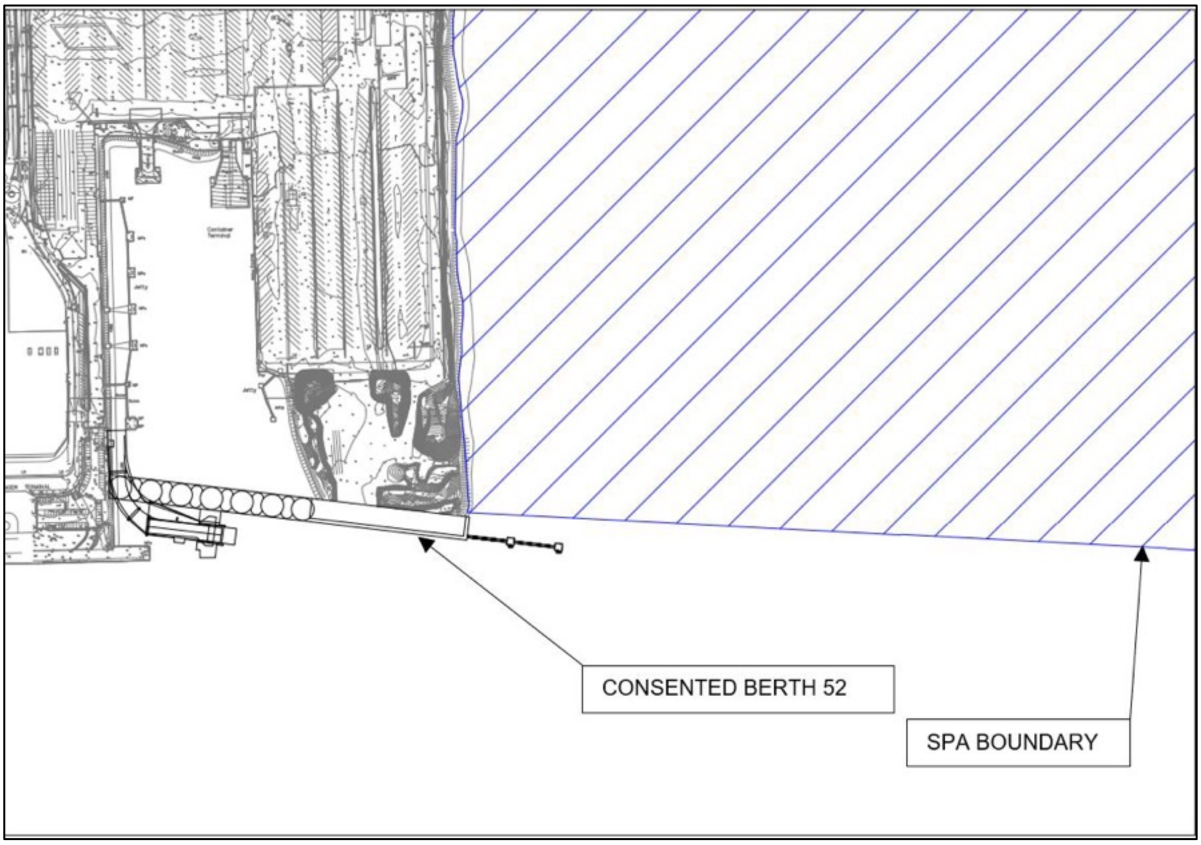


Figure 4-8 Consented Berth 52 & SPA Boundary

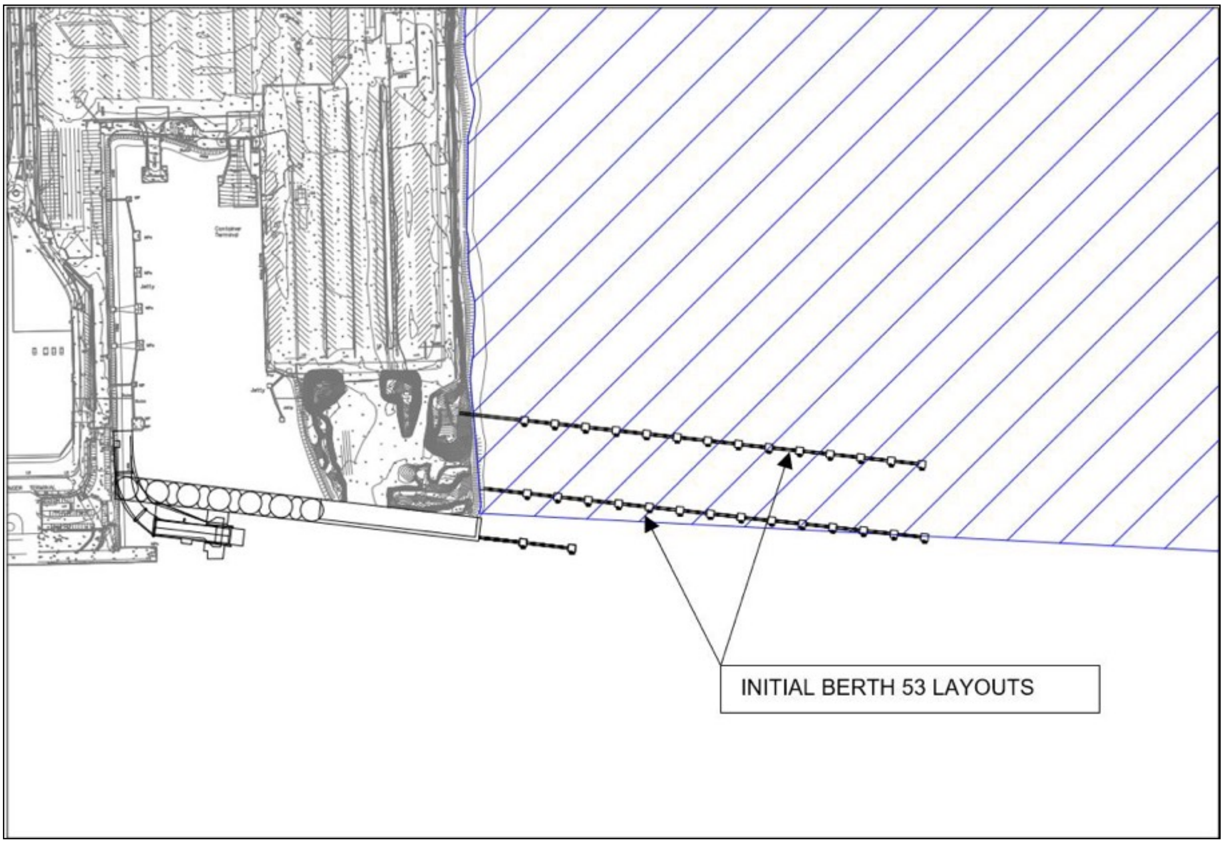


Figure 4-9 SPA Boundary & Initial Berth 53 Layouts

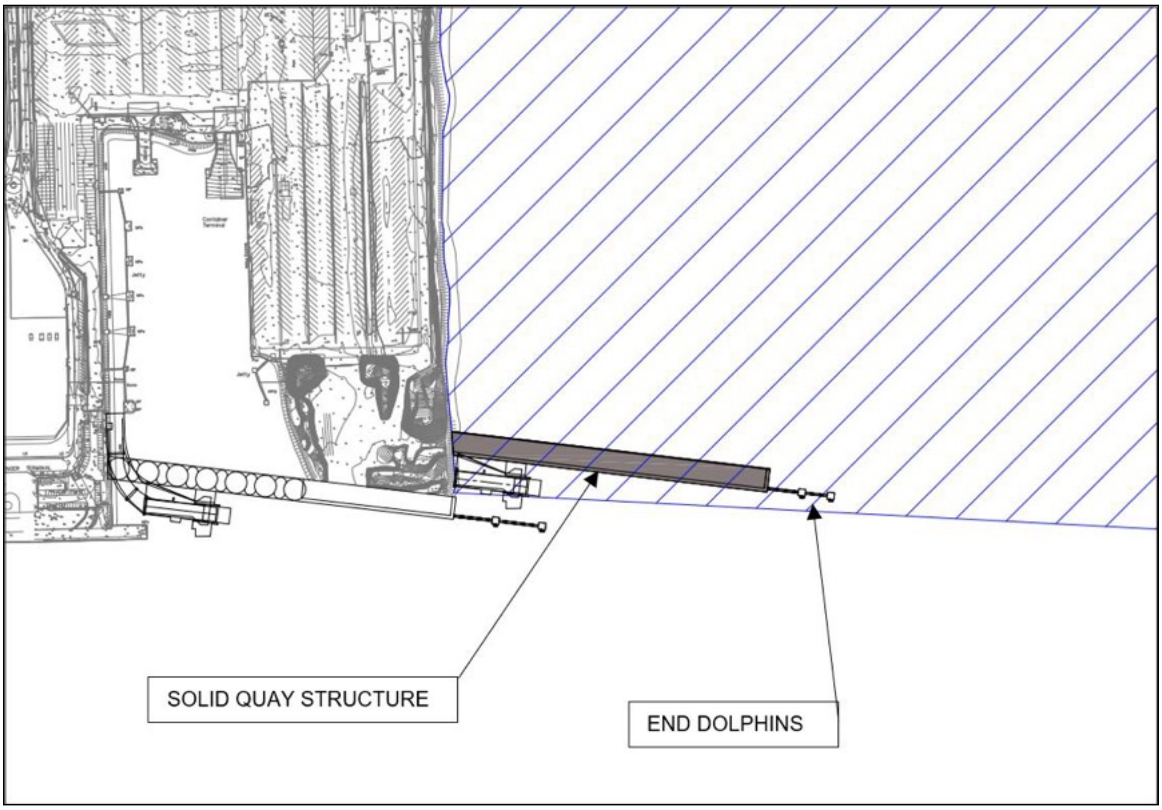


Figure 4-10 Berth 53 Design Progression (1a)

This was developed to include a public access along the northern side of the pier leading to a public realm space at the easternmost point of the structure (Figure 4-11). These structures were entirely located within the SPA.

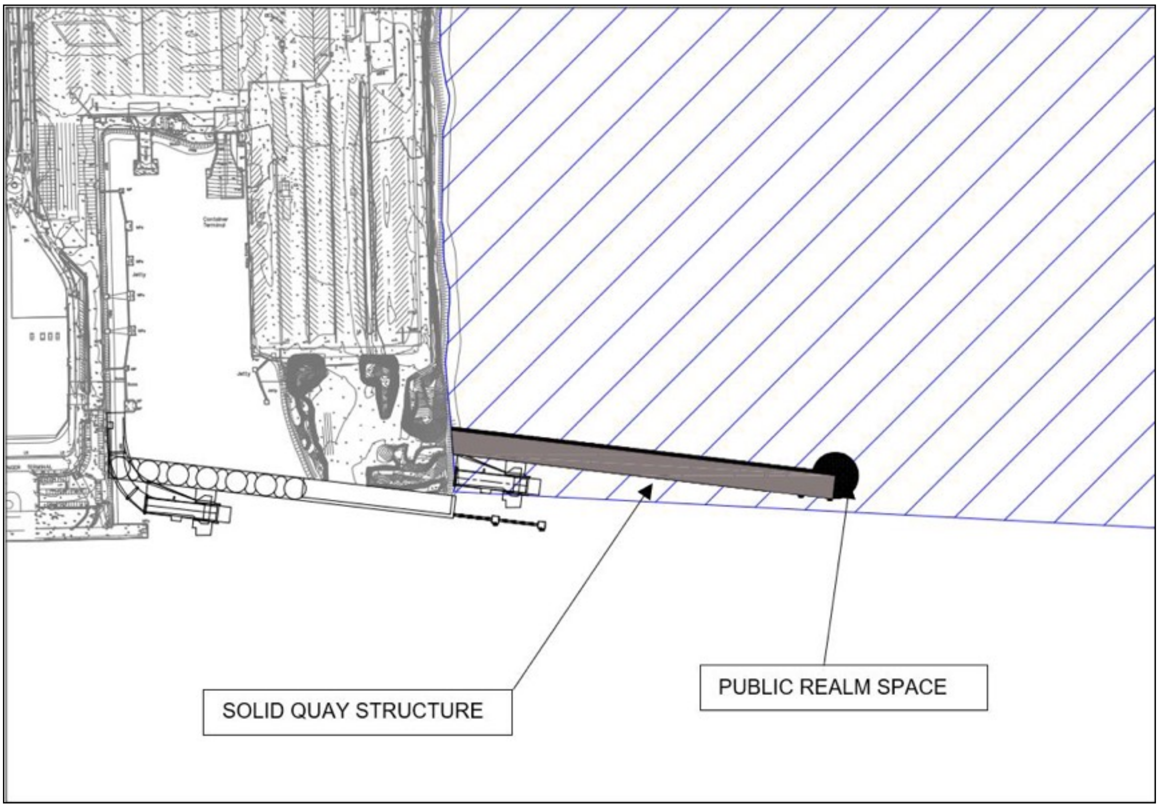


Figure 4-11 Berth 53 Design Progression (1b)

Environmental Effects

A summary of the predicted effects of Berth 53 Design Progression One is provided in Table 4-3.

Table 4-3 Summary of Predicted Impacts of Berth 53 Design Progression One

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Minor loss of marine habitats within working areas.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species.	+ / -	Change in sea bed level leading to significant loss of low-tide bird feeding area. Movement of pedestrians and ships' crew has the potential to cause indirect impacts on non-breeding birds during short periods at low spring tide. Potential beneficial impact (increased time for foraging) of jetty lighting upon foraging waterbirds.
Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging and disposal. Adverse exposure to piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	0 / -	Some loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and disposal operations.	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0 / -	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works. Construction activities will protrude from existing site boundary.	0 / -	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option. Completed infrastructure will protrude from existing site boundary.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				

Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation routes due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedules.	+	Creation of employment directly associated with expansion of Dublin Port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential impacts to sediment transport regime.	0 / -	Changes to seabed level to the north (erosion) and east (deposition) of the berth. This has the potential to reduce the low tide feeding area within the SPA.
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential disturbance noise during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species

Note for all Summary Impacts Tables: Assessment was conducted in comparison to the Do-Nothing Scenario: + positive potential impacts, 0 neutral potential impacts, - negative potential impacts.

4.3.3.3 Design Progression Two

Based on preliminary feedback from the morphological modelling process, it was determined that a solid walled quay structure would have a potential impact on the seabed levels within the SPA due to the proposed structure causing changes to the tidal/river flow within the proximity of the proposed jetty. The revised design, which was still partially located within the SPA was comprised of an open type structure supported on an array of piles supporting a reinforced concrete deck. The structure had an overall length of 600m and a deck width of 25m. Due to the proximity of Berth 52 stern berthing dolphins the linkspan structure for Berth 53 had to be moved eastwards, resulting in a long overall structure.

The results from further morphological modelling of this proposed structure indicated that due to the location of the structure, the overall length and the number of supporting piles, there would still be an unacceptable loss of low tide bird feeding areas within the SPA (Figure 4-12). Consequently, this design layout was ruled out due to these environmental impacts and an alternative design was progressed to avoid habitat loss within the SPA.

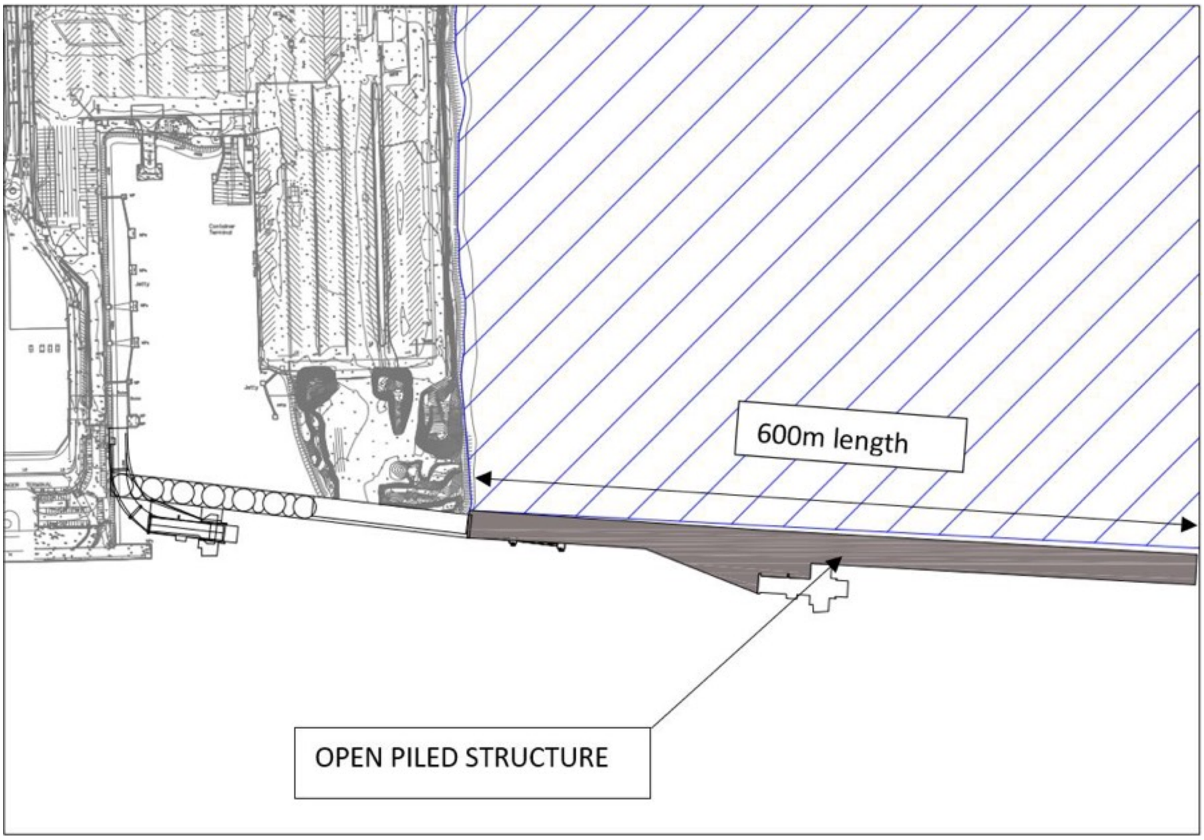


Figure 4-12 Berth 53 Design Progression (2)

Environmental Effects

A summary of predicted effects of Berth 53 Design Progression Two is provided in Table 4-4.

Table 4-4 Summary of Predicted Impacts of Berth 53 Design Progression Two

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Minor loss of marine habitats within working areas.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species.	+ / -	Change in sea bed level leading to some loss of low-tide bird feeding area. Movement of pedestrians and ships' crew has the potential to cause indirect impacts on non-breeding birds during short periods of low spring tide. Potential beneficial impacts

				(increased time for foraging) of jetty lighting upon foraging waterbirds.
Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging and disposal. Adverse exposure to piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	0 / -	Some loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and disposal operations.	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0 / -	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works. Construction activities will protrude from existing site boundary.	0 / -	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option. Completed infrastructure will protrude from existing site boundary.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation routes due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential impacts to sediment transport regime.	0 / -	Changes to seabed level to the north (erosion) and east (deposition) of the berth. This has the potential to reduce the availability of the low tide feeding area within the SPA.

Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species

4.3.3.4 Design Progression Three

Taking into consideration the results of the morphological modelling results from Design Progression Two, after several functional iterations, a further layout was designed. This layout was an open structure. It was comprised of (1) an array of pile supported dolphin structures acting as the vessel berthing/mooring face, (2) an approach bridge structure supported on bridge beams and piles and a two-tier vessel access linkspan structure. The overall length of this structure was circa 540m. This structure was located outside of the SPA (Figure 4-8 & Figure 4-12).

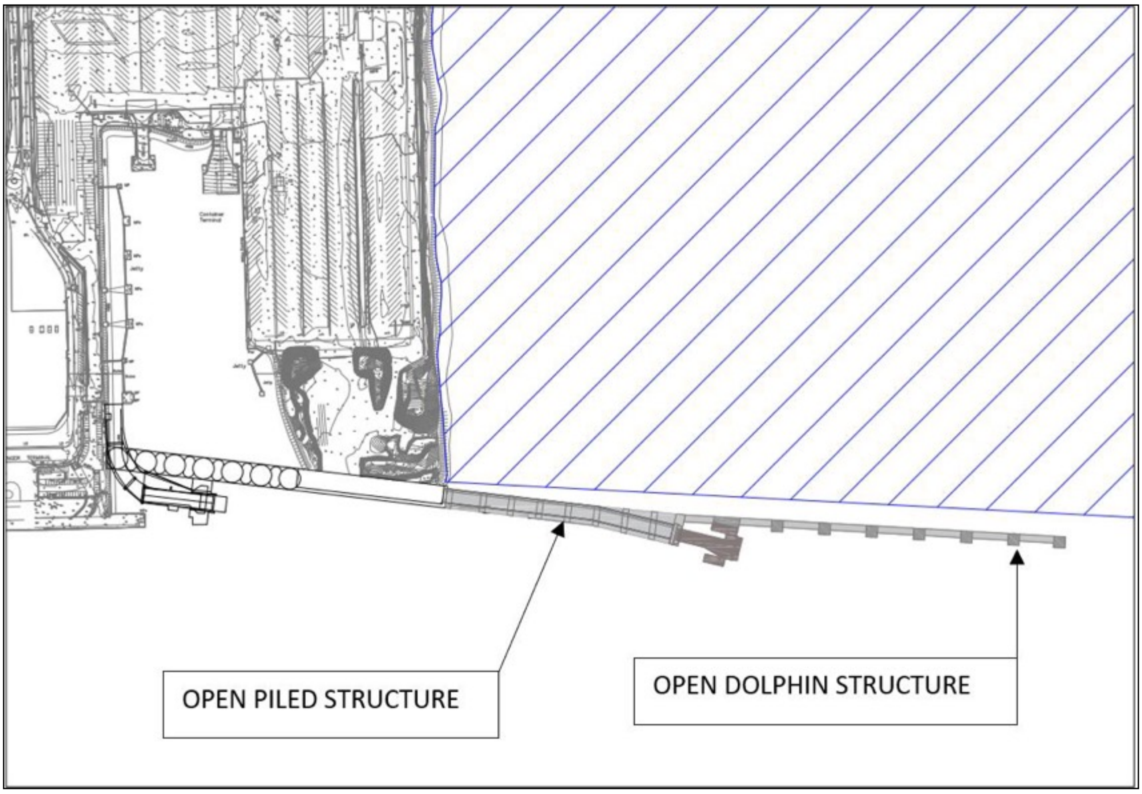


Figure 4-13 Berth 53 Design Progression (3)

While the Design Progression Three design met many of the operational requirements, it remained a long structure close to the SPA which is an environmentally sensitive site. Therefore, for environmental reasons, further consideration was given to an alternative design which would refine the berth structure by shortening its overall length.

Environmental Effects

A summary of the predicted effects of Berth 53 Design Progression Three is provided in Table 4-5.

Table 4-5 Summary of Predicted Impacts of Berth 53 Design Progression Three

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Minor loss of marine habitats within working areas.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species.	+ / -	Change in sea bed level leading to minor loss of low-tide bird feeding area. Movement of pedestrians and ships' crew has the potential to cause indirect impacts on non-breeding birds during short periods at low spring tide. Potential beneficial impact (increased time for foraging) of jetty lighting upon foraging waterbirds.
Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging and disposal. Adverse exposure to piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	0 / -	Some loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and disposal operations	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0 / -	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works. Construction activities will protrude from existing site boundary.	0 / -	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option. Completed infrastructure will protrude from existing site boundary.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				

Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation routes due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential minor impacts to sediment transport regime.	0 / -	Minor changes to seabed level resulting in limited impact upon low tide feeding area.
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species

4.3.3.5 Design Progression Four

The shortening of the berth structure was achieved by re-examining the previously consented Berth 52 structure with a view to altering the alignment of the berth to allow the Berth 53 structure to be moved westwards. To achieve this, a number of revisions to the Berth 52 layout options were examined and a ship navigation exercise undertaken by DPC and HR Wallingford to ensure that any alterations to Berth 52 would not impact on vessel navigation (passing in the main River Liffey channel) and manoeuvring close to the berths. Furthermore, a propeller wash protection structure was added to the north face of Berth 53 to protect the SPA from ship propeller and thruster scouring.

These culminated in the layout ultimately selected as the final design iteration shown in Figure 4-14.

Environmental Effects

A summary of the predicted effects of Design Progression Four is provided in Table 4-6.

Table 4-6 Summary of Predicted Impacts of Berth 53 Design Progression Four (Final Design)

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Loss of marine habitats within working areas.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species.	+ / -	Movement of pedestrians and ships' crew has the potential to cause indirect impacts on non-breeding birds during short periods at low spring tide. Potential beneficial impact (increased time for foraging) of jetty lighting upon foraging waterbirds.
Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging and disposal. Adverse exposure to piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	0 / -	Some loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and disposal operations.	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0 / -	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works. Construction activities will protrude from existing site boundary.	0 / -	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option. Completed infrastructure will protrude from existing site boundary.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				

Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to navigation due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities in relation to both berths. Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential impacts to sediment transport regime.	0	No impacts anticipated
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species.

4.3.3.6 Berth 53 Final Design

Berth 53 will be used predominantly for the berthing of Roll On / Roll Off (Ro-Ro) ferries. The berth will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 240m in length.

The final design of Berth 53 has some potential environmental effects which are comparatively less favourable than those associated with do-nothing scenario, the positive long-term impacts of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment, is the principle reason for this decision. The negative environmental effects of the redevelopment of Berth 53 can be mitigated.

The final design of Berth 53 has been developed via an iterative process, considering a wide range of environmental matters. A comparison of the environmental effects of the alternatives considered, indicates that

Design Progression Four is the most sustainable option available, as presented in Table 4 6. This has thus been chosen as the final design.

Design Progression Four has been selected as the preferred alternative as it has the least significant impact upon sediment movement, thus resulting in no significant change to the nearby low-tide bird feeding area of the SPA, and its dependent bird populations.

The Berth 53 Final Design has reduced functionality compared to the original design progressions, for example, there is no space to provide a passenger gangway on the berth, so passengers will be bussed onto the vessel via the linkspan; A solid wall structure is preferred by ferry operators, but an open pile structure has been proposed to mitigate impacts on the SPA. The design compromises the preferred functionality of the structure in order to mitigate environmental impacts.

The proposed works at Berth 53, identified under Design Progression 4, are indicated in Figure 4-14. This final design is as described in Chapter 3 of this EIAR.

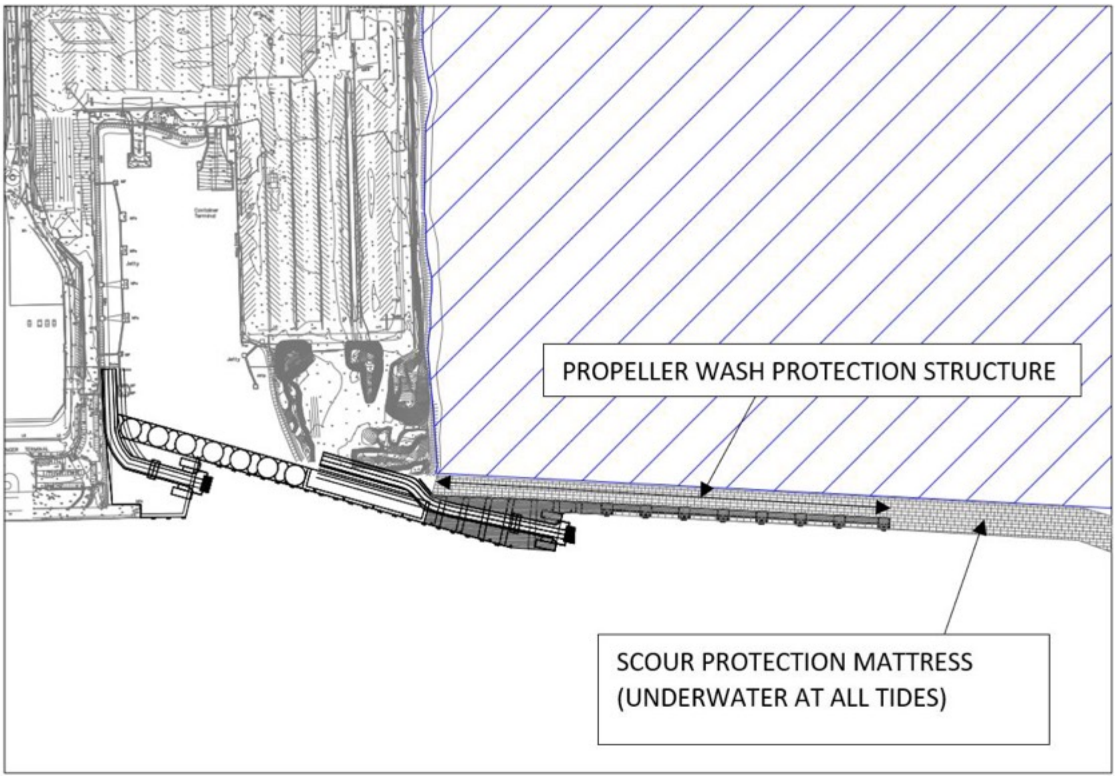


Figure 4-14 Berth 53 Proposed Layout

4.3.4 Berth 52 / 49 – Design Progression

Berth 52 was granted permission under An Bord Pleanála Ref. PL29N.PA0034. Berth 52 was not originally within the Scope of the MP2 Project but, due to the interaction of facilities as the design of Berth 53 progressed, it became apparent that for environmental reasons it was necessary to re-visit the orientation and alignment of Berth 52.

Berth 49 was granted permission under An Bord Pleanála Ref PL29N.PA0034. As a result of the proposed repositioning of Berth 52, permitted Berth 49 requires minor amendments (40m long wall encompassing its eastern dolphins).

The layout and alignment of Berth 52 / 49 progressed in tandem with Berth 53. The design progression included the following design stages:

- Do-nothing Scenario (existing consented orientation)
- Design Progression One (options for reorientation)

4.3.4.1 Do-nothing Scenario

Figure 4-15 shows the existing consented layout of the proposed Berth 52 / 49 structure. This berth facility is required to accommodate design vessels identified in the Port's Masterplan and is therefore an integral part of the Port's development. This consented development represents the MP2 Project's do-nothing scenario.

In lieu of the reorientation of Berth 52 / 49 to accommodate Berth 53, the port would provide insufficient capacity to accommodate Ro-Ro related future demand. 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, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

Additionally, in lieu of the reorientation of Berth 52 / 49, and construction of Berth 53 by extension, future port investment would be limited as a result of 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.

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there would be no impact upon these as a result of inaction.

4.3.4.2 Design Progression One (Final Design)

The alignment of the Berth 52 / 49 quay/jetty structure is proposed to be altered to accommodate and facilitate the development of the Berth 53 structure. Berth 52 / 49 structure will be adjusted to allow the Berth 53 structure to be moved as far westward as possible to minimise the intrusion of the SPA located to the east. The form of construction and general layout of Berth 52 / 49 are not proposed to be altered.

A number of berth re-alignment/re-orientation options were examined to determine the optimum alignment of Berth 52 / 49 in relation to Berth 53. Navigation simulations were undertaken to ensure that the alignment options did not have an impact on navigational safety of the proposed Berth 52, Berth 53, Berth 49 and the main navigation channel.

The following alternative alignment options were examined:

- Option A – Rotation of Berth 49 and Berth 52. 359m long Berth 53.
- Option B – Rotation of Berth 52 and Berth 53. No change to Berth 49.
- Option C – Rotation of Berth 49 and Berth 53.
- Option D – Rotation of Berth 52, 11 degrees.

- Option E – Rotation of Berth 52, 11 degrees, movement westwards.
- Option F – Rotation of Berth 52, 10 degrees.
- Option G – Final option, generated as part of navigation simulation process.

The alternative layout options which were designed as part of this exercise are presented in Figures 4-16 to 4-22 respectively. The environmental effects of these layouts are unaltered given that the form of construction and general layout of Berth 52 / 49 are not proposed to be altered. The environmental impacts arising from the re-orientated facility are those associated with the Berth 53.

Environmental Effects

The design refinements of Berth 52 / 49 were undertaken in relation to the navigational requirements of the inter-related facilities of the port rather than being motivated by environmental factors (beyond providing for the location of Berth 53 /49 away from the South Dublin Bay and River Tolka Estuary SPA). There is no significant alteration in the predicted environmental effects of the Berth 52 / 49 reorientation (those impacts have already been addressed under An Bord Pleanála permission (reference Ref PL29N.PA0034)). None of the options proposed present a more favourable option in environmental terms to provide for the sustainable alignment of Berth 53.

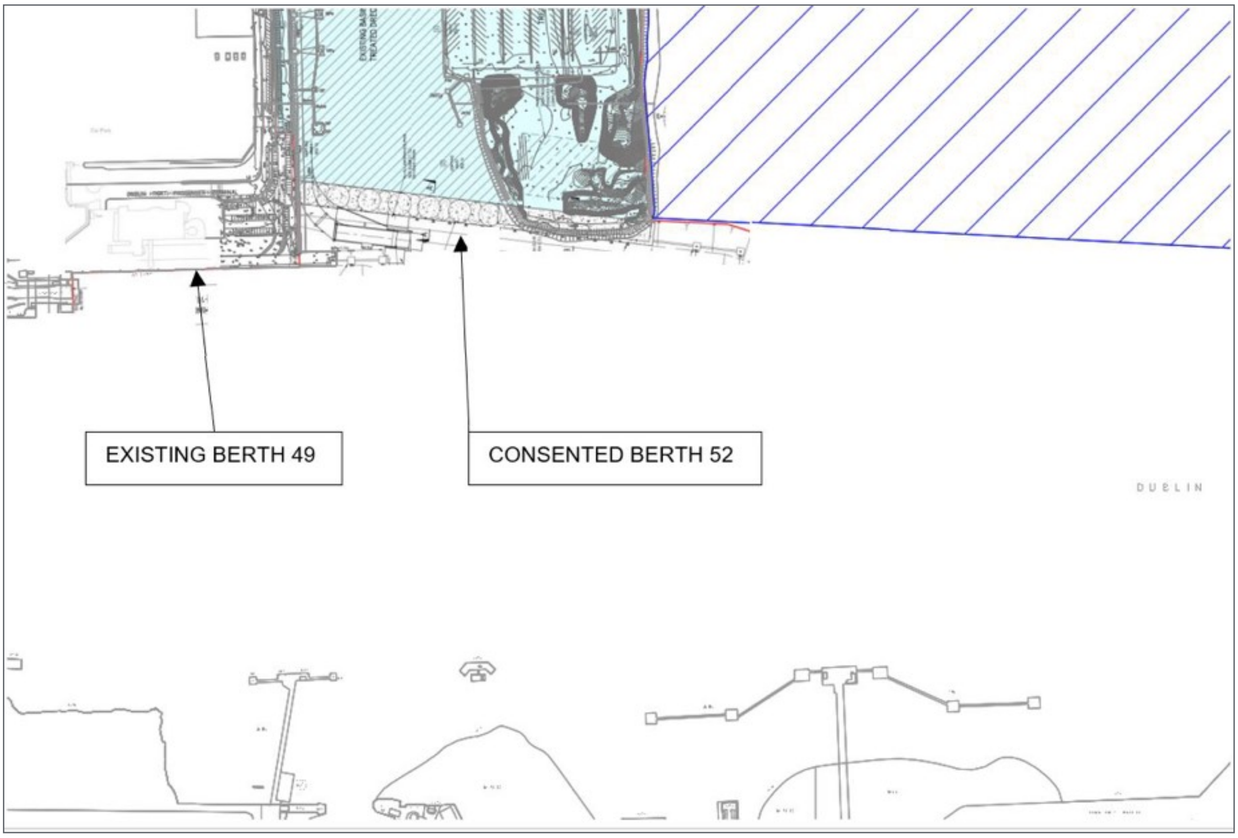


Figure 4-15 Berth 52 / 49 Consented under ABP Ref PL29N.PA0034 (Existing)

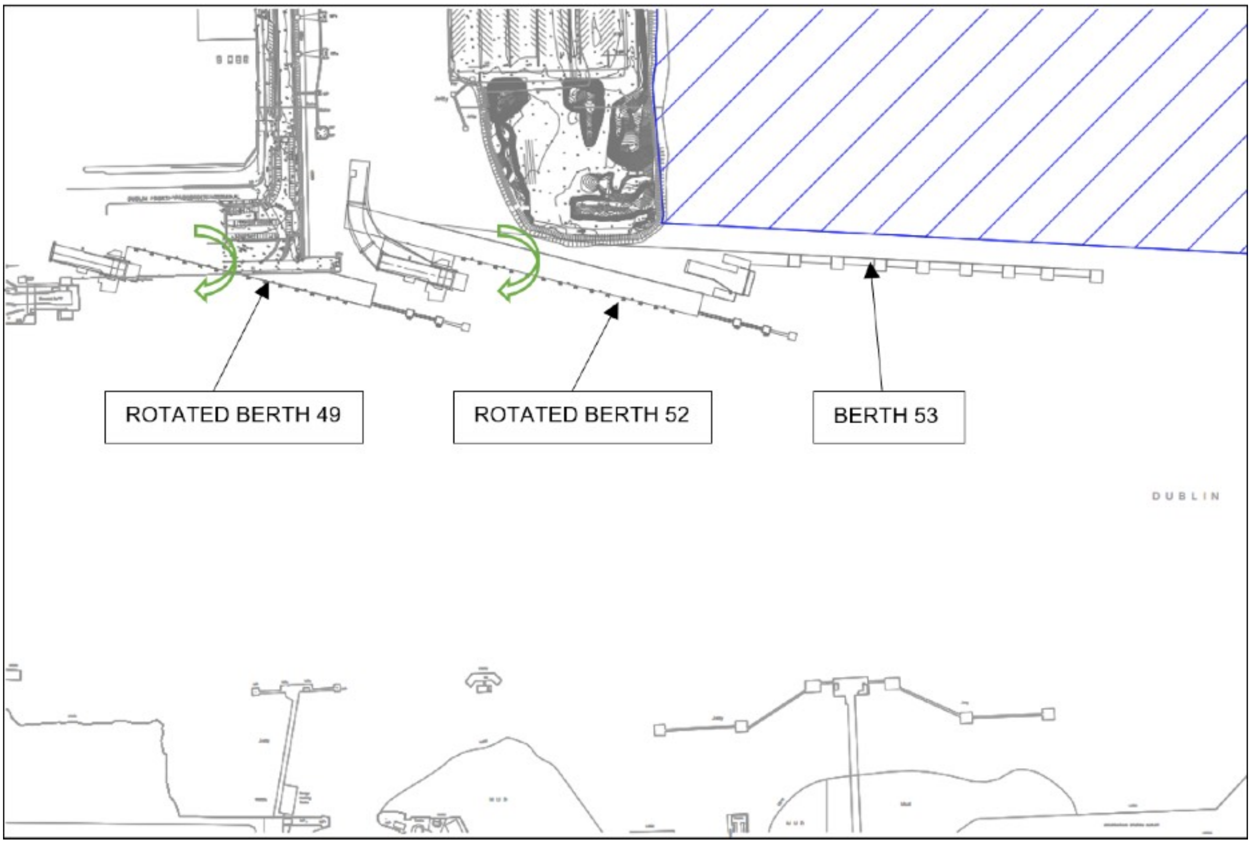


Figure 4-16 Option A

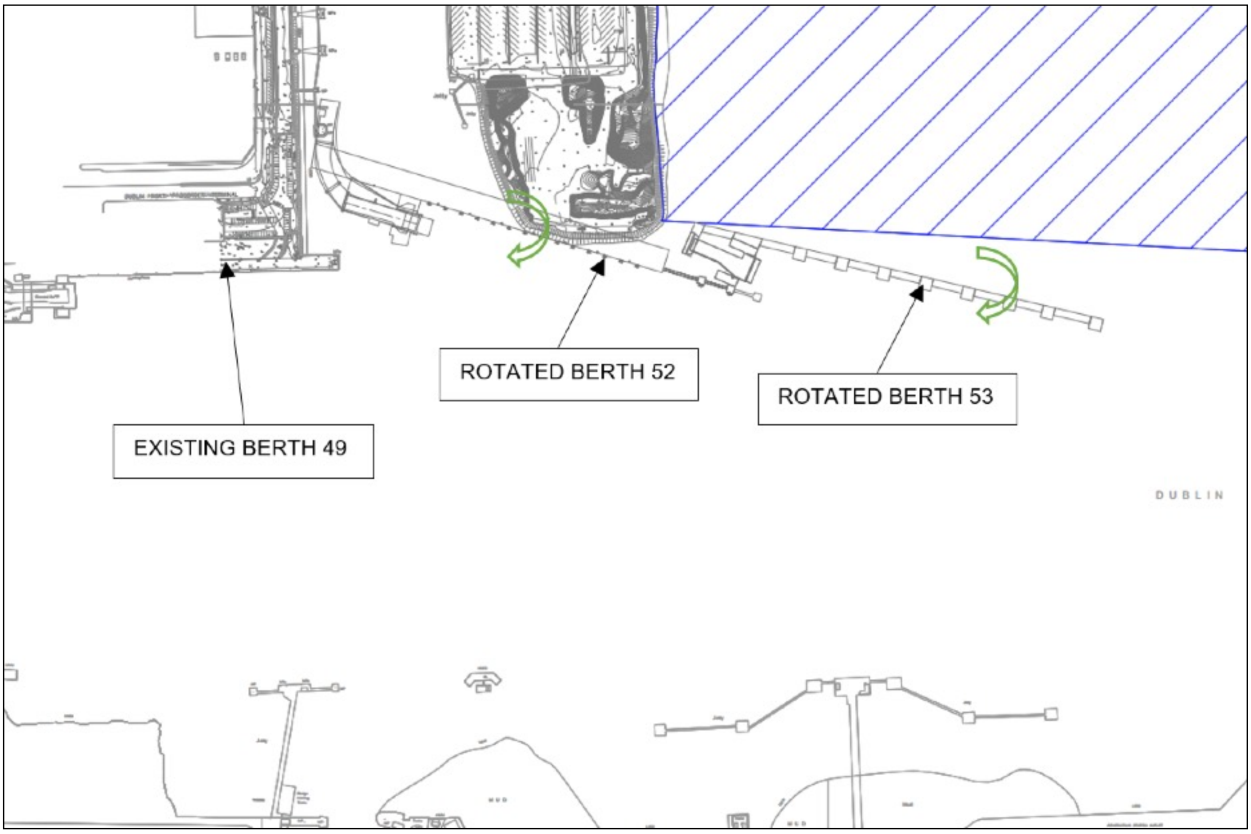


Figure 4-17 Option B

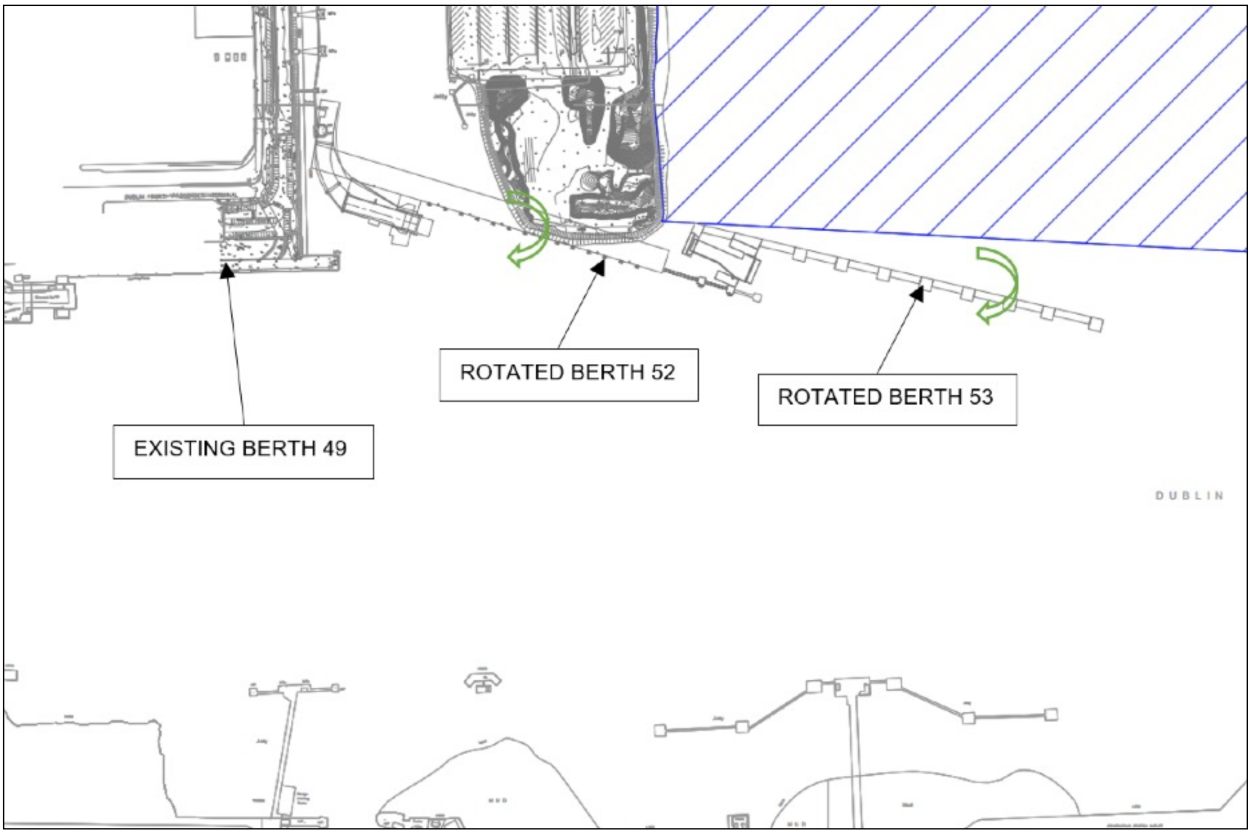


Figure 4-18 Option C

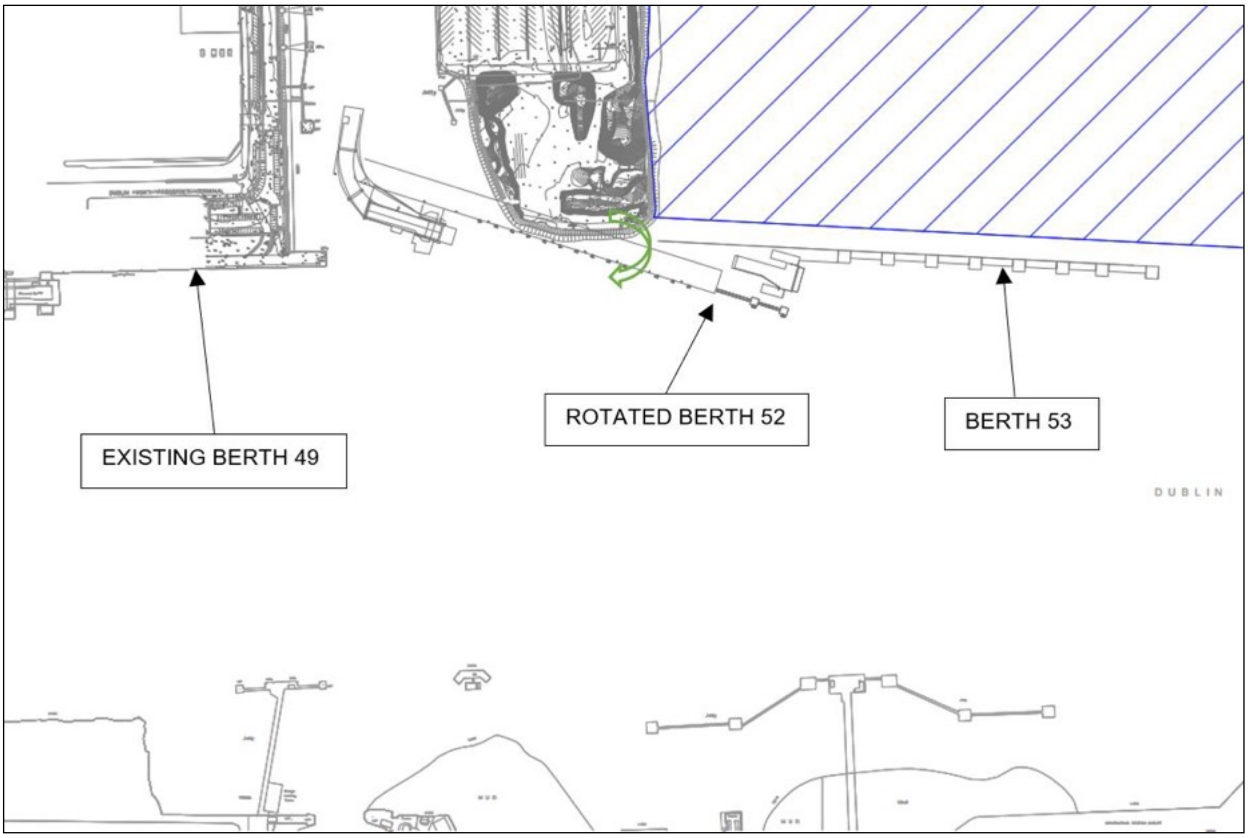


Figure 4-19 Option D

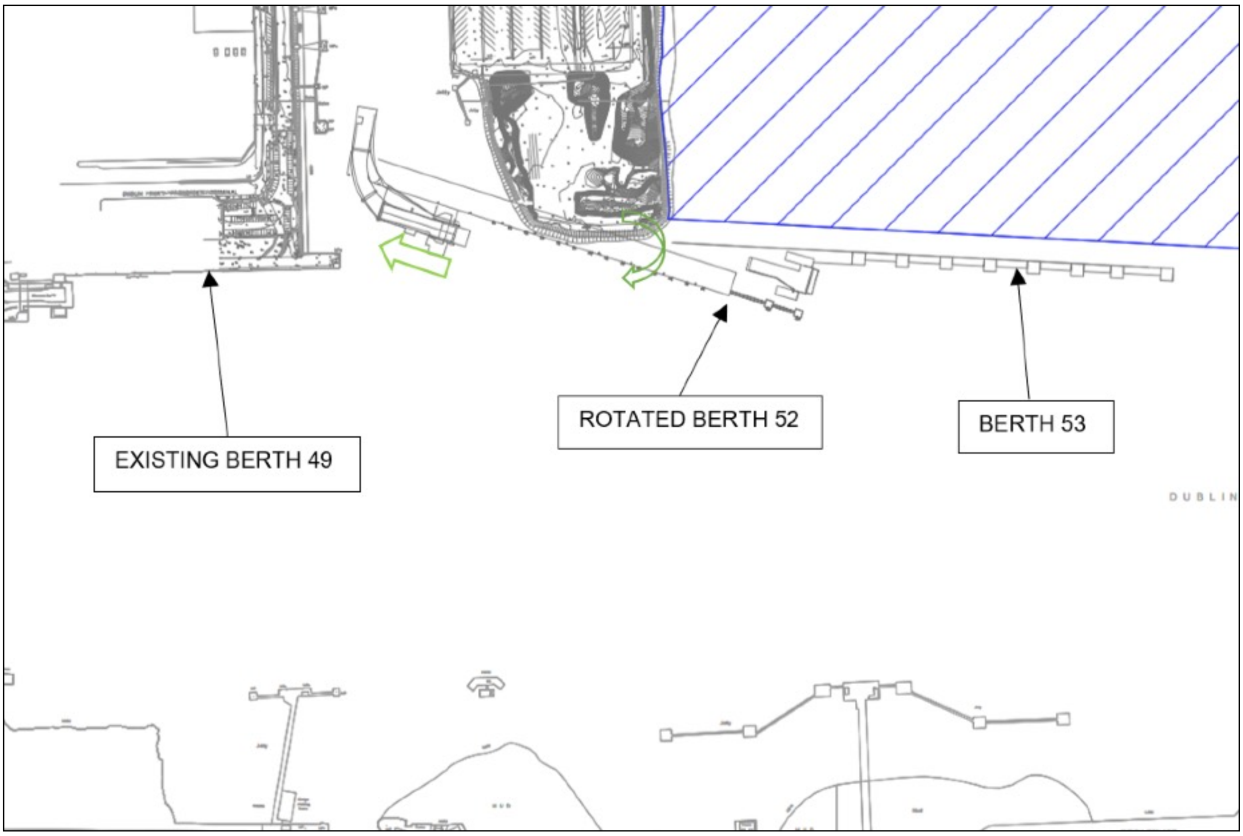


Figure 4-20 Option E

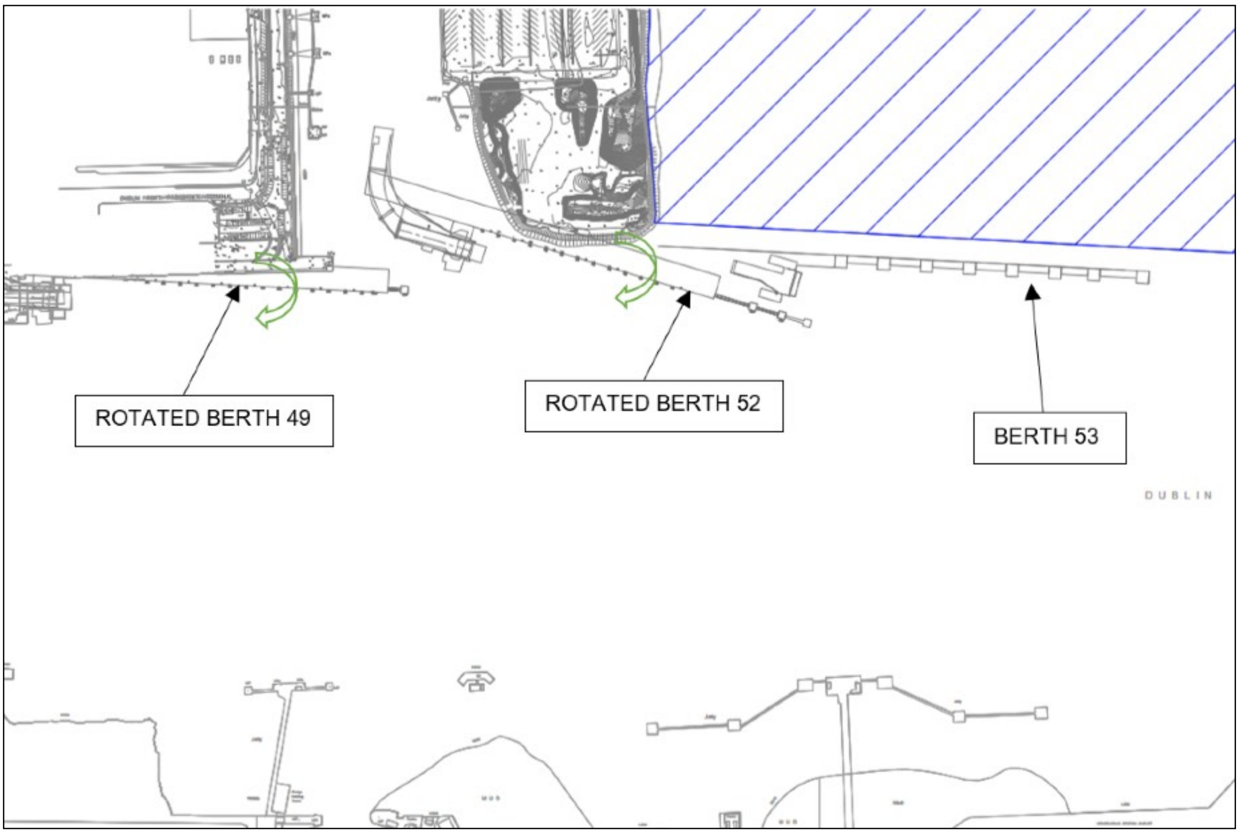


Figure 4-21 Option F

4.3.4.3 Berth 52 / 49 Final Design

Berth 52 / 49 will be used predominantly for the berthing of Ro-Ro ferries. The berth will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 240m in length.

The proposed works at Berth 52 / 49 (Figure 4-22 developed as Option G) will comprise a modification of Berth 52 which was previously granted An Bord Pleanála permission (reference PL29N.PA0034)). This final design is as described in Chapter 3 of this EIAR. The modification will comprise the following:

- Rotation of Berth 52 by approximately 9 degrees (clockwise);
- Encompassing the proposed Berth 49 eastern dolphins within a new quay wall structure;
- Reorientation of the proposed linkspan and approach ramp to Berth 52.

The proposed reorientation of the berth arises as a result of the requirement to facilitate the development of Berth 53 whilst having regard to the conservation objectives of the adjacent South Dublin Bay and River Tolka SPA. It allows the proposed Berth 53 to be moved southwards, to avoid affecting the future bathymetry of the sea bed within the SPA.

There are no likely environmental effects arising from the rotation of Berth 52 by 9 degrees. The modification of this berth will not result in any change of environmental impact considered as part of permission (reference PL29N.PA0034) as the form of construction and general layout of Berth 52 / 49 are not proposed to be altered.

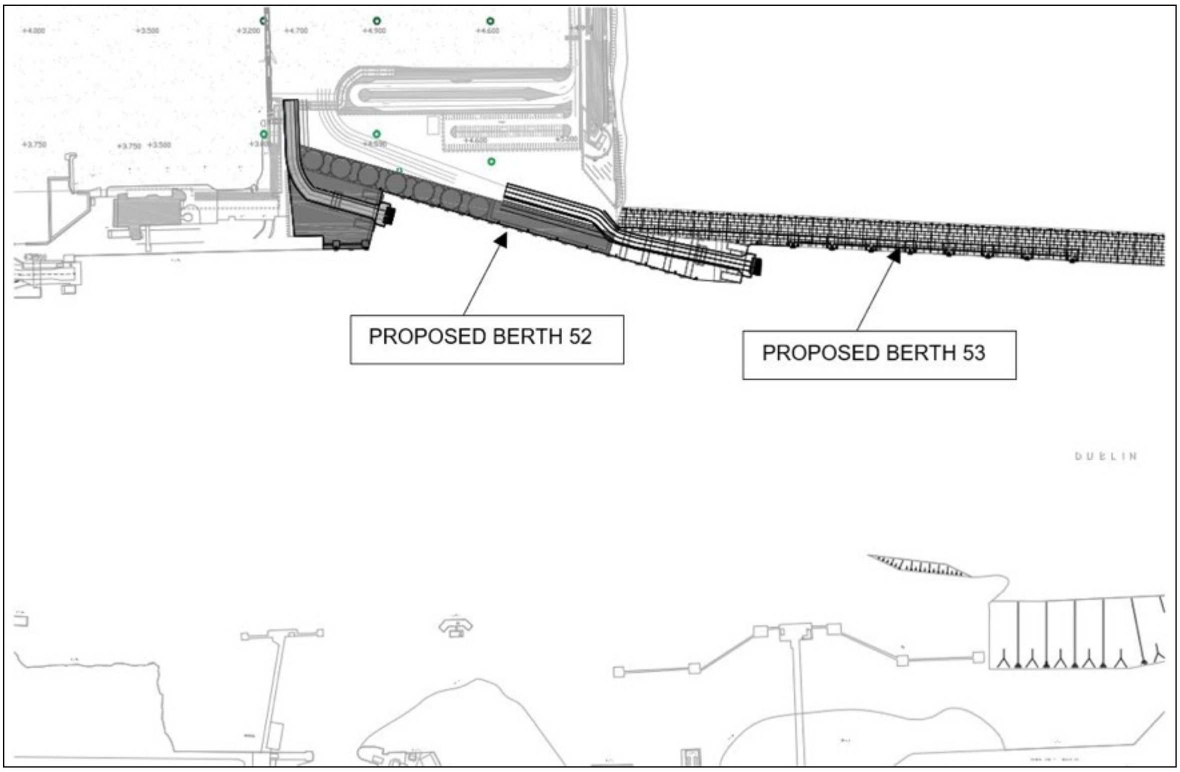


Figure 4-22 Berth 52 / 49 Proposed Layout (Option G)

The optimum design solution for Berth 52 / 49 was determined through an iterative design process. The re-orientation was selected due to consideration of the impacts of the design upon the position of Berth 53, and the subsequent (lack of) effects of this upon the bathymetry of the South Dublin Bay and Tolka Estuary SPA, also with reference to navigation simulation modelling to achieve optimum navigation safety. The final design is thus the optimal design solution; being both technically feasible (with optimal operational safety in mind) and environmentally sustainable (no impact upon environmental factors; particularly with regard to protected bird species).

4.3.5 Berth 50A – Design Progression

Berth 50A is currently in use as a Lo-Lo berth. The berth structure is circa 180m long and is of steel combi wall construction. The existing harbour operations building is located to the west of Berth 50A, on the existing Eastern Breakwater structure. The berth contains gantry crane rails running in an east-west alignment. The design progression included the following design stages:

- Do-nothing Scenario (existing structure)
- Design Progression One (extended facility)

4.3.5.1 Do-nothing Scenario

The existing layout of Berth 50A structure and the adjacent Eastern Breakwater is shown in Figure 4-23. The development of this berth facility is an integral part of the Port's development.

Presently, there is sufficient terminal capacity for Lo-Lo container handling with potential to increase container throughput. Nevertheless, in lieu of the redevelopment of this berth, the capacity of the port to accommodate Lo-Lo vessels and large container ships would be limited in the long term. This would have a negative impact upon national and regional economies, particularly by way of trade, employment and associated taxes for societal benefit. This in turn, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

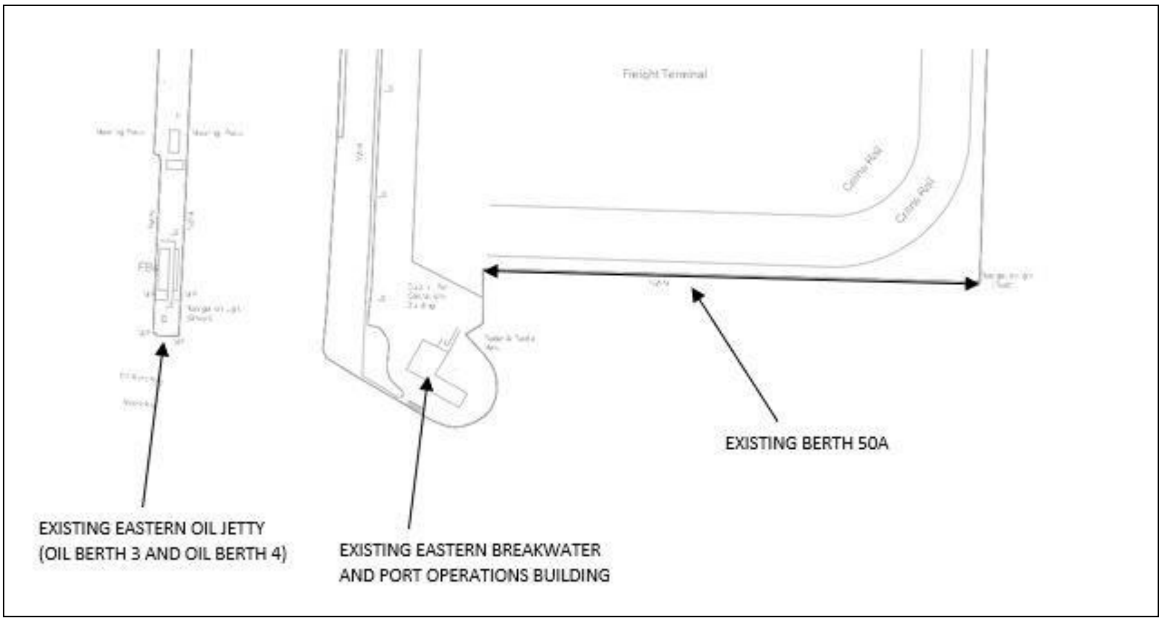


Figure 4-23 Berth 50A (Existing)

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there would be no impact upon these as a result of lack of investment into Berth 50A.

4.3.5.2 Design Progression One

The scope of the MP2 Project includes the removal of the Eastern Breakwater structure. The purpose of removing this structure is to allow the Berth 50A quay wall to be extended westwards. This will extend the berth and provide a closure to the proposed Oil Berth 4 infill. It is not possible to extend this quay wall eastward as this would impinge on the navigational safety of Berth 51. It would also close off the use of B50, 50A and potentially B51A as ships may not be able to swing into the basin.

The design progression for this element of the MP2 Project was conventional in nature and there were no alternatives considered, (Figure 4-24 and 4-25).

Preliminary design of the proposed bridging structure to accommodate the underwater ESB cables has been undertaken. Detailed design will be commenced post grant of planning permission.

Environmental Effects

A summary of the predicted effects of the redevelopment of Berth 50A is provided in Table 4-7.

Table 4-7 Summary of Predicted Impacts of Berth 50A (Final Design)

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Minor loss of marine habitats within working areas.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species. Removal of black guillemot nests.	0	No impacts anticipated
Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging. Adverse exposure to demolition and piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	0 / -	Some loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and disposal operations.	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option.

Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation routes due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedules.	+	Creation of employment directly associated with expansion of Dublin port (in relation to Berth 53). Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0	No impacts anticipated	0	No impacts anticipated
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential disturbance noise during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species

4.3.5.3 Berth 50A Final Design

Design Progression One has been selected as the preferred option for the redevelopment of Berth 50A as opposed to the do-nothing scenario. It is proposed to extend the existing Berth 50A to provide a multipurpose predominately Lo-Lo Container Vessel berth. As presented in Table 4-7, some of the potential environmental effects of this alternative are comparatively less favourable than those associated with do-nothing scenario. However, the positive long-term impacts of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment, is the principle reason for this decision. The negative environmental effects of the redevelopment of Berth 50A can be mitigated.

The proposed works at Berth 50A are indicated in Figure 4-24 and Figure 4-25 and as described in Section 2.2.4 of this EIAR.

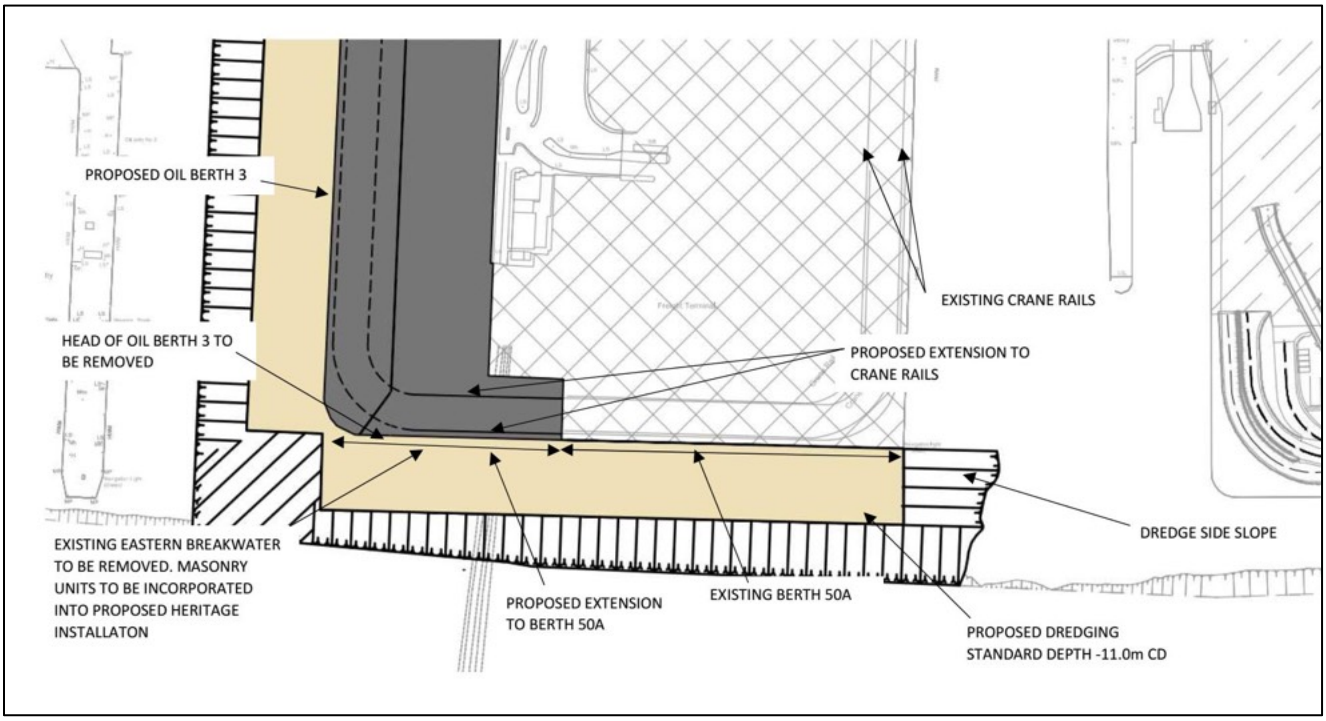


Figure 4-24 Berth 50A Layout (Proposed)

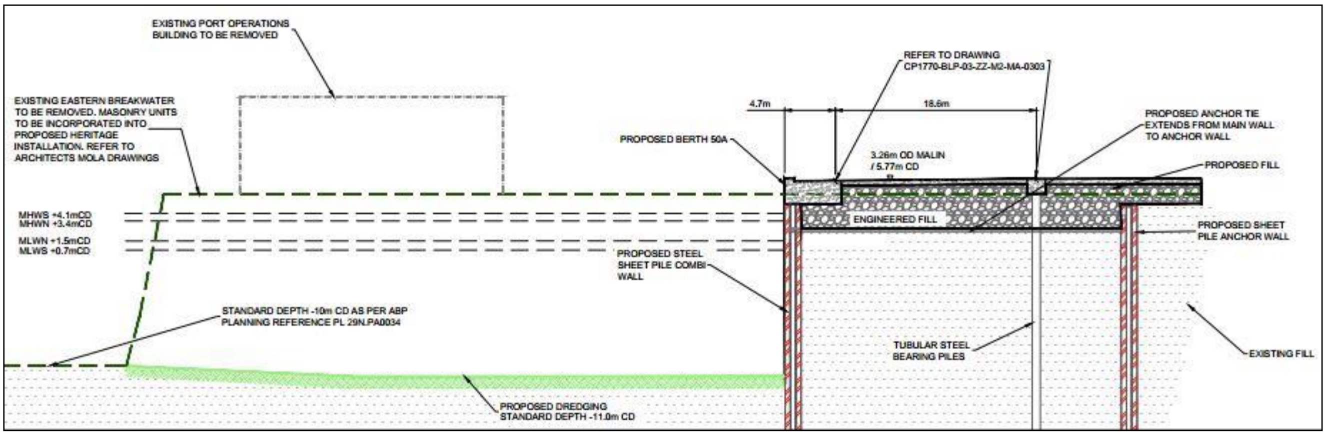


Figure 4-25 Berth 50A Section (Proposed)

4.3.6 Oil Berth 3 and 4 - Design Progression

The Eastern Oil Jetty comprises Oil Berth 3 to the west and Oil Berth 4 to the east. Oil Berths 3 and 4 are formed by a concrete jetty structure running in a north-south alignment with berthing either side of the jetty. The proposal is to infill the Oil Berth 4 basin to provide additional hardstanding for the adjacent Lo-Lo terminal facility. 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 design progression included the following design stages.

- Do-nothing Scenario (existing structure)

- Design Progression One (extended facilities)

4.3.6.1 Do-nothing Scenario

This plot shows the existing layout of the structure of Oil Berths 3 and 4 and the surrounding port (Figure 4-26). Again, reconfiguration of these facilities is an integral part of the Port's development.

Should Oil Berth 4 remain in use, no significant impact would take place owing to its present low usage (0.9%). The berth would continue to go relatively unused before falling into disrepair. Should the basin of this berth remain unfilled, additional storage would not be provided for petroleum products (at present) and container handling (into the future).

Should the basin of Oil Berth 3 remain at its current depth, then the berth would become redundant in the long term, as the throughput of petroleum products declines in response to national policies to decarbonise the economy. Small container ships may continue to use the berth, however, considering the anticipated size of newly constructed ships going forward, the capacity of Oil Berth 3 to accommodate vessels, in the general sense, would be limited.

The repurposing of this area aims to create a multi-purpose facility with flexibility of use against changes in oil product import thus future proofing the usage of this part of the port. With regard to the collective implications of inaction relating to Oil Berth 3 and 4, resultant capacity constraints would impact upon national and regional economies, particularly by way of trade, transport, employment and associated taxes for societal benefit. This in turn, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

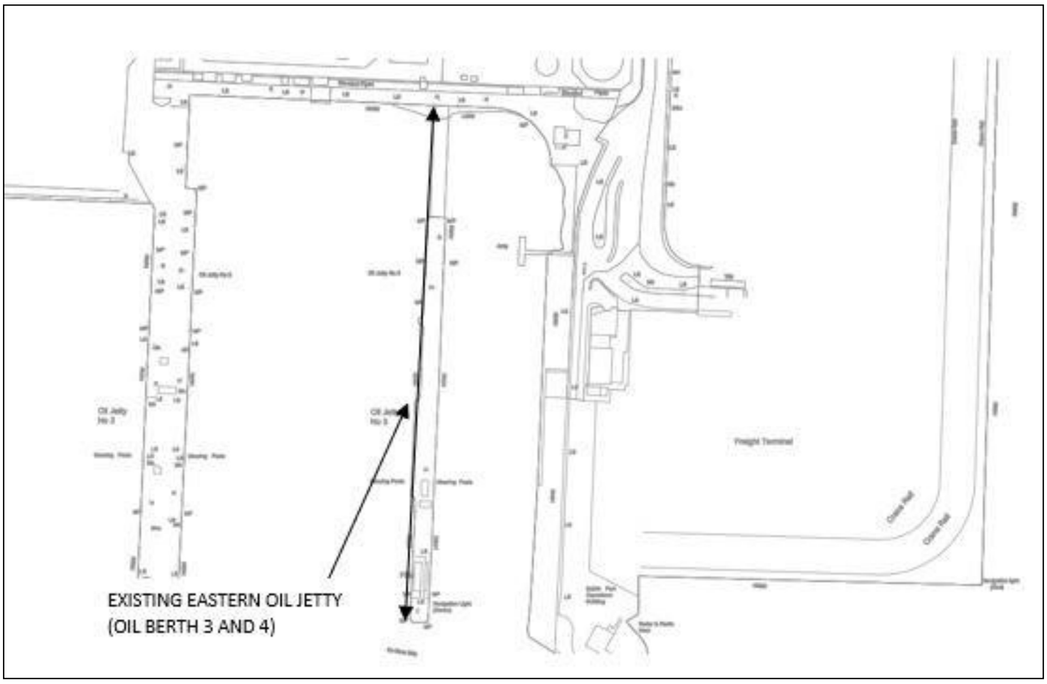


Figure 4-26 Oil Berth 3/4 (Existing)

Additionally, inaction regarding these berths 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.

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there will be no impact upon these as a result of the lack of investment in Oil Berths 3 and 4.

4.3.6.2 Design Progression One

The scope of the MP2 Project includes the removal of the Eastern Breakwater structure. The purpose of removing this structure is to allow the Berth 50A quay wall to be extended westwards to extend the berth and to provide a closure to the Oil Berth 4 infill. The southern end of the Oil Berth jetty will also be removed.

The design progression for this element of the works focussed on the proposed dredge depths at the berth, the form of quay wall construction, the type and source of fill for infilling the Oil Berth 4 basin and the need to reconstruct the quay wall along Jetty Road.

Consideration was given to the form of construction of the proposed new quay wall. The final design will be a steel combi wall structure situated 5m from the face of the existing quay wall. The fill for the infill material will be a combination of engineered fill and suitable recycled Construction and Demolition (C&D) waste. Consideration was given to infilling the basin with dredged material from the proposed deepened berths at 50A and Oil Berth 3, but the engineering properties of the dredged material precluded this option.

Due to the proposed deepening of the Oil Berth 3 berthing pocket, and the condition of the existing quay wall at Jetty Road, it is necessary to reconstruct this quay with a new steel sheet pile wall.

The overall design progression for this element of the MP2 Project was conventional in nature and there were no further alternatives considered (Figure 4-27 to Figure 4-28).

Environmental Effects

A summary of the predicted effects of the repurposing of Oil Berth 3 and 4 is provided in Table 4-8.

Table 4-8 Summary of Predicted Impacts of Oil Berth 3 and 4 (Final Design)

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Minor loss of marine habitats within working areas due to construction activities, capital dredging and infill.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal, as well as some minor permanent loss under footprint.
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species. Removal of black guillemot nests.	0	No impact anticipated.

Fauna – Marine Mammals	0 / -	Disturbance impacts during capital dredging and infill/disposal. Adverse exposure to demolition and piling operations.	0 / -	Potential for species displacement due to increased vessel noise. Potential disturbance impacts to seals located on Bull Island haul-out site. Disturbance impacts during maintenance dredging.
Fauna – Benthic and Littoral	0 / -	Minor loss of soft sediment benthos due to capital dredging and infill/disposal operations.	0 / -	Minor loss of soft sediment benthos due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability due to capital dredging and infill/disposal operations.	0 / -	Reduction in benthic food availability due to maintenance dredging and disposal operations.
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	0	No impacts anticipated.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to terrestrial construction.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation routes due to construction activities.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedules.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and infill/disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0	No impacts anticipated	0	No impacts anticipated
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased marine and terrestrial traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.

Noise	0 / -	Potential disturbance noise during construction and through increased marine and terrestrial traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic and human activity along the berth.
Vibration	0 / -	Potential for vibration from construction activities e.g. drilling, to impact on sensitive marine species.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species

4.3.6.3 Oil Berth 3 and 4 Final Design

Design Progression One has been selected as the preferred option for the repurposing of Oil Berth 3 and 4 as opposed to the do-nothing scenario. The Eastern Oil Jetty comprises Oil Berth 3 to the west, and Oil Berth 4 to the east. The proposed works will involve the removal of Oil Berth 4 and consolidating operations to Oil Berth 3. The berth shall be used as a multi-purpose structure, initially for oil tanker berthing, with a future potential use as a container vessel berth.

The proposed layout is indicated in Figure 4-27 to Figure 4-28 and detailed further within Chapter 3 of this EIAR.

The repurposing of Oil Berth 3 and 04 was chosen instead of the do-nothing scenario. As presented in Table 4-8, some of the potential environmental effects of this alternative are comparatively less favourable than those associated with do-nothing scenario. However, the positive long-term impacts of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment, is the principle reason for this decision. The negative environmental effects of the redevelopment of can be mitigated.

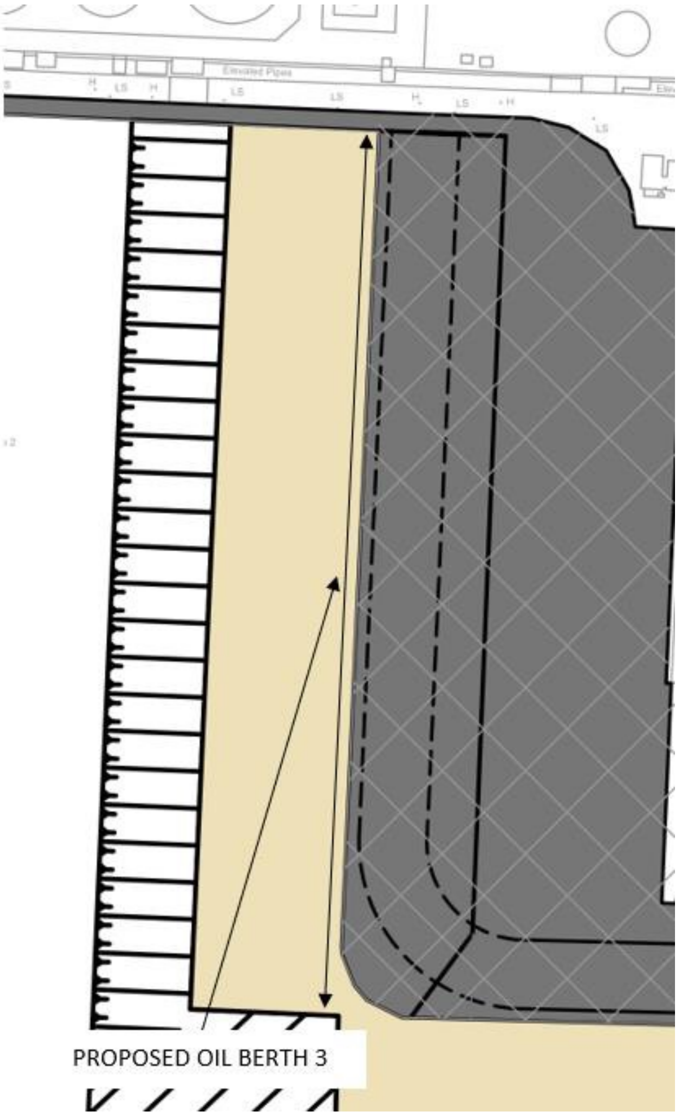


Figure 4-27 Oil Berth 3 (Proposed)

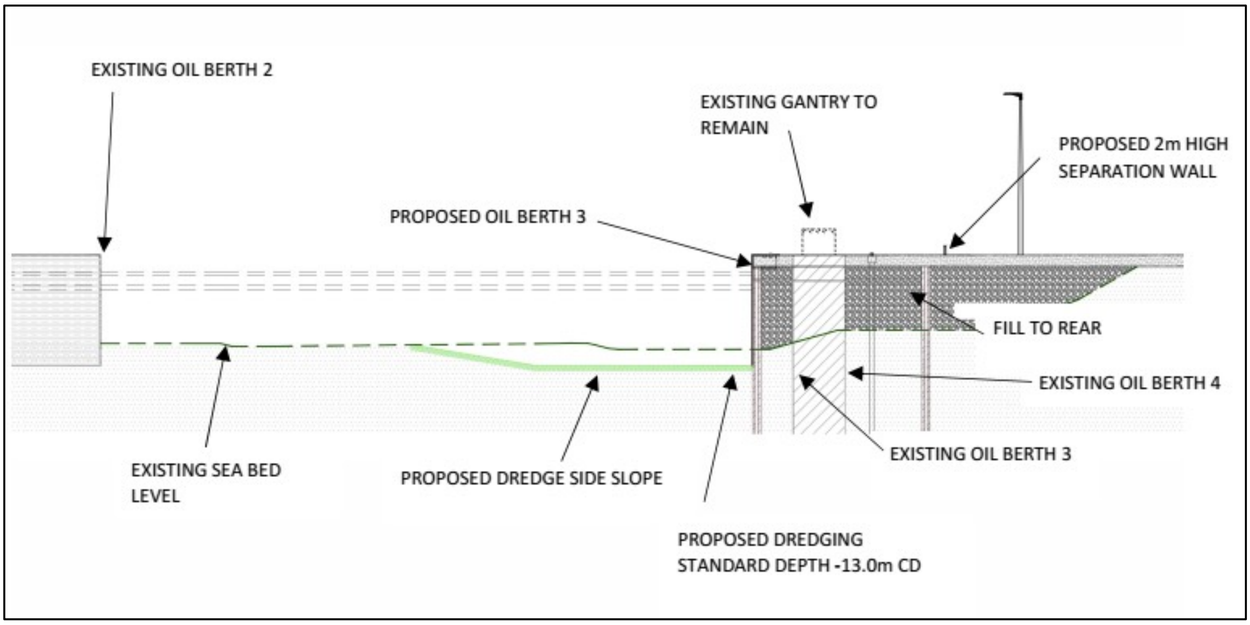


Figure 4-28 Proposed Cross Section of Oil Berth 3

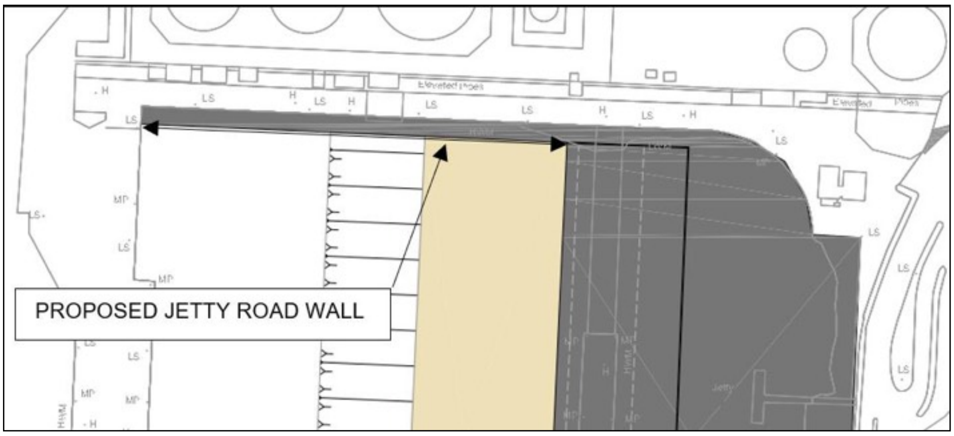


Figure 4-29 New Quay Wall at Jetty Road

4.3.7 Landside Works – Design Progression

It is proposed to provide a Unified Ferry Terminal at the eastern end of the port to facilitate Irish Ferries, Stena Line, P&O and the seasonal Isle of Man service. The existing Seatruck operation in this area will be relocated to the western end of the port. The aim is to provide a unified facility for the operators with a similar Ro-Ro business which is functional while also optimising the operational space available.

The layout of the Landside works progressed over a period of time. The design progression included the following design stages:

- Do-nothing Scenario
- Design Progression One (options a (initial) to j (final) comprising the following primary layout criteria):
- Elevated road, original building location (options a, b, c, d, e)
- New building location (options f, g)
- Removal of building (options h, i)
- Removal of building and maximising space in UFTY (option j - Final Design)

4.3.7.1 Do-nothing Scenario

The existing landside infrastructure at the ferry terminal is comprised of a mix of buildings, access and vehicle storage operated by the existing operators. The area is currently occupied by Irish Ferries (Terminal 1), Stena Line (Terminal 2) and Seatruck (Terminal 5). The area includes facilities for traffic and passengers both within the International Ship and Port Facility Security Code (ISPS) restricted area and areas outside the restricted area where public access is possible. The public access areas include a north/south axis through this proposed UFT to service the existing Terminal 1 building located to the south adjacent to Berth 49.

Figure 4-30 Existing Layout - Google Aerial Image

To maximise the efficient usage of brownfield areas within the Port in line with the Port Masterplan it is proposed to reconfigure this area to support increased usage as envisaged within the Masterplan.

Under the do-nothing scenario, in lieu of the Unified Ferry Terminal, the Ro-Ro yard would not be optimised, thus remaining comparatively inefficient and inflexible. As a consequence of this, optimum throughput would not be achieved and the capacity of the port to accommodate Ro-Ro vessels would be limited owing to the insufficient capacity of the yard to accommodate containers and unaccompanied trailer units etc. The (re)development of concerned berths would thus be, to an extent, nugatory without the consolidation of storage space.

As a key facilitator of merchandise trade, the limited capacity of the port's Ro-Ro facilities would have a critical impact upon national and regional economies. This in turn, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

Additionally, the non-consolidation of storage space would result in limits to future port investment resulting from a loss of predicted revenue following such 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.

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there will be no impact upon these as a result of the landside works.

4.3.7.2 Design Progression One (design layout options a (initial) to j (final))

Based on the design brief, the proposed UFT site was divided into three sections:

- The Unified Ferry Terminal Yard [UFTY], to be located to the south of Alexandra Road between the existing RoRo berths 51, 51A, 49 and proposed Berths 52 and 53.
- The Unified Ferry Terminal Buildings [UFTB], to be located to the north of the site between Tolka Quay Road and Promenade Road Extension.
- The State Services Area, to be located between Alexandra Road and Tolka Quay Road.

Following review of the functional requirements of the project brief, and consultation with Dublin Port Company, a preliminary design was developed. This initial concept consisted of schematic line diagrams indicating the required departures and arrivals links and routes within the UFT. This is presented in Figure 4-31.

There are two categories of vehicles for transit to be facilitated. Accompanied vehicles, where the driver travels with the vehicle and unaccompanied vehicles, where a trailer is dropped off at the port and loaded and unloaded by the Ferry Operator before being collected at the destination port. The areas adjacent to the berths were to be reserved for transit vehicles with preference for unaccompanied vehicles to be located directly adjacent to the berths for operational reasons. Non-critical structures and facilities were to be located away from the berths where possible. The line diagram identified conflict points at the interface between Arrivals and Departures traffic.

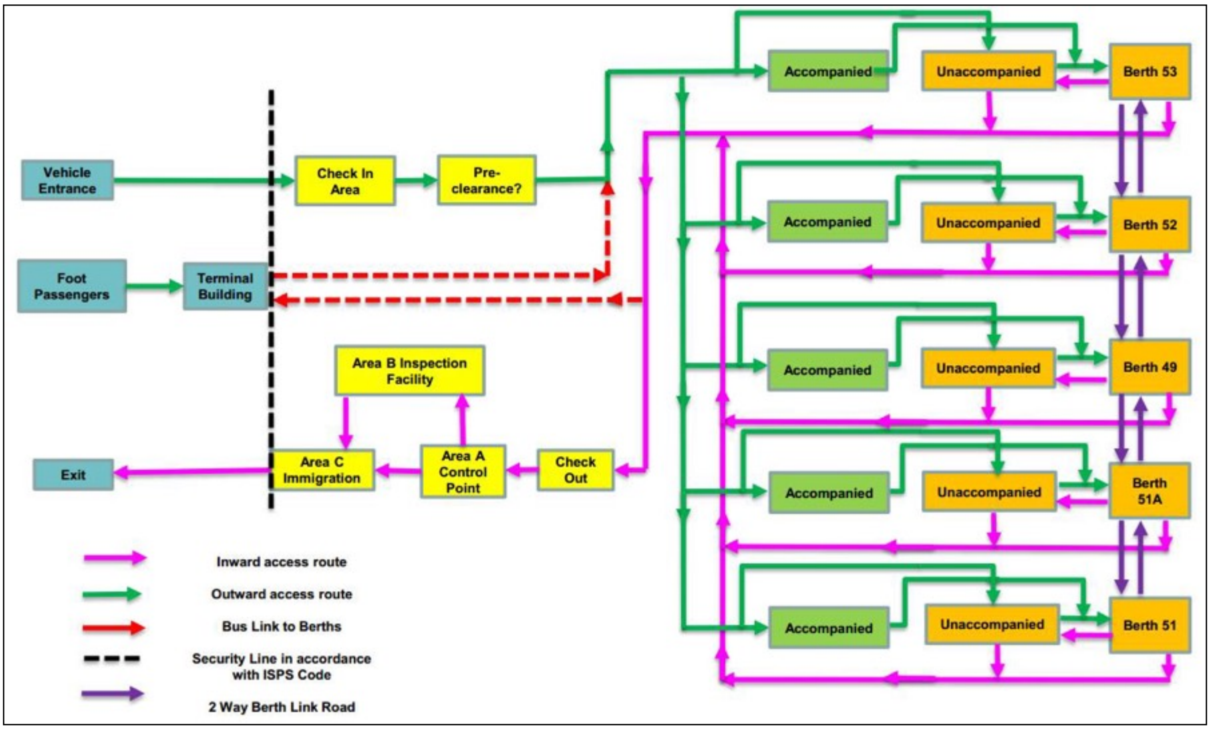


Figure 4-31 Proposed Traffic Links

Elevated road, original building location (Options a, b, c, d, e)

Options of elevated roads were proposed for all arrivals traffic to overcome these traffic conflicts and allow free flowing traffic throughout the UFT.

The Initial design (Design - Option a) included the following:

- Ferry Terminal Building
- Multi-storey Car Park
- State Services Yard
- Individual Accompanied staging areas for each berth
- Individual Unaccompanied staging areas for each berth
- Combined vehicle check-in area
- At grade circulation routes for departures traffic
- Elevated roads for arrivals traffic
- At grade internal circulation for port vehicles between the Terminal Building and the berths

The legend in

Figure 4-32 annotates the various proposed vehicular circulation routes within Dublin Port for the figures in the design options.

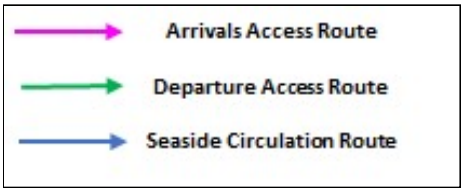


Figure 4-32: Legend for traffic layouts

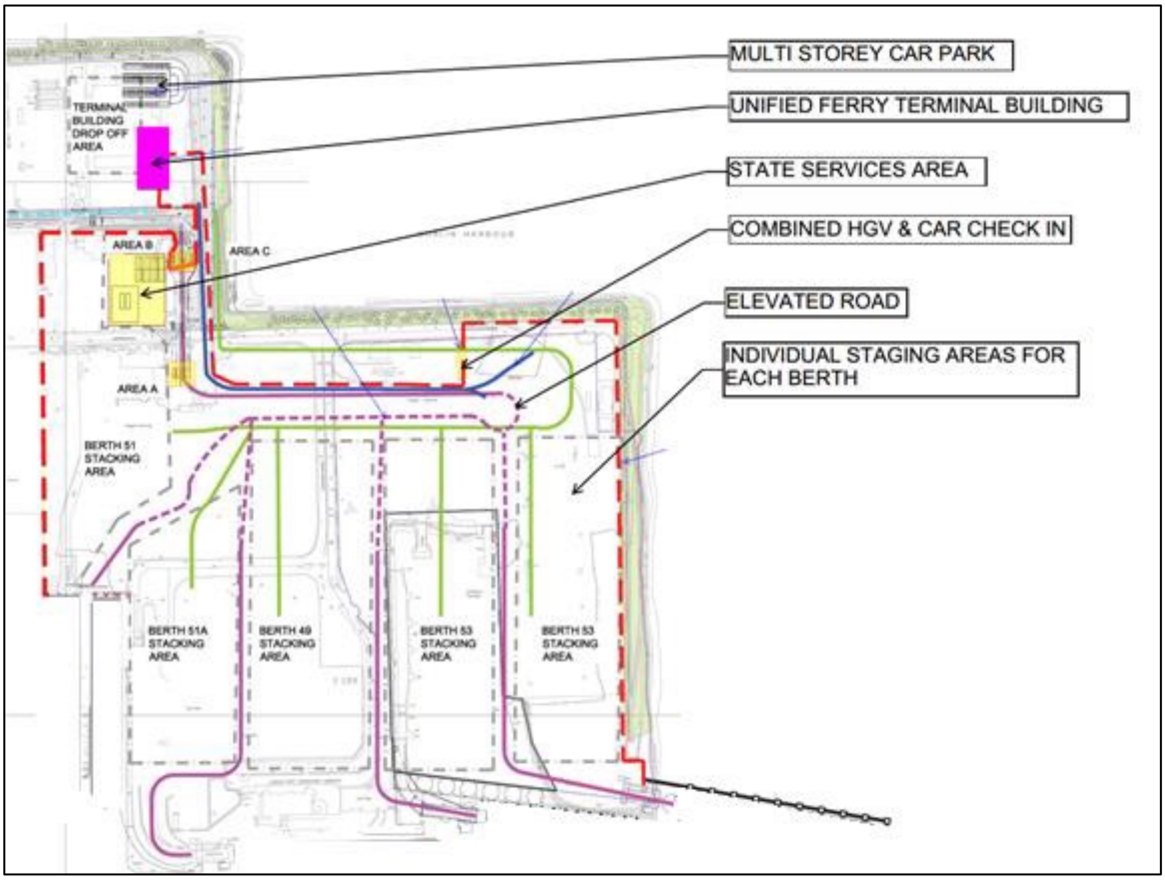


Figure 4-33 Initial Proposal - Option a

Design - Option b included all items from the initial design and also included for rearranging the UFTB area to better cater for the movement of vehicles and foot passengers. The rearrangement involved relocating the multi-storey car park to the south west corner of the proposed UFTB site with the UFTB located to north east corner. A pedestrian link was proposed from the terminal building to the car park structure with set down areas provided at ground level. The layout also included a high-level pedestrian link between the Terminal Building and the consented greenway over the proposed route for departing traffic. This would provide a good link between the building and the adjacent greenway.

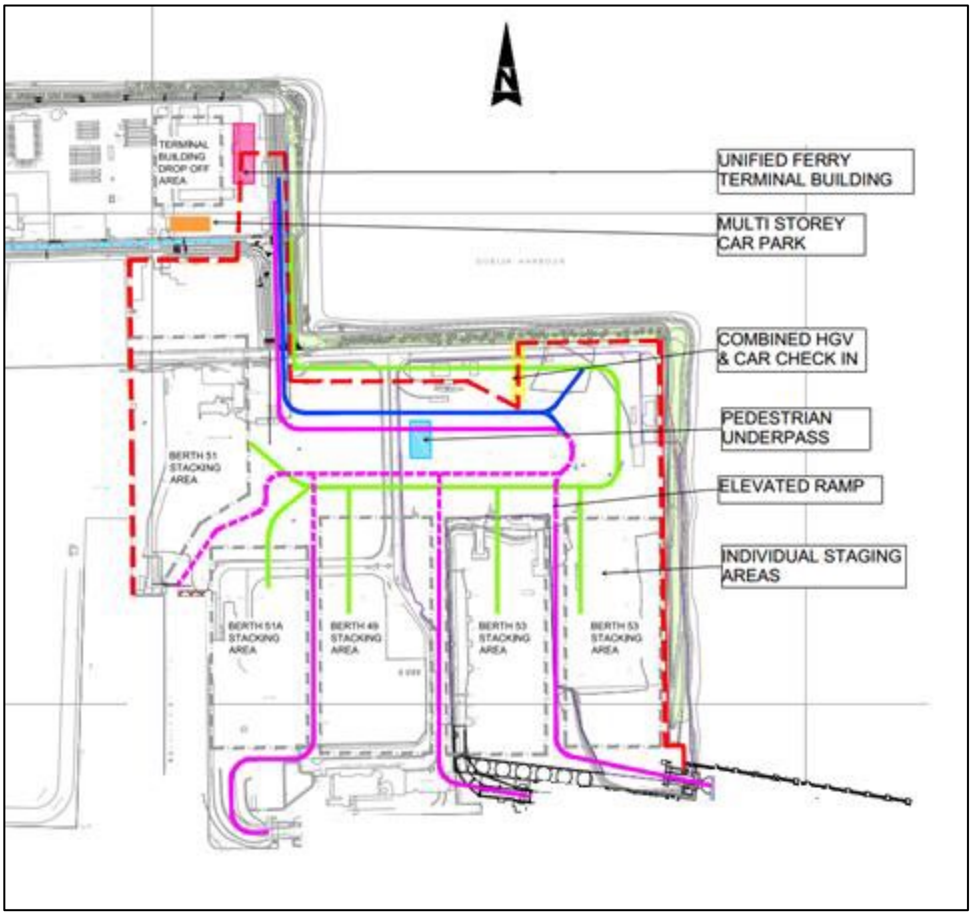


Figure 4-34 Design - Option b

As the line diagrams developed, more accurate space utilisation drawings were prepared. Design - Option c included the provision of 12 check in lanes to the north east corner of the UFTY. These 12 lanes linked west to tie into 7 consented lanes at terminal road north which could act as a holding area for pre-check in vehicles in the event of a delay. Individual staging areas for both accompanied and unaccompanied vehicles were provided for berth 49, 52 and 53. Combined staging areas were provided for berths 51 and 51A due to the close proximity of each linkspan. A dedicated internal circulation route is provided for operational plant vehicles and bus routes. This route transports foot passengers between proposed Terminal building and each individual berth. An initial layout was also developed for the State Services Yard to meet the brief requirements.

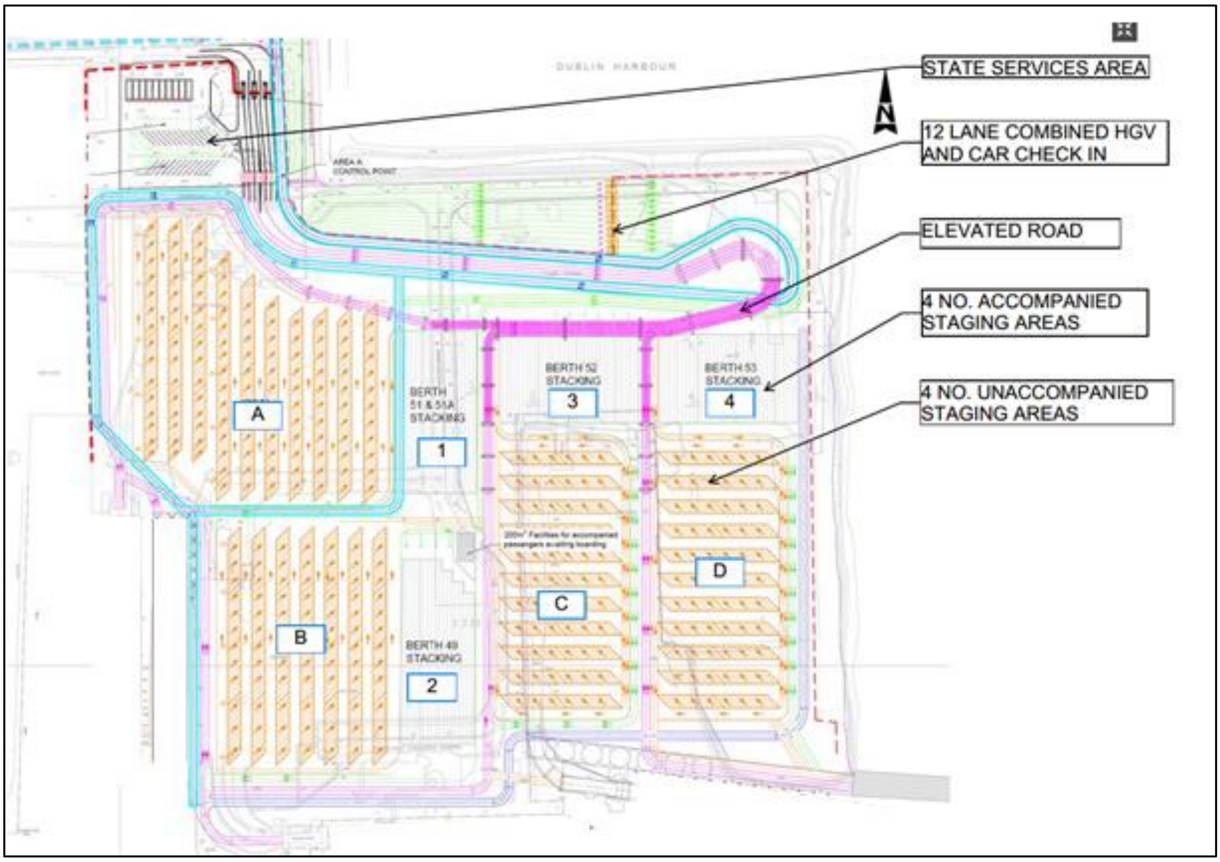


Figure 4-35 Design - Option c

Design - Option d divided the check in booths into two locations. Twelve check-In lanes were positioned at the end of terminal road north and 6 lanes were located to the north east of the UFTY. This amendment was made to reduce the departure queue length within the UFTY and therefore maximise staging space for departing vehicles post check in. This adjustment allowed all circulation roads to be adjusted northwards providing more space in the UFTY. Two accompanied vehicle staging zones were located in the centre of the UFTY which were not allocated to any individual berth. Four unaccompanied vehicle staging zones were proposed to cater for the five berths.

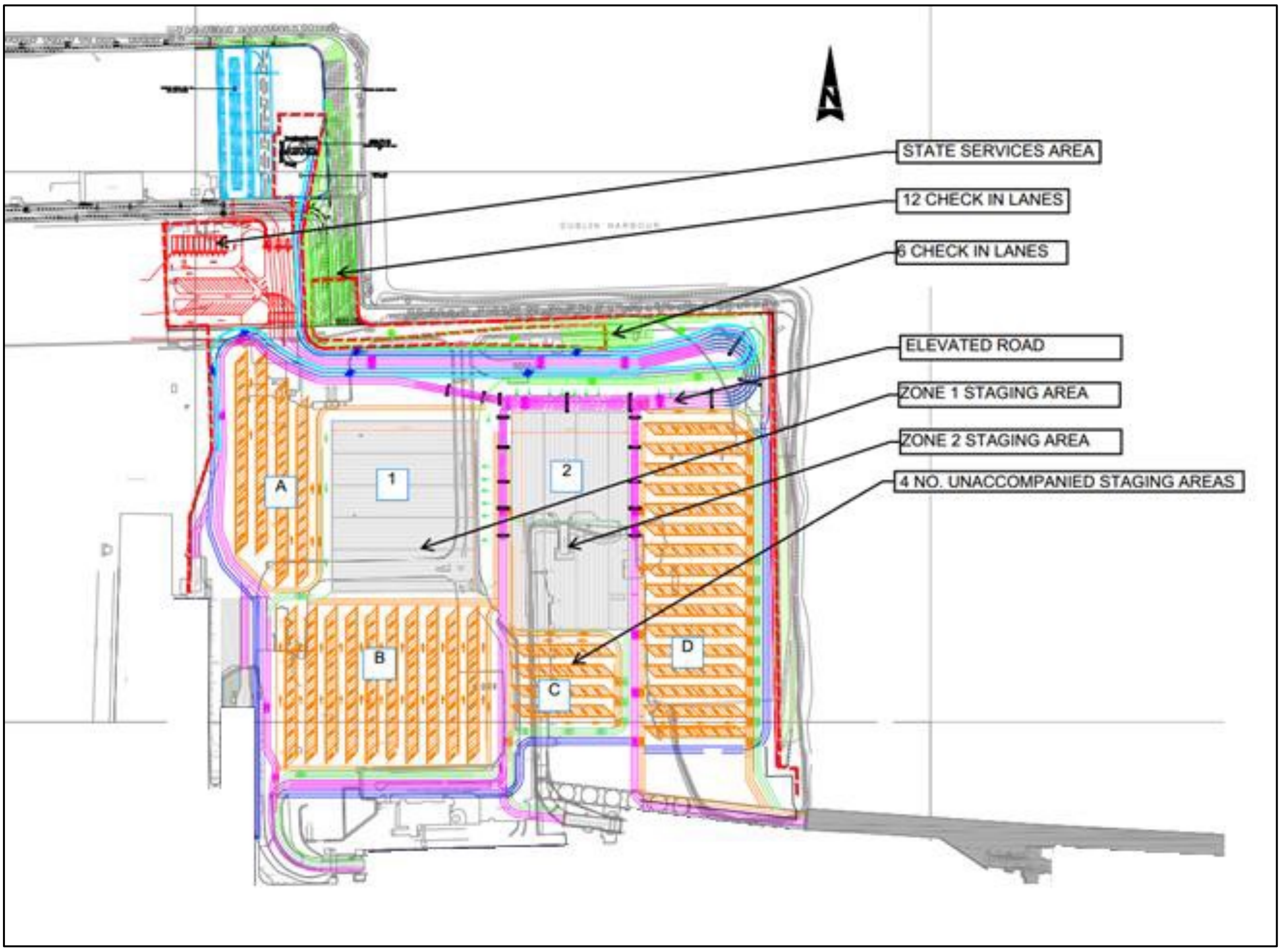


Figure 4-36 Design - Option d

Design - Option e indicated the provision of a single accompanied staging area and three unaccompanied staging zones. The accompanied vehicle staging area was located in the north east quadrant of the UFTY directly adjacent to the check in facility. The unaccompanied vehicle staging zones were located closer to the berths for operational reasons. Internal circulation routes were updated to allow the free movement of vehicles to various areas in the site. In an effort to ensure all disembarking vehicles had two alternative routes to exit the port, an additional ramp connecting to the elevated road along the eastern boundary was included. The UFTB area was also further developed to facilitate the Building to North East Corner and the Multi-storey Carpark to the South West Corner of the UFTB Site.

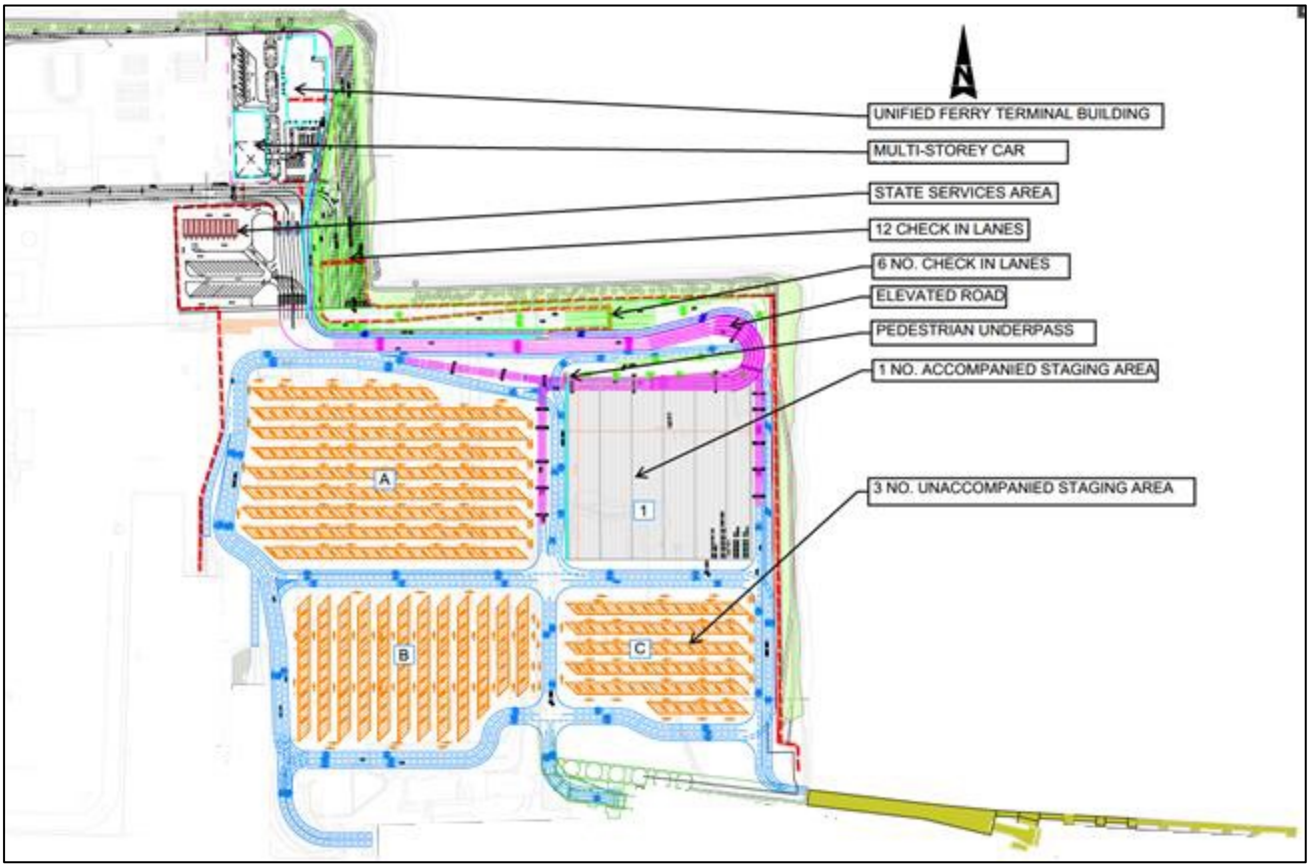


Figure 4-37 Design - Option e

New building location (options f, g)

Following a review of the proposed layouts in the context of the Land Use and Planning report prepared in line with the Control of Major Accident Hazards (COMAH) Regulations, it was determined that the proposed terminal building and associated multi storey car park was not suited to the proposed location. Options were developed to locate the building in an appropriate location within the UFTY. The proposed UFTY was adjusted to provide layouts which maintained the parameters required to fulfil the brief but also facilitated the Terminal Building within the UFTY.

Design - Option f positioned the UFTB in the north east corner of the UFTY. The check in locations were relocated to east of State Services Yard to utilise the space to the north of the site for pre-check in queuing of vehicles and maintain maximum space within the UFTY for operations. A public access roadway was required to continue past the end of terminal road north and service the terminal building which reduced the space available for operations within the UFTY. Departing vehicles were directed along the northern perimeter around the terminal building and distributed south to the unified accompanied vehicle staging area or one of the four unaccompanied vehicle staging areas. An elevated road for arrivals was retained but relocated further south within the UFTY.

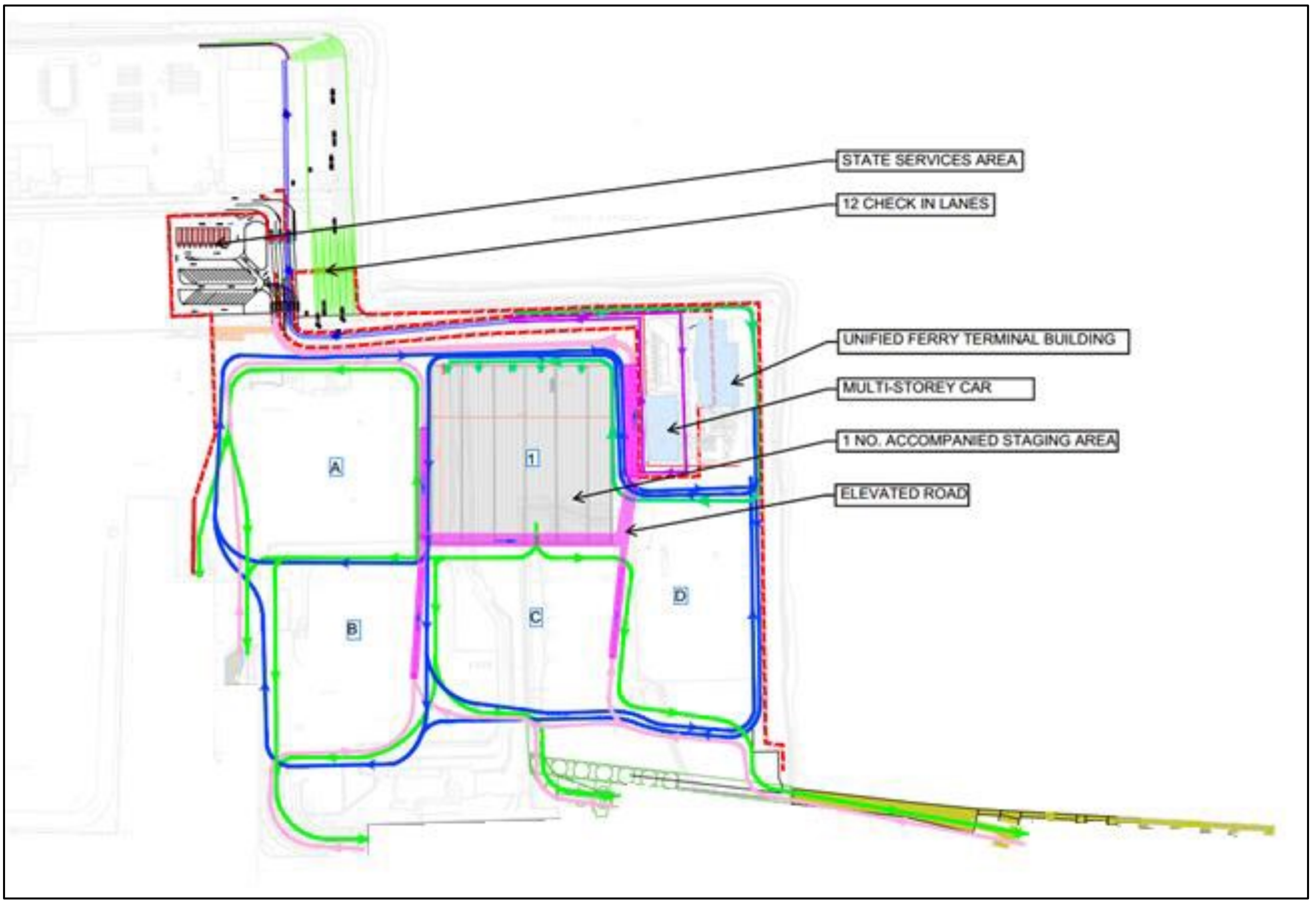


Figure 4-38 Relocating Terminal Building - Design - Option f

Design - Option g orientated the building and multi-storey car park in an east-west arrangement. This layout is similar to option f however the change to the building reduces the impact on operations space available within the UFTY.

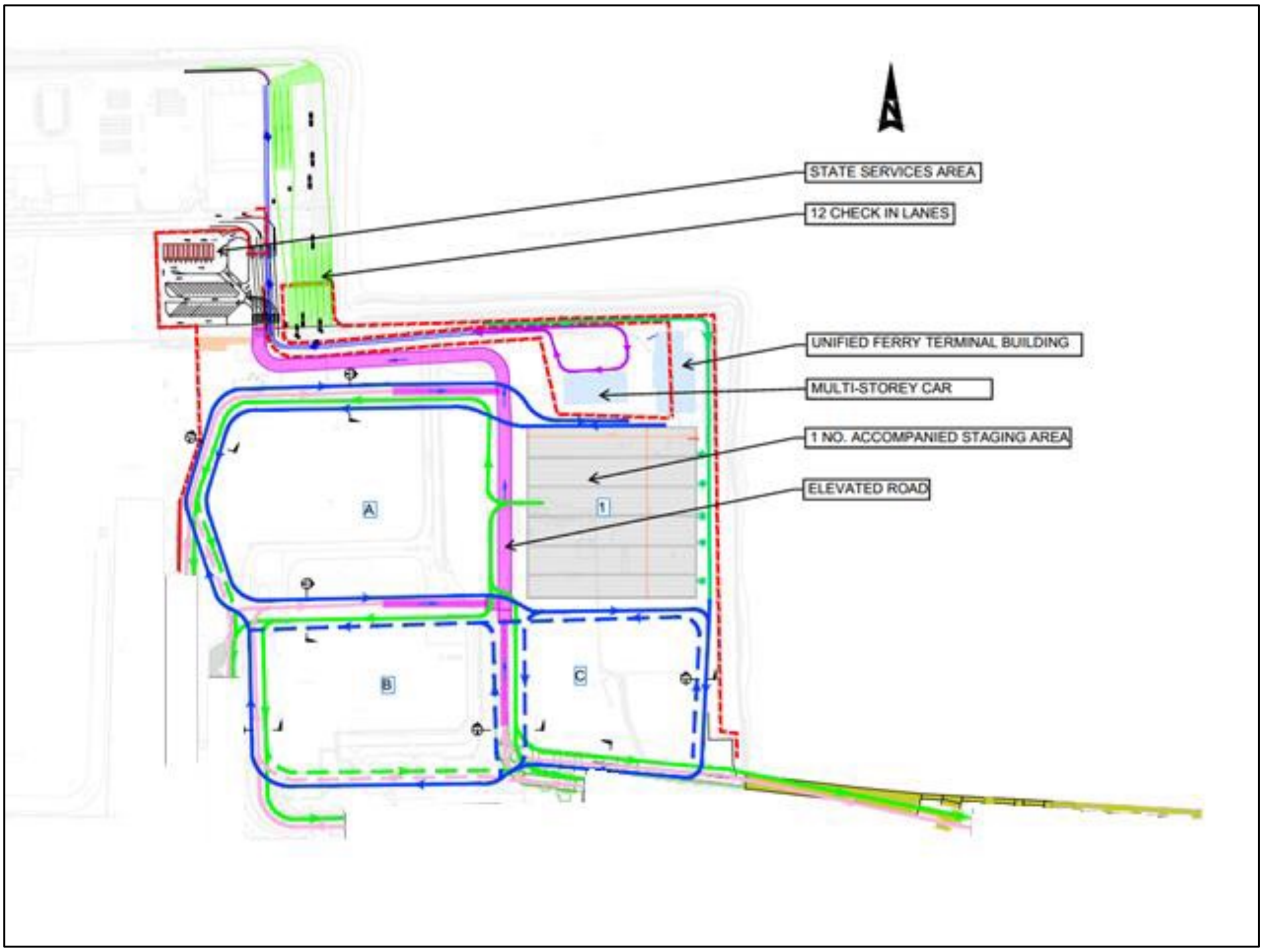


Figure 4-39 Relocating Terminal Building - Design - Option g

Removal of building (options h, i)

Following a further review of the project in light of continued uncertainty around Brexit a number of changes were proposed to the landside scope of MP2 as follows:

- Omit the State Services yard from MP2 and address it as part of a separate planning application
- Omit the new Terminal Building and adapt the existing Terminal 1 for use as the Unified Ferry Terminal Building
- Utilise existing and consented layouts, reconfigured as necessary, with minimal capital works to provide landside operations required to suit the marine side proposals of the MP2 Project.

An assessment of the maximum capacity of the existing Terminal Building was undertaken. The assessment concluded that adequate capacity is available for the predicted building use.

Design - Option h examined the option of retaining the use of the existing Terminal 1 building to the south of the site as a Unified Ferry Terminal Building while maintaining a suitable Unified Ferry Terminal Yard. The layout segregates light vehicles from heavy vehicles at the end of terminal road north. Separate HGV and Light Vehicle check in booths were indicated. A public access roadway was required to connect terminal road north with the terminal building. In order to maintain the existing public roadway running north to south a new elevated road was proposed within the restricted area to link the UFTY to the east and the west of the site and allow free movement of traffic within the ISPS controlled zone. The layout incorporates 5 no accompanied vehicle staging areas with two no. zones dedicated to cars located near the Terminal Building and 3 no. unaccompanied vehicle staging areas.

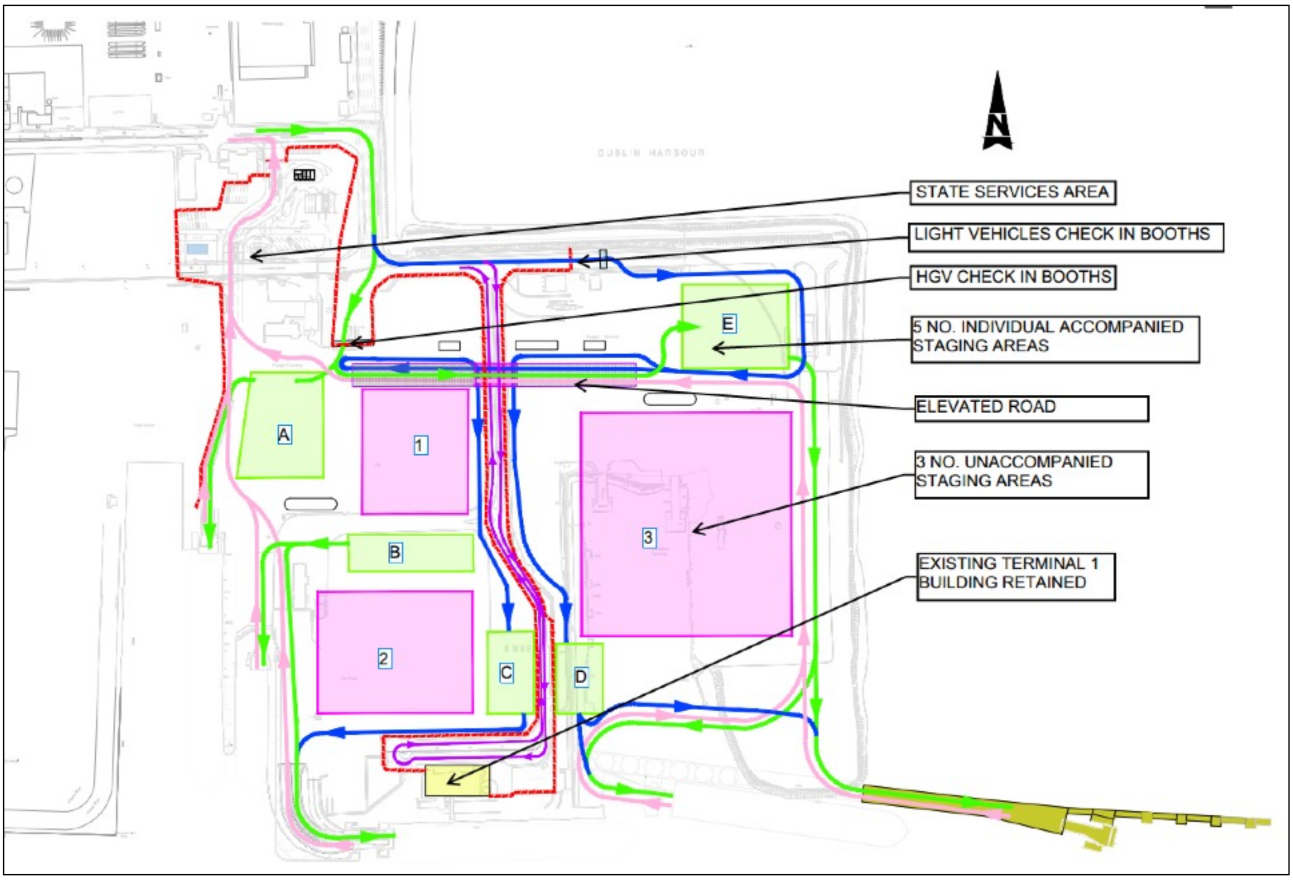


Figure 4-40 Retaining Terminal 1 - Design - Option h

Design - Option i retains a similar layout to design option g, with the exception of the omission of the elevated roadway from this design. The link between the east and west ISPS security zones is maintained at grade to the north of the building. Public access to the building is facilitated through a pedestrian underpass structure to link a new set down area to the existing terminal building.

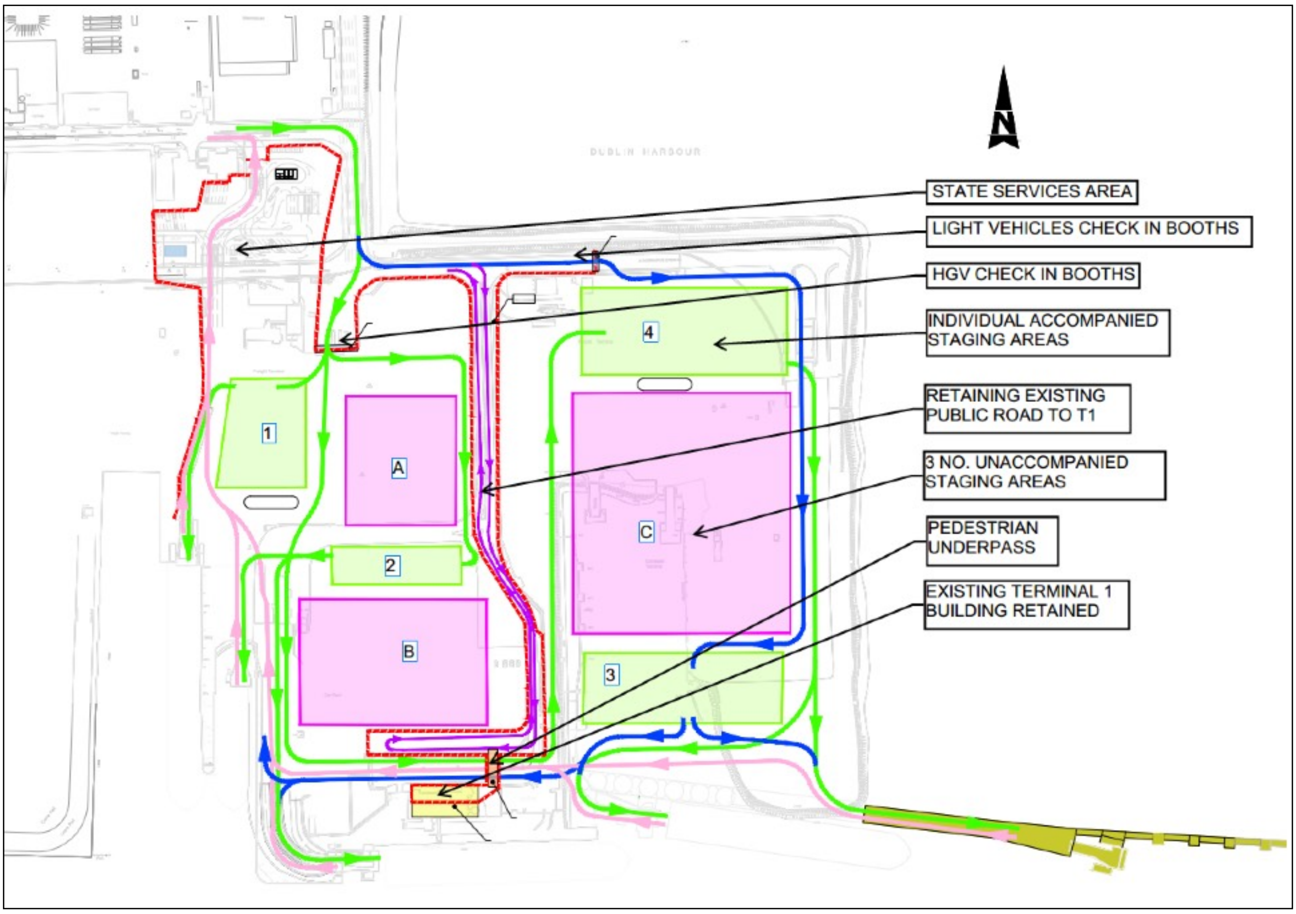


Figure 4-41 Retaining Terminal 1 - Design - Option i

Removal of building and maximising space in UFTY (option j, Final Design)

Further design evolution was undertaken. Design - Option j is similar to eight in that a new set down area is proposed, with a pedestrian link to the existing Terminal 1 building via a pedestrian underpass. This option however includes for the removal of the existing terminal building access road running north to south through the middle of the UFTY with public access provided to the set down area via the northern and eastern perimeter of UFTY. This adjustment facilitates an uninterrupted Unified Ferry Terminal Yard for operations which maximises efficiency of this space.

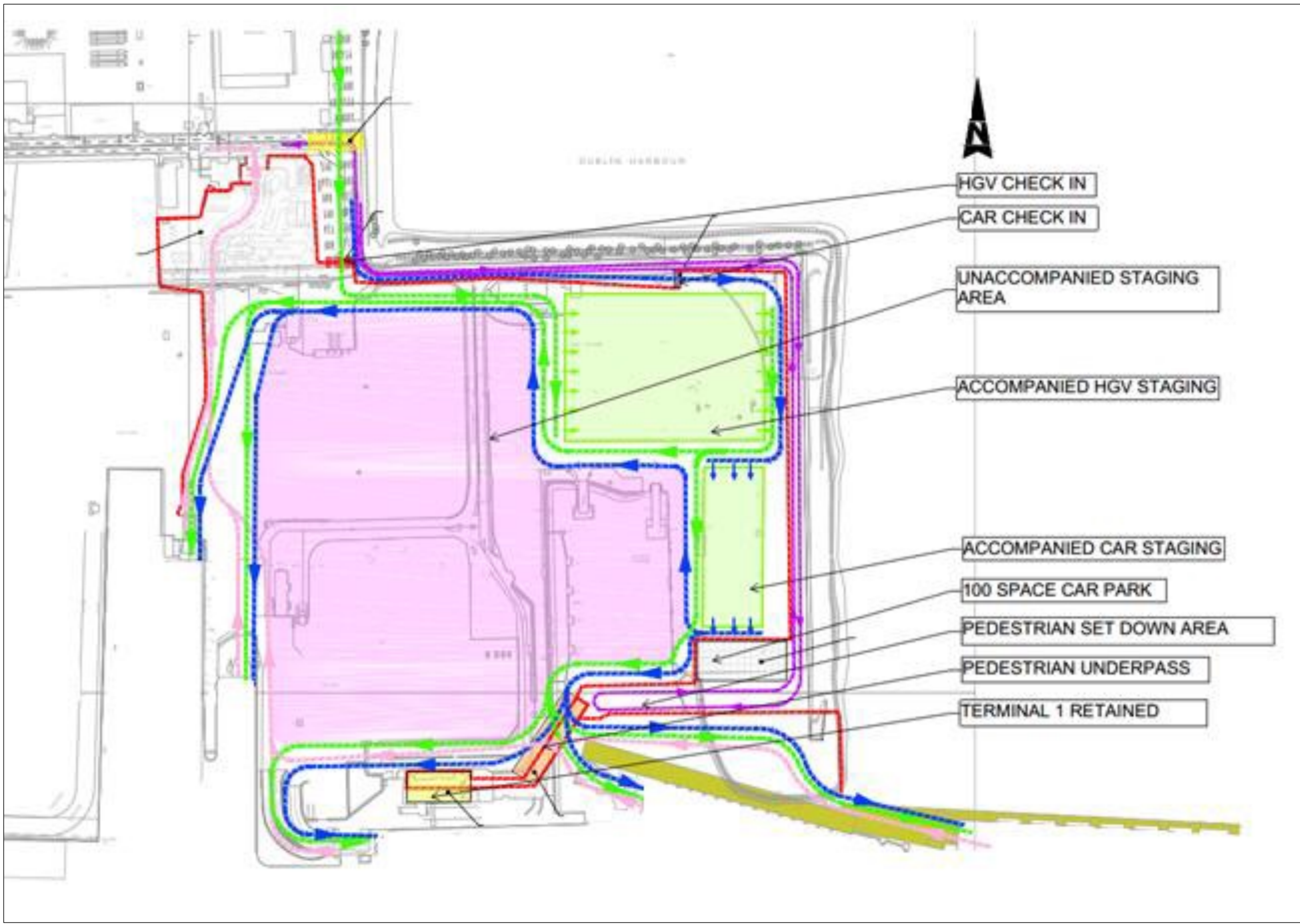


Figure 4-42 Retaining Terminal 1 - Design - Option j

In order to facilitate the proposed Unified Ferry Terminal [UFT], it is a requirement to demolish existing structures in the site. A number of structures are to be demolished in advance of the MP2 project as part of other consents. The demolitions proposed to facilitate the UFT as part of MP2 are:

- Terminal 2 Building;
- Terminal 2 Check In;
- Terminal 5 Building;
- Terminal 5 Check In;
- Terminal 5 Sheds (3 No.),
- Terminal 5 Substations (2 No.),
- Terminal 1 Car Check In.

A demolition plan is indicated in Figure 4-43.

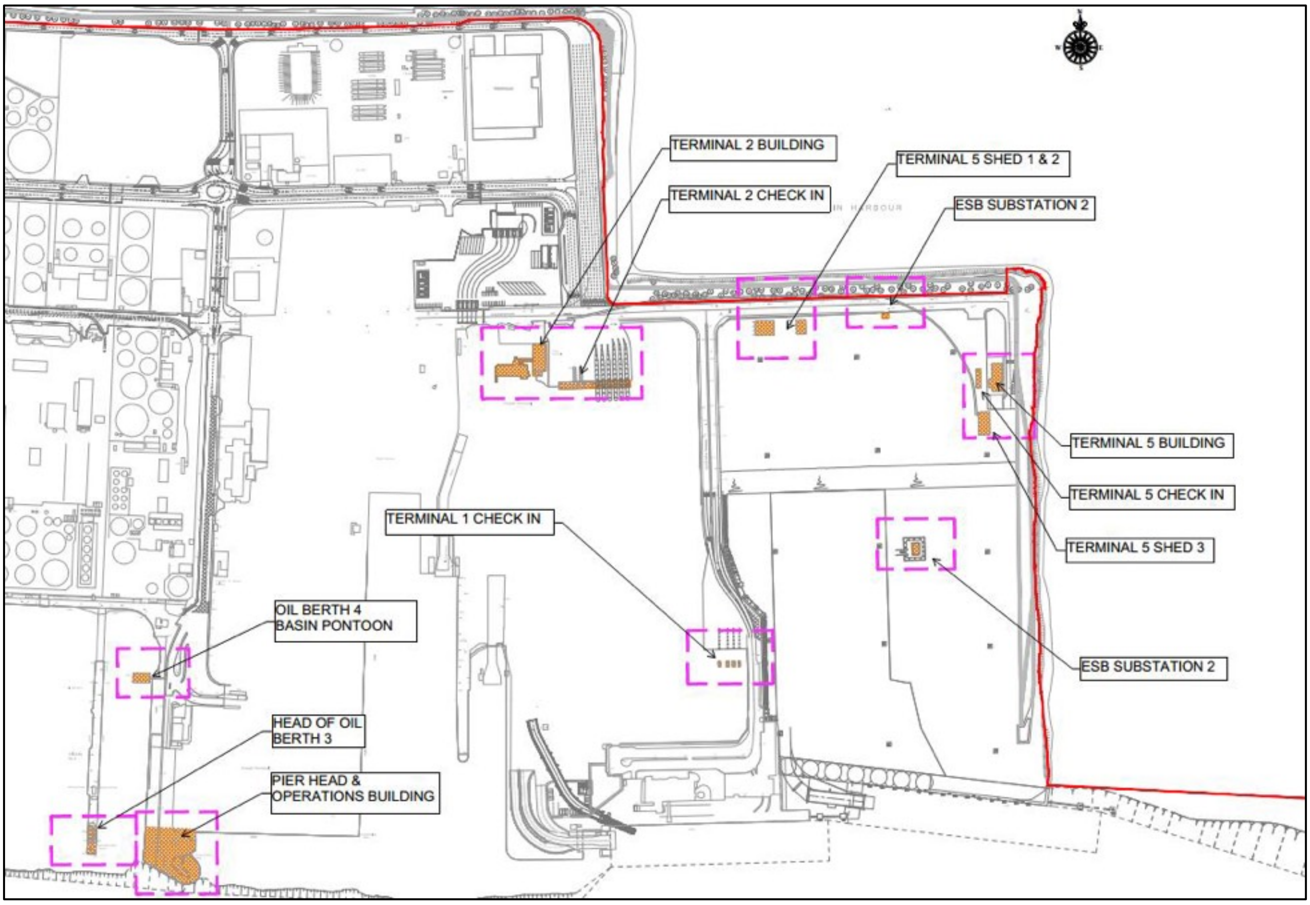


Figure 4-43 Demolition Plan

Environmental Effects

A summary of predicted effects of the development of the Unified Ferry Terminal is provided in Table 4-9.

Table 4-9 Summary of Predicted Effects of a Unified Ferry Terminal (Final Design)

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0	No impact anticipated	0	No impact anticipated
Fauna – Birds	0 / -	Movement of personnel and machinery liable to cause disturbance impacts to protected species.	+ / -	Movement of pedestrians has the potential to cause indirect impacts on non-breeding birds during short periods at low spring tide. Potential beneficial impact (increased time for foraging) of terminal lighting upon foraging waterbirds.
Fauna – Marine Mammals	0	No impact anticipated	0	No impact anticipated

Fauna – Benthic and Littoral	0	No impact anticipated	0	No impact anticipated
Fisheries				
Dredging	0	No impact anticipated	0	No impact anticipated
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	Option consistent with the existing character of the landscape. No protected views or prospects within the vicinity of development option.
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	0	No impacts anticipated	0	No impacts anticipated
Material Assets				
Roads / Traffic	0 / -	Potential for temporary traffic disturbances due to construction.	0	No impacts anticipated
Navigation	0	No impacts anticipated	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	+ / -	Creation of employment associated with construction activities. Potential disruptions to travel schedules.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0	No impacts anticipated	0	No impacts anticipated
Coastal Processes				
Coastal Processes	0	No impacts anticipated	0	No impacts anticipated
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from site activities and increased traffic.	0 / -	Increase in emissions due to heightened traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential disturbance noise during construction and through increased traffic. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased traffic and human activity.
Vibration	0 / -	Potential for vibration from construction activities	0 / -	Potential vibration as a result of increased traffic and human activity.

4.3.7.3 Landside Works Final Design

The final design proposed is a development of Design - option j discussed above. The final layout includes:

- Reuse of the existing Terminal 1 Building as the Unified Ferry Terminal Building
- Car parking for up to 180 vehicles (including designated disabled spaces) to compensate spaces removed within the proposed UFTY with some allowance for growth.
- An open at grade area within the UFTY for marshalling/staging of Ro-Ro traffic. A dedicated HGV check in area (6 lanes) to the east of state services yard is proposed and a multi vehicle check in area (8 lanes suitable for HGVs and Light vehicles) is proposed to the north of the UFTY. The number of booths and space available has been assessed to ensure the estimated queue length for HGVs does not impact upon on the public access to the Terminal building or light vehicle access to the dual use check in booths. The design for the car/tourism check-in ensures the anticipated queues are in line with the guidance on the COMAH Land Use Planning Assessment Report prepared for the project which requires that only a small portion of this queue (up to 10%) extends into the middle risk zone.
- Public access along the north and east perimeter of the site. Route will facilitate private cars, coaches and cyclists.
- Facilities for cars and coaches (public and private) to set down passengers for access to the existing Terminal 1 building
- Pedestrian underpass to link building to set down area without impacting on operation of the UFTY. This underpass has a separate access corridor for passengers within the ISPS security zone walking back to the building without integrating with the public. The underpass crosses the link roads to Berth 52 and Berth 53.
- A new substation is proposed to facilitate required power demand of the development
- Three no. toilet blocks are proposed to cater for the set down area, staff, accompanied light vehicle passengers and HGV passengers.
- A Heritage Installation is proposed on the South East corner of the UFTY.

The area of the landside development will be flexible, as the usage of the port evolves. It will generally be split into staging areas for accompanied heavy goods vehicles (HGVs), accompanied cars and unaccompanied trailers, with circulation routes indicated to route vehicles to each zone and to and from the berths.

An indicative operational layout is included in the figure below which allows for segregated accompanied staging areas for cars/tourism vehicles and HGVs on the eastern perimeter as well as 3 no. accompanied staging areas and an internal road circulation network.

The development of the Unified Ferry Terminal was chosen instead of the do-nothing scenario. For the most part, the potential environmental effects of this choice are comparatively less favourable (Table 4-9). However, the long-term impact of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment is the principle reason for this decision. The negative environmental effects of the redevelopment of can be mitigated.

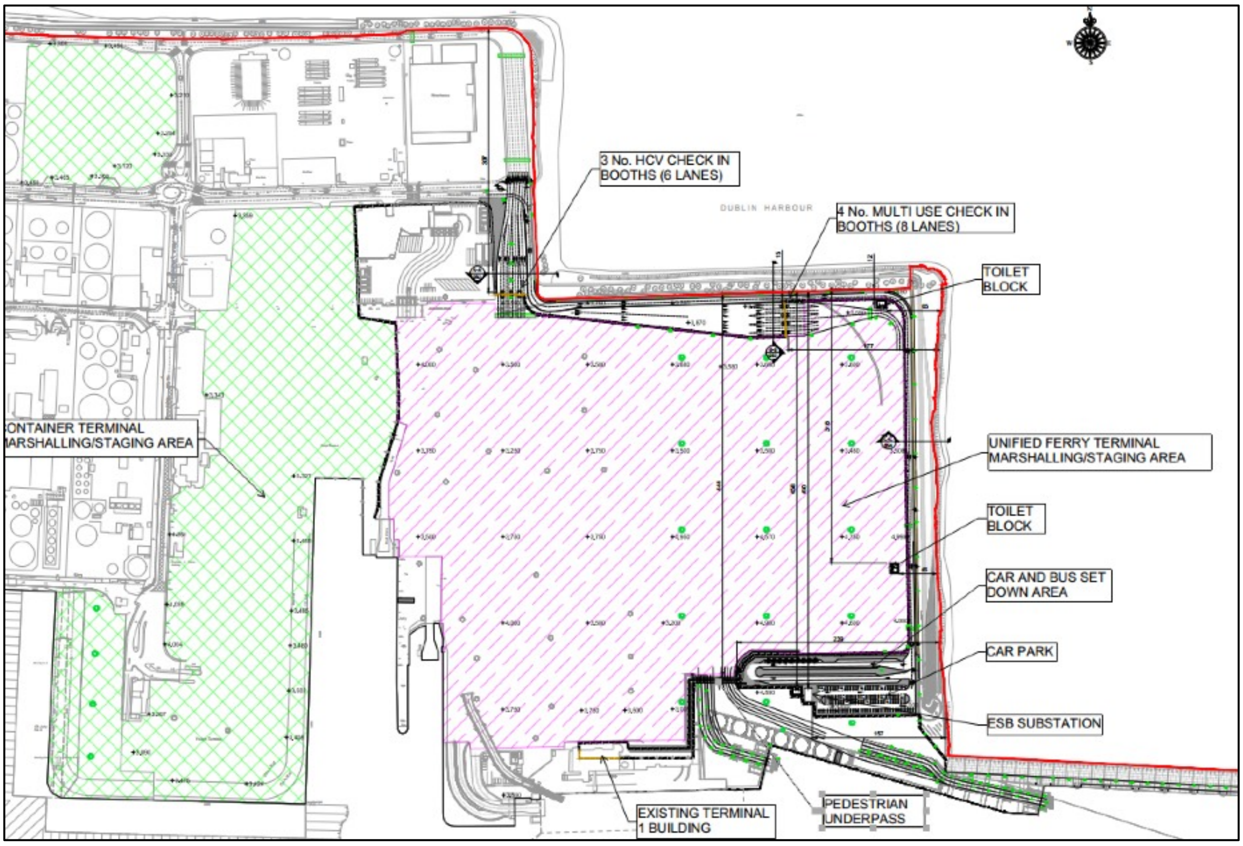


Figure 4-44 Final Design Layout

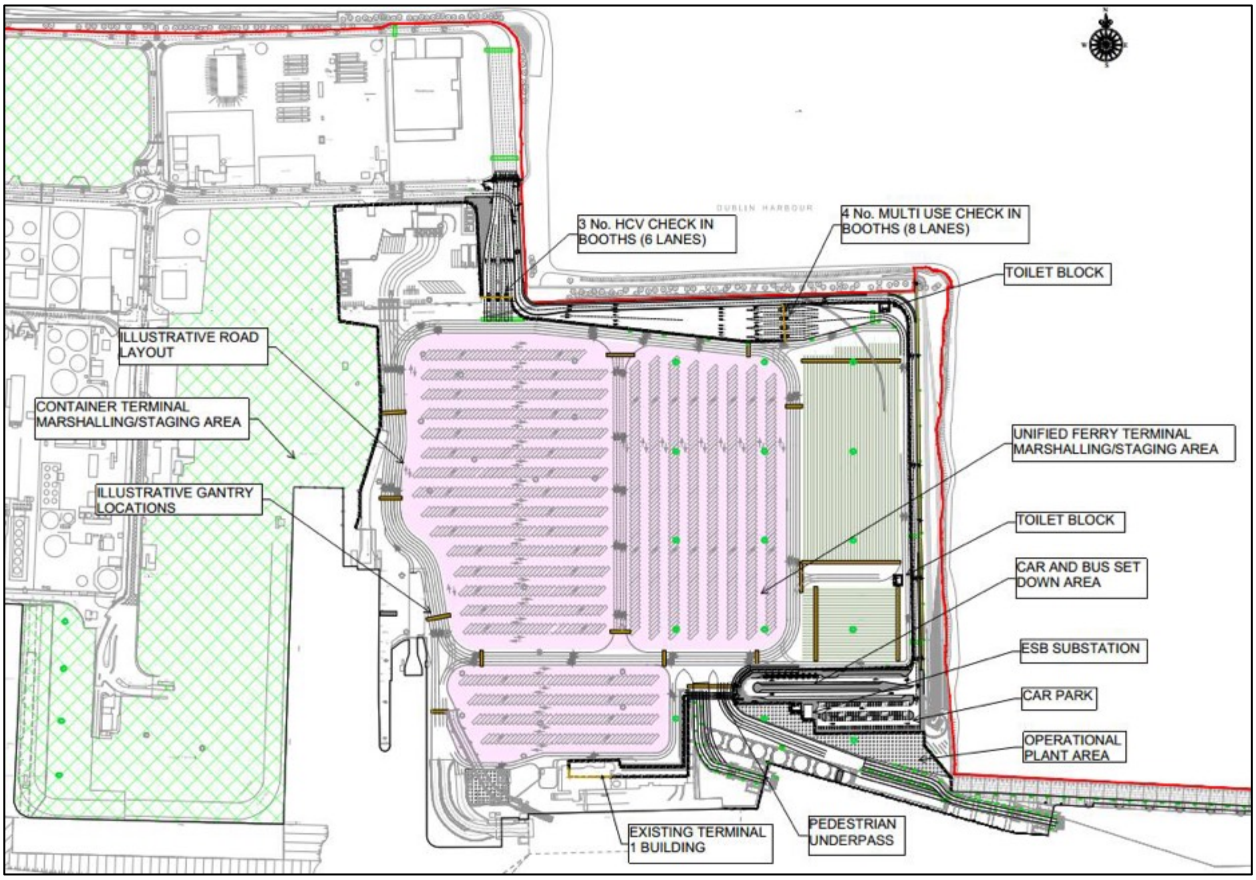


Figure 4-45 Representation of Operational Layout

4.3.8 Channel Widening - Design Progression

To facilitate the safe navigation and turning of vessel of up to 240m in length, and the expected increased frequency of sailings, channel widening will be required to the south of the existing navigation channel. Widening will be carried out via dredging works. The standard depth of the channel will be -10.0m CD.

The layout design of the dredging works has been developed via an iterative process considering, amongst others, its navigational safety, proximity to proposed berths, its potential impact on the Great South Wall and its potential impact on the conservation objectives of the South Dublin Bay and River Tolka SPA.

The navigation channel has permission to be deepened from -7.8m CD to -10.0m CD under the ABR Project (ABP Ref. 29N.PA0034). The capital dredging scheme for the ABR Project commenced in October 2017 with dredging activity taking place within the navigation channel and fairway within Dublin Bay. The ABR Project capital dredging of the section of navigation channel in the vicinity of the south of the existing navigation channel is scheduled for the winter season October 2023 – March 2024.

The design progression included the following design stages:

- Do-nothing Scenario
- Design Progression One
- Design Progression Two
- Design Progression Three
- Design Progression Four

4.3.8.1 Do-nothing Scenario

Channel widening is required to facilitate the navigation and turning of large ferries (240m length) and more frequent sailings. The works are essential for the safe and effective operation of the proposed port facilities and is therefore an integral part of the MP2 Project. In lieu of this widening, the safe and effective operation of large ferries and more frequent sailings would not be possible and would thus result in other aspects of the project, including the redevelopment of several berths, being made redundant. This would impose significant capacity constraints upon the port into the future, thus having a critical impact upon national and regional economies, particularly by way of trade, employment and associated taxes for societal benefit. This in turn, would undermine the port's ability to contribute towards achieving the sustainable transport objectives of National Port Policy.

Additionally, the absence of the widening works would result in limits to future port investment. This would inhibit the attainment of a number of objectives set out in 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 to reside at the port as well.

With regard to environmental factors such as biodiversity, flora and fauna, air and water quality etc. there will be limited impact upon these as a result of the absence of the widening works. The potential environment impacts of other channel widening options are considered below.

4.3.8.2 Design Progression One

The original scope required the development of a manoeuvring area to the east of the proposed Berth 53. This area would allow ferry vessels to turn when arrived to or departing from Berths 53, 52 and 49. The initial design, which was ascertained based on the outputs from extensive navigation simulation modelling resulted in an area with a circa 400m radius to a standard depth of -10m CD. This concept layout is indicated in Figure 4-46

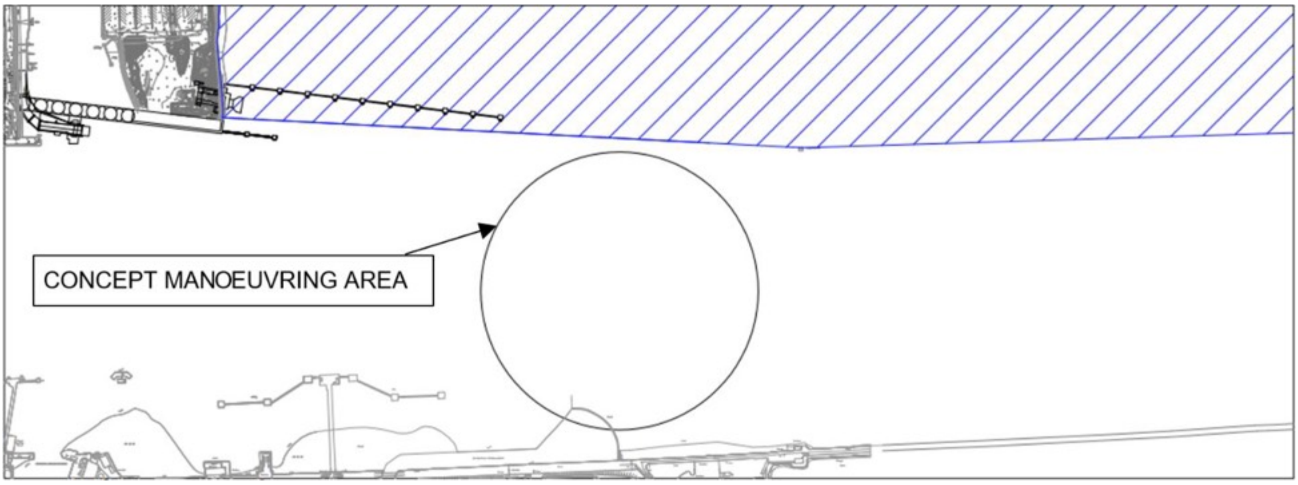


Figure 4-46 Concept Channel Widening

Through the modelling process, the concept manoeuvring area was deemed to be located too far west and was adjusted eastwards (Figure 4-47). The dredge envelope for this progression was developed and is indicated in Figure 4-48.

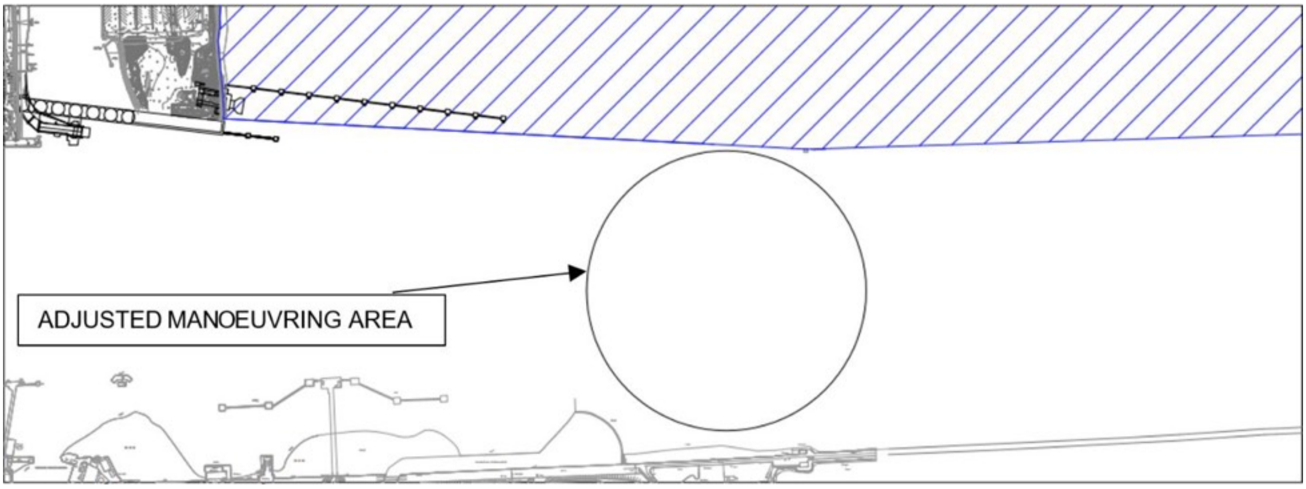


Figure 4-47 Adjusted Manoeuvring Area

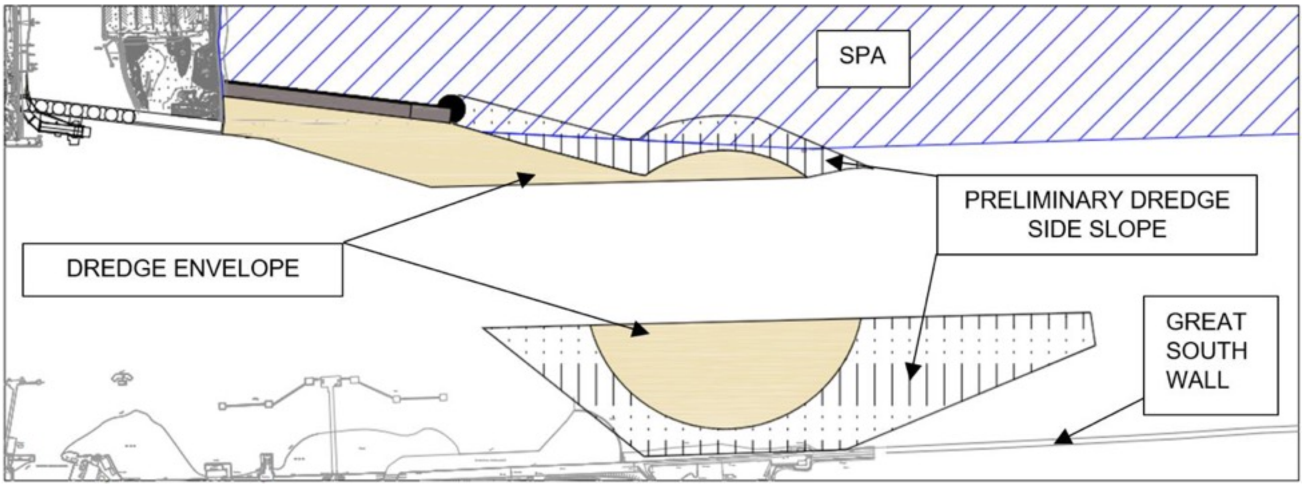


Figure 4-48 Design Progression 1 Dredge Envelope

Environmental Effects

A summary of the predicted effects of Channel Widening Progression One is provided in Table 4-10.

Table 4-10 Summary of Predicted Impacts of Channel Widening Design Progression One

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Loss of marine habitats and flora due to capital dredging and deposition operations.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal.
Fauna – Birds	-	The proposed capital dredging to the north of the navigation channel is located within the South Dublin Bay and River Tolka Estuary SPA. Construction and capital dredging operations have the potential to cause disturbance to the Natura 2000 sites and the protected bird species that utilise it.	-	Change in sea bed level leading to minor loss of low-tide bird feeding area.
Fauna – Marine Mammals	-	Disturbance impacts during capital dredging and disposal.	0 / -	Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	+ / 0	Some loss of soft sediment due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability	0 / -	Reduction in benthic food availability.
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	No impacts anticipated

Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	-	Potential impacts to stability of the Great South Wall caused by ship thrusters during turning operations by larger ships
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0	No impacts anticipated.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation area during construction.	+ / 0	Creation of 400m radius navigation area.
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	0 / -	Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential changes to existing tidal patterns and currents. Potential changes to existing sediment regime.	0 / -	Potential changes to circulation patterns and sediment transport.
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from increased marine traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during capital dredging activities. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic.
Vibration	0 / -	Potential for vibration due to capital dredging activities.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species. Potential vibration due to maintenance dredging activities.

4.3.8.3 Design Progression Two

The design of the manoeuvring area evolved as the layout of the proposed Berth 53 was adjusted, option 2a is shown in Figure 4-49. Additional adjustments included tapering of the southern dredge boundary to facilitate vessel access and turning as shown in Figure 4-50 for option 2b.

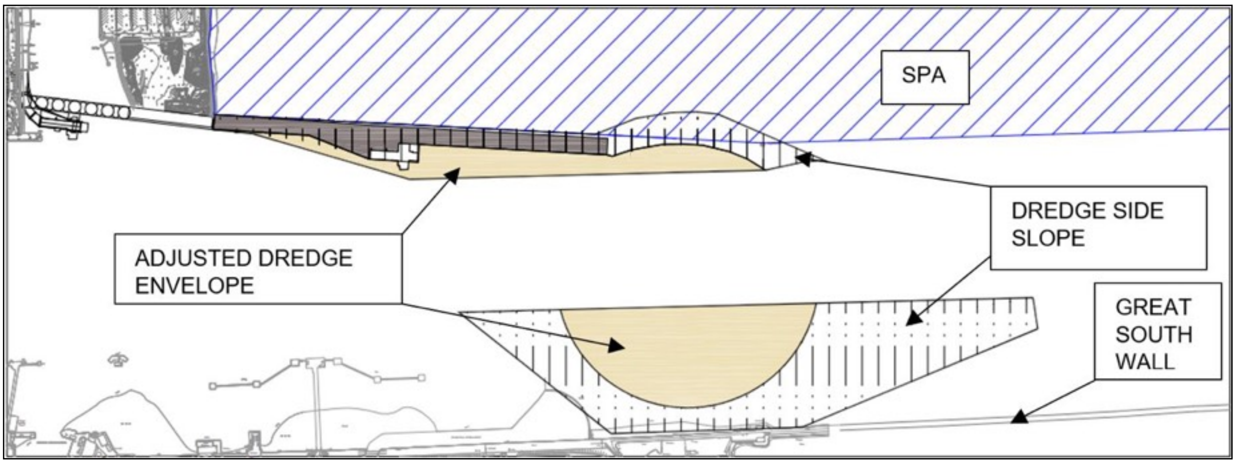


Figure 4-49 Design Progression 2 Dredge Envelope (option 2a)

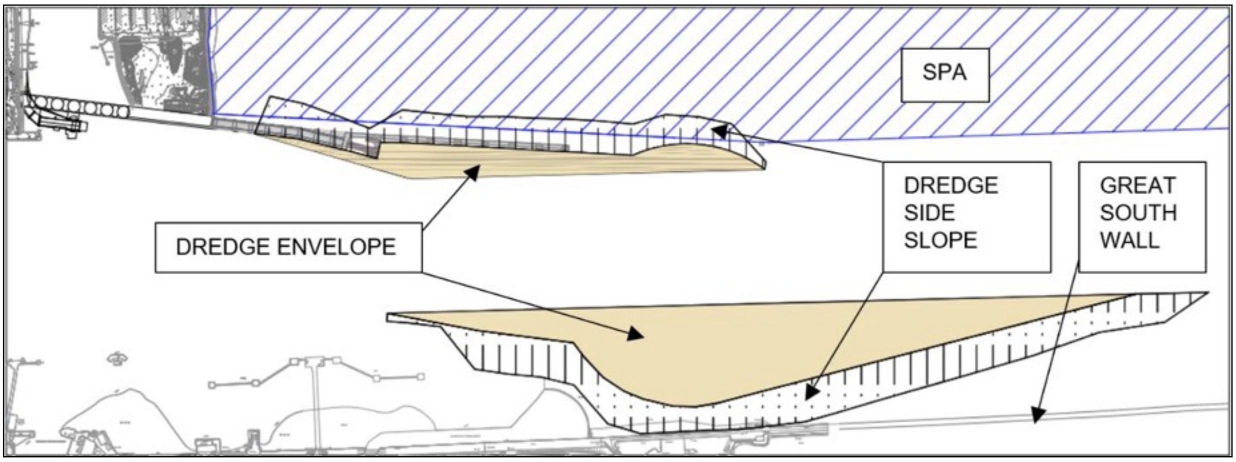


Figure 4-50 Design Progression 2 Dredge Envelope (option 2b)

Environmental Effects

A summary of predicted effects of Channel Widening Progression Two is provided in Table 4-11.

Table 4-11 Summary of Predicted Impacts of Channel Widening Design Progression Two (option 2b)

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Loss of marine habitats and flora due to capital dredging and deposition operations.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal.
Fauna – Birds	-	The proposed capital dredging to the north of the navigation channel is located within the South Dublin Bay and River Tolka Estuary SPA. Construction and capital dredging operations have the potential to cause disturbance to the Natura 2000 sites and the protected bird species that utilise it.	-	Change in sea bed level leading to minor loss of low-tide bird feeding area.

Fauna – Marine Mammals	-	Disturbance impacts during capital dredging and disposal.	0 / -	Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	+ / 0	Some loss of soft sediment due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability	0 / -	Reduction in benthic food availability.
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	No impacts anticipated
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	-	Potential impacts to stability of the Great South Wall caused by ship thrusters during turning operations by larger ships
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0	No impacts anticipated.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation area during construction.	+ / 0	Creation of 400m radius navigation area.
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	0 / -	Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential changes to existing tidal patterns and currents. Potential changes to existing sediment regime.	0 / -	Potential changes to circulation patterns and sediment transport.
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from increased marine traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during capital dredging activities. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic.

Vibration	0 / -	Potential for vibration due to capital dredging activities.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species. Potential vibration due to maintenance dredging activities.

4.3.8.4 Design Progression Three

Due to the proximity of the proposed dredged slopes to both the SPA and the Great South Wall, new navigation simulations were carried out with a view to refining the manoeuvring area design. The design progression of Berths 53 and 52 ran concurrently with this process. Design Progression 3 (Figure 4-51) resulted in a refined design that was consistent with the progression of Berth 53 as it evolved in tandem. The side slopes were removed from the SPA to the north and the Great South Wall to the south. To achieve this the following were proposed:

- Reduction of the manoeuvring area radius;
- Installation of a low-level sheet pile wall with a concrete capping beam at the Great South Wall. The wall proposed was approximately 500m in length and would be positioned a minimum distance of 20m from the Great South Wall.
- Installation of scour concrete mattresses in front of the sheet pile wall to stabilise the dredge side slopes. A typical cross section of the proposed works is indicated in Figure 4-52.

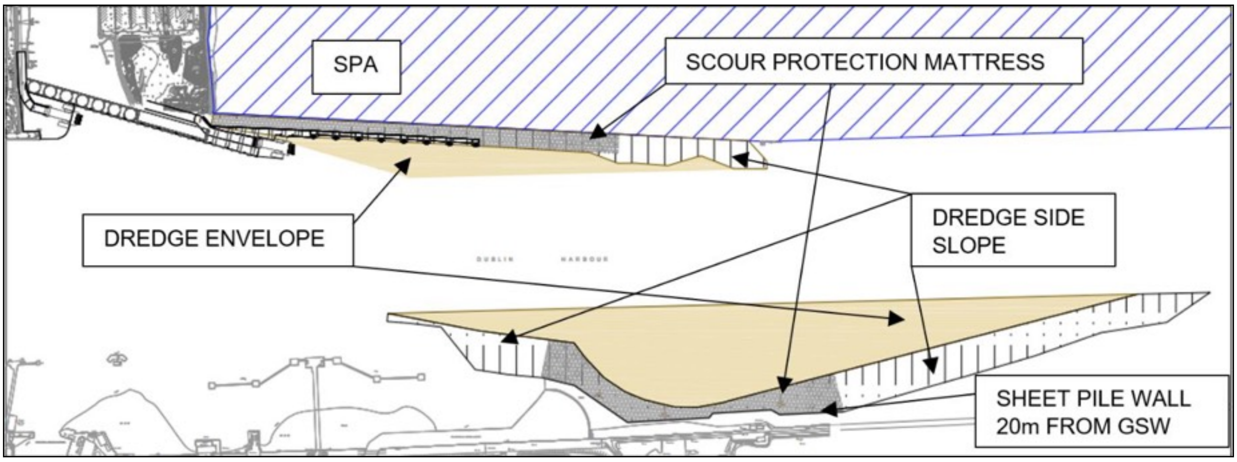


Figure 4-51 Design Progression 3 Dredge Envelope

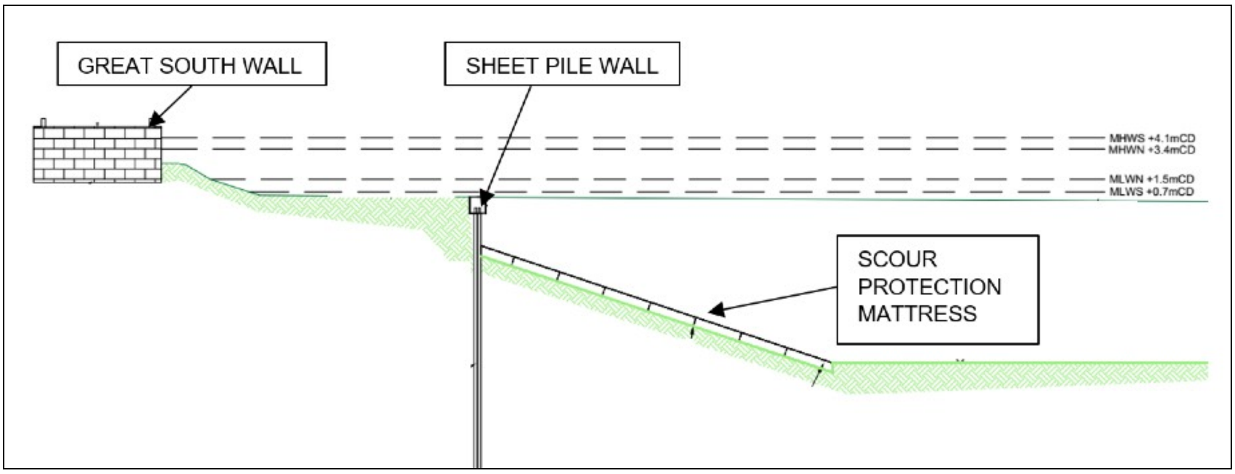


Figure 4-52 Design Progression 3 Sheet Pile Wall at Great South Wall

Environmental Effects

A summary of predicted effects of Channel Widening Progression Three is provided in Figure 4-12.

Table 4-12 Summary of Predicted Impacts of Channel Widening Design Progression Three

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Loss of marine habitats and flora due to capital dredging and deposition operations.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal.
Fauna – Birds	0 / -	The proposed capital dredging to the north of the navigation channel is not located within the South Dublin Bay and River Tolka Estuary SPA. Construction and capital dredging operations have the potential to cause disturbance to the Natura 2000 sites and the protected bird species that utilise it.	-	Change in sea bed level leading to minor loss of low-tide bird feeding area.
Fauna – Marine Mammals	-	Disturbance impacts during capital dredging and disposal.	0 / -	Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	+ / 0	Some loss of soft sediment due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability	0 / -	Reduction in benthic food availability.
Scour Protection Mattress	0 / -	Temporary loss of marine habitats and flora resulting from the installation of the scour protection	0 / -	Reestablishment of marine habitats and flora colonies following construction
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	-	The installation of the Installation of a low-level sheet pile wall with a concrete capping beam at the Great South Wall has the potential to cause a visual impact particularly at periods of low tide.
Cultural Heritage				
Terrestrial Archaeology	0 / -	Potential impacts to Great South Wall during construction	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0	No impacts anticipated.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation area during construction.	+ / 0	Creation of 400m radius navigation area.
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated

Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	0 / -	Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential changes to existing tidal patterns and currents. Potential changes to existing sediment regime.	0 / -	Potential changes to circulation patterns and sediment transport.
Air Quality / Noise / Vibration				
Air	0 / -	Potential emissions to air from increased marine traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during capital dredging activities. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic.
Vibration	0 / -	Potential for vibration due to capital dredging activities.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species. Potential vibration due to maintenance dredging activities.

4.3.8.5 Design Progression Four

In order to mitigate the risk of negative impacts on the SPA and eliminate any risks to impacts on the Great South Wall, it was decided to eliminate the manoeuvring area from the final design. Additional navigation simulation was carried out by HR Wallingford, which determined that by carrying out some minor channel widening, safe access and egress for the design vessels to the proposed Berths 52 and 53 and the existing Berth 49 is possible.

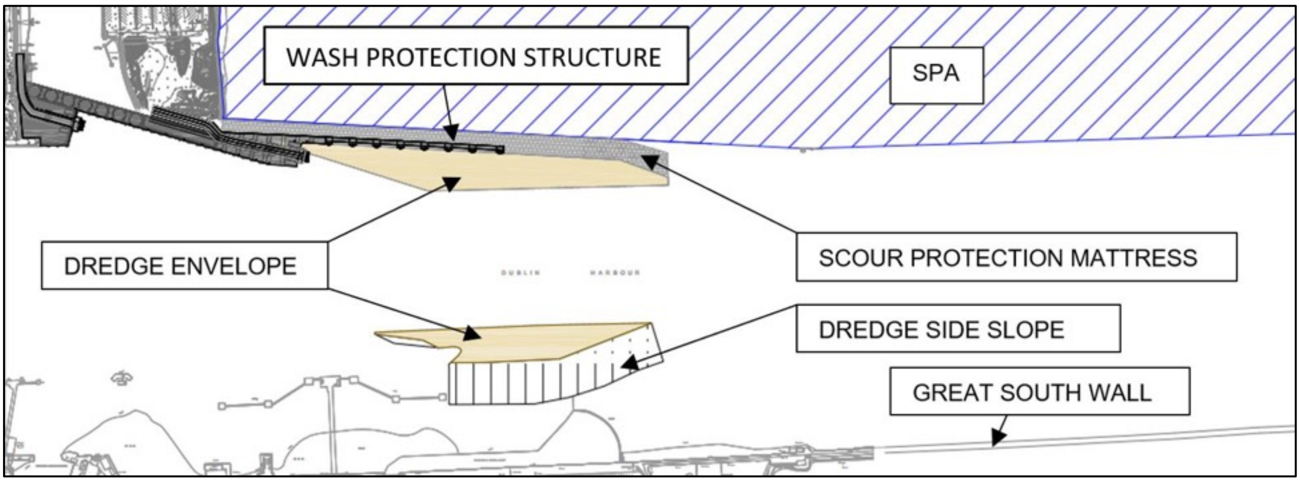


Figure 4-53 Channel Widening Final Design

The final channel widening design is indicated in Figure 4-53. It involves dredging immediately south of the proposed Berth 53 to a standard depth of -10.0m CD.

In order to prevent scouring within the SPA associated with vessel propeller and thruster wash, a wash protection structure is proposed to the rear of Berth 53 (Figure 4-54). The structure will allow tidal flows pass through, while limiting the velocity of thruster and propeller wash.

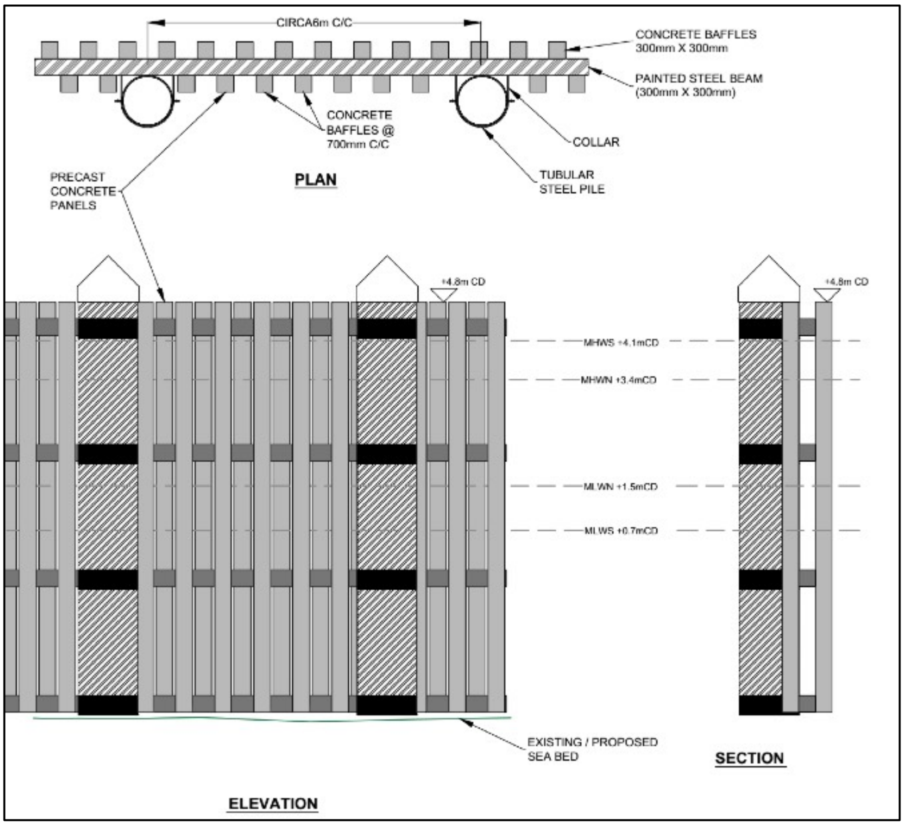


Figure 4-54 Wash Protection Structure

Environmental Effects

A summary of the predicted effects of Channel Widening Progression Four is provided in Table 4-13.

Table 4-13 Summary of Predicted Impacts of Channel Widening Design Progression Four

Environmental Topic	Potential Impacts			
	Construction Phase		Operation Phase	
	Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora & Fauna				
Flora – Terrestrial and Marine	0 / -	Loss of marine habitats and flora due to capital dredging and deposition operations.	0 / -	Reestablishment of marine habitats and flora colonies following construction. However, intermittent temporary loss resulting from maintenance dredging and disposal.
Fauna – Birds	0 / -	The proposed capital dredging to the north of the navigation channel is not located within the South	-	Change in sea bed level leading to minor loss of low-tide bird feeding area.

		Dublin Bay and River Tolka Estuary SPA. Construction and capital dredging operations have the potential to cause disturbance to the Natura 2000 sites and the protected bird species that utilise it.		
Fauna – Marine Mammals	-	Disturbance impacts during capital dredging and disposal.	0 / -	Disturbance impacts during maintenance dredging and disposal.
Fauna – Benthic and Littoral	0 / -	Some loss of soft sediment benthos due to capital dredging and disposal operations.	+ / 0	Some loss of soft sediment due to maintenance dredging and disposal operations.
Fisheries				
Dredging	0 / -	Reduction in benthic food availability	0 / -	Reduction in benthic food availability.
Scour Protection Mattress	0 / -	Temporary loss of marine habitats and flora resulting from the installation of the scour protection	0 / -	Reestablishment of marine habitats and flora colonies following construction
Landscape & Visual				
Landscape and Visual	0	Construction activity is consistent with the existing character of the landscape. No protected views or prospects within vicinity of proposed works.	0	No impacts anticipated
Cultural Heritage				
Terrestrial Archaeology	0	No impacts anticipated	0	No impacts anticipated
Marine Archaeology	+ / 0	Potential for the recovery of shipping debris and/or shipwrecks.	0	No impacts anticipated
Material Assets				
Roads / Traffic	0	No impacts anticipated.	0	No impacts anticipated
Navigation	0 / -	Potential disruption to existing navigation area during construction.	+ / 0	Creation of 400m radius navigation area.
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated
Energy / Power	0	No impacts anticipated	0	No impacts anticipated
Human Beings				
Socio-Economic	0 / -	Potential disruptions to travel schedule.	+	Creation of employment directly associated with expansion of Dublin port. Indirect creation of employment in relation to port-reliant/associated sectors e.g. import and export, rail transport etc.
Water				
Water Quality	0 / -	Potential temporary impacts upon water quality as a result of capital dredging and disposal operations.	0 / -	Potential temporary impacts upon water quality as a result of maintenance dredging and disposal operations.
Coastal Processes				
Coastal Processes	0 / -	Potential changes to existing tidal patterns and currents. Potential changes to existing sediment regime.	0 / -	Potential changes to circulation patterns and sediment transport.
Air Quality / Noise / Vibration				

Air	0 / -	Potential emissions to air from increased marine traffic.	0 / -	Increase in emissions due to heightened marine traffic resulting from the accommodation of anticipated growth.
Noise	0 / -	Potential noise disturbance during capital dredging activities. Noise levels should not exceed limits if good practice is maintained.	0 / -	Potential noise as a result of increased marine traffic.
Vibration	0 / -	Potential for vibration due to capital dredging activities.	0 / -	Vibration from increased number of vessels has potential to affect sensitive marine species. Potential vibration due to maintenance dredging activities.

4.3.8.6 Channel Widening Final Design

The final refinement and proposed design of the channel widening, developed as Design Progression Four, can be seen in Figure 4-53. Details of this design are further detailed in Section 3.2.6 of this EIAR.

Whilst some of the environmental effects of the final design of the channel widening are comparatively less favourable than those associated with do-nothing scenario, the positive long-term economic impacts of this development are significant. In addition, the likely environmental impacts of the final design of the channel widening are not significant, particularly given the decision to evolve the design, modifying the location and scale and eliminating the side slopes from the SPA and move away from the Great South Wall. The residual environmental effects of the channel widening, which are not significant can be mitigated.

Design Progression Four has been selected as the final design. As presented in Table 4-13 this design option has lesser potential to impact upon protected bird species and their habitats. This is a result of the design's lesser potential to impact upon coastal processes. In addition, this option has less potential to impact on cultural heritage due to the mitigation impingement on the protected Great South Wall.

4.3.9 Dredging & Disposal/Re-use Works – Design Progression

The MP2 Project includes a capital dredging scheme to create the following elements of the MP2 Project, described previously in Chapter 3.2.

- Channel widening to -10.0m CD;
- An approach channel and berthing pocket at Berth 53 dredged to -10.0m CD;
- A berthing pocket at Berth 50A dredged to -11.0 m CD;
- A berthing pocket at Oil Berth 3 dredged to -13.0m CD.

The estimated volume of marine sediments to be dredged for each element of the MP2 Project is presented in Table 4-14. The total volume of material to be dredged is circa 424,644m^3. The marine sediments can be described as a sandy CLAY with pockets of gravel. No rock is required to be dredged to achieve the design depths of the channel widening and berthing pockets.

A chemical sediment sampling and analysis programme, described in Chapter 8, confirmed that the marine sediments are 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).

Sections 4.3.3 to 4.3.8 focussed on the alternatives for the sizing, scale and location of these works, which originate from the navigational and design studies, and their environmental progressions. The further alternatives considered within this section are the disposal/re-use technologies associated with dredging.

Table 4-14 Dredging & Disposal Summary

Element	Dredge Level	Volume *
Berth 53	-10.0m CD	159,595m^3
Channel Widening	-10.0m CD	111,995m^3
Oil Berth 3	-13.0m CD	83,414m^3
Berth 50A	-11.0 m CD	69,640m^3
Total		424,644m^3

The following disposal/re-use options for the dredged marine sediments were considered:

- Do-Nothing Scenario;
- Design Progression One (final design)
  - Beneficial Re-use;
  - Disposal on Land;
  - Incineration;
  - Disposal at Sea.

4.3.9.1 Do-Nothing Scenario

The channel widening is required to facilitate the operation of the larger ferries (240m length) and the expected more frequent sailings. This area must provide a maintained depth of -10.0m CD. The channel is essential for the safe and effective operation of the proposed port facilities and is therefore an integral part of the MP2 Project. In the absence of this channel widening the port investment would fail to deliver the required increase in usage identified by the Port's Masterplan, as detailed in Section 4.3.1.7.

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 dredging and widening 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.

All of the MP2 Project dredging and widening works are integral parts of the project. As set out in Section 4.3.2, 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 MP2 project, then there will 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 as per formerly defined quantities and in accordance with the existing schedule. The environmental, social and economic consequences of this will continue as they presently exist.

However, the absence of the MP2 Project would have a critical economic impact thus undermining the Port's ability to attain the objectives specified within the Masterplan.

4.3.9.2 Design Progression One (Final Design)

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: The MP2 Project requires the infilling of the basin at Oil Berth 4 (145,000m^3). The dredged marine sediments are not suitable for the infill of Oil Berth 4 due to the proposed form of structure and proposed crane rails. The dredged marine sediments will not provide adequate bearing or lateral support to the proposed structure. There is no further requirement for fill material within the MP2 Project or 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. 1,000m³ - 5,000m³) (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 MP2 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 deposed of 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 MP2 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 cSAC.

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.

<u>Disposal on Land</u>

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. 500m³) per week. Due to the large quantity of material arising from the dredging activities, this option is considered to be unfeasible on a technical basis.

<u>Incineration</u>

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 sampling and analysis programme, described in Chapter 8, confirmed that the marine sediments are 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 in Figure 4-55. The site lies within the Rockabill to Dalkey Island cSAC for which the qualifying interests are Harbour Porpoise and Reefs.

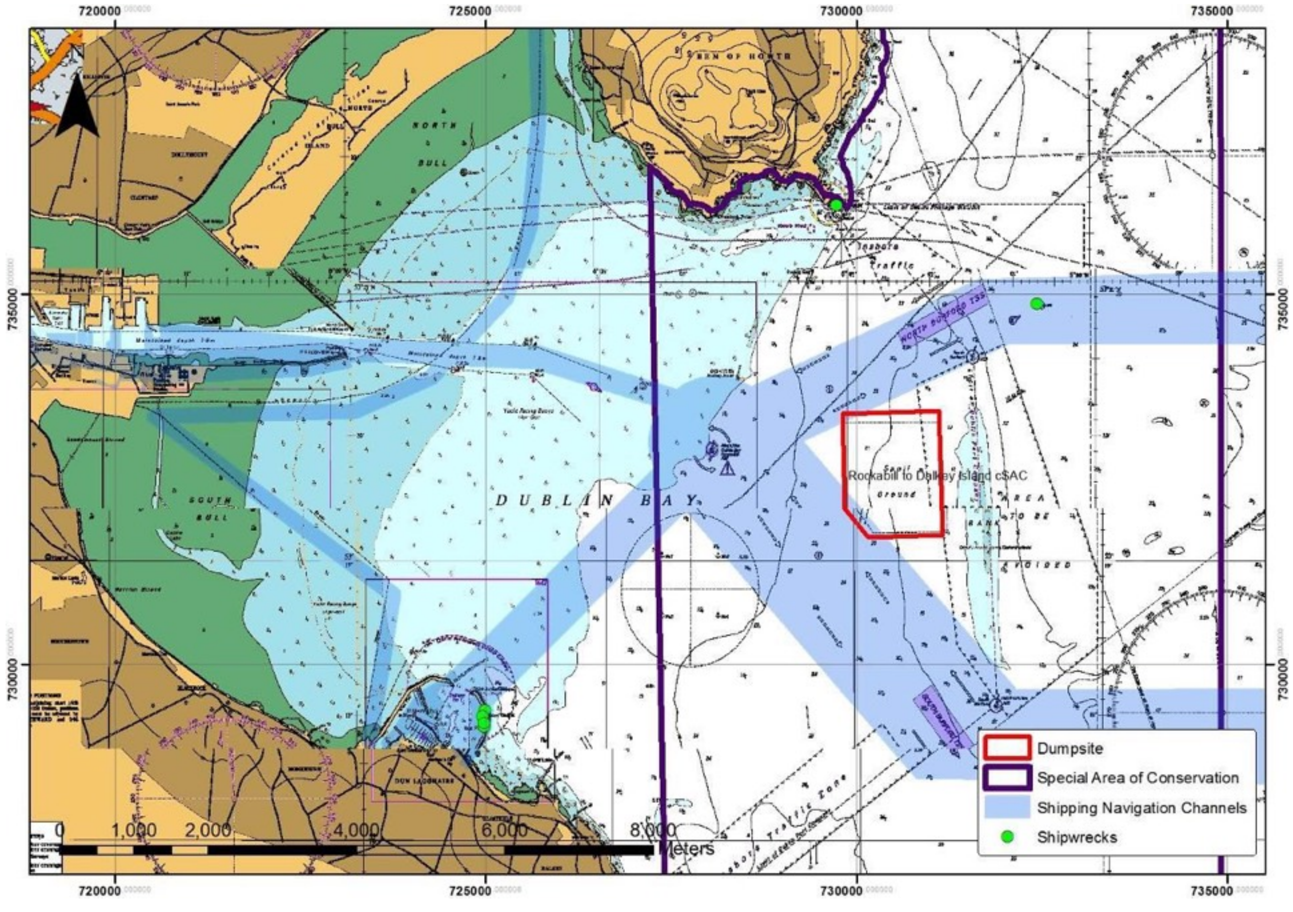


Figure 4-55 Location of licenced offshore disposal site

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 MP2 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 cSAC.

Extensive environmental monitoring is ongoing with respect to the dumping of dredged spoil from the ABR Project. The results of the monitoring undertaken during 2017 are presented in the Annual Environmental Report (AER) which is available for download on the EPAs Website. During this period capital dredging took place within Dublin Bay and maintenance dredging took place within the inner Liffey channel including the MP2 Project development area.

The AER 2017 concluded that measured turbidity results demonstrated that both the maintenance dredging campaign of September 2017 and the ABR Project capital dredging campaign (October – December 2017) did not cause any discernible increase in turbidity above recorded background levels.

The environmental impact of dredging and the disposal activities is described in detail in Chapters 7, 9 and 12 of this EIAR. 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 MP2 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.

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

Environmental Effects

This further alternatives assessment addresses the disposal/re-use technologies considered within the design evolution process. The full environmental effect of the MP2 Project elements, including dredging and associated disposal/re-use, has been assessed in Sections 4.3.3 to 4.3.8. Within the full assessment each of these elements, the potential impacts of the works, on Flora & Fauna, Fisheries, Landscape & Visual, Cultural Heritage, Material Assets, Human Beings, Water, Coastal Processes, Air Quality/Noise and Vibration are taken into account.

4.3.9.3 Dredging and Disposal Final Design

Design Progression One has been selected as the preferred option for dredging and associated disposal/re-use works. This entails the Disposal at Sea method (for finer materials), in combination with Environmental Enhancement - Sediment Cell Maintenance technology (for coarser materials). This combination has been selected as feasible with no environmentally better alternative. These methods will utilise the existing licenced offshore disposal site located at the approaches to Dublin Bay to the west of the Burford Bank. This option has been incorporated into the design of the MP2 Project owing to the absence of technically feasible alternatives.

There would be potential temporary negative impacts during construction on biodiversity, flora and fauna, air and water quality. There would also be potential short term disruption to navigation during the works. Whilst the final design has some potential environmental effects which are comparatively less favourable than those associated with do-nothing scenario, the positive long-term impacts of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment, is the principle reason for this decision. The negative environmental effects of the works can be mitigated, as demonstrated by the ABR Project.

The 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 sampling and analysis programme, confirmed the sediments were not contaminated and thereby suitable for the safe disposal at sea. No significant environmental impacts of this design choice were identified.

4.3.10 Piling Works – Design Progression

The MP2 Project includes piling works to provide structural support for the following elements, which are described previously in Chapter 3.

- Open Jetty Structures;
- Closed Jetty Structures and Quay Walls;
- Foundations for Crane Rails;
- Foundations for Landside Structures - Pedestrian Underpass / Gantries / Substation / High Mast Lighting;
- Foundations for Landside Buildings – Toilet Blocks / Check-in Booths and Canopies.

The engineering design of each of these elements considers the feasibility of both the construction and operational phases of the project, also taking into consideration potential environmental impacts to evolve the design process.

Piling works are required at Berth 53 to allow for the construction of an open type structure, which will provide free flow of tidal waters in and out of the adjacent SPA. A closed type structure will not provide this free flow; therefore, the only feasible solution is an open type structure.

The berths are essential for the safe and effective operation of the proposed port facilities and is therefore an integral part of the MP2 Project. In the absence of these berths, the port investment would fail to deliver the required increase in usage identified by the Port's Masterplan, as detailed in Section 4.3.1.7. The reasons for selecting steel pile structures are discussed further in Section 4.3.10.2.

Sections 4.3.3 to 4.3.8 focussed on the alternatives for the sizing, scale and location, and also the design, of these marine and landside elements, and their environmental progressions. For example, the design format of Berth 53 was selected as an open jetty structure with evolution of its size, scale and location, in order to mitigate impacts on nearby habitat and bird populations.

The further alternatives considered within this section are those associated with the piling materials and piling technologies. Materials and technologies are considered in parallel within the design evolution process as they interact, for example the selection of material influences the technology used to install foundations.

The key technical factors which influence alternative piling materials considered are:

- structural properties with regard to supporting the design loadings, impacts, shear and bending forces;
- suitability for site specific ground/marine conditions and the selected design format;
- constructability including ease of handling, installation, adaptation, rate of construction and availability;
- ease of maintenance and durability to operate within the port, and particularly the marine environment.

The key technical factors which influence alternative piling technologies, in terms of the means of installation considered are:

- suitability for site specific ground/marine conditions, the underlying ground conditions at the MP2 Project, are firm clays with dense granular materials;
- pile length for those elements requiring deeper foundations.

The following piling works options were therefore considered for the relevant elements of the MP2 Project:

- Do-Nothing Scenario;
- Design Progression One (final design)
  - Alternative Materials;
  - Alternative Technologies.

4.3.10.1 Do-Nothing Scenario

Piling and foundations are needed for the safe construction, and operation, of these project elements. All of the MP2 Project jetties, quay walls, crane rails and landside structures and buildings operate as integral parts of the project. As set out in Section 4.3.2, 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, noise and water quality etc at the site. However, the absence of the MP2 Project would have a critical economic impact thus undermining the Port's ability to attain the objectives specified within the Masterplan.

4.3.10.2 Design Progression One (Final Design) - Alternative Materials

The options for materials are dependent on the structural element, influenced by key technical factors.

<u>Open Jetty Structures</u>

The alternative materials considered were tubular steel, timber or concrete.

Tubular steel piles were selected as the vertical and raking piles, for open jetty structures, for the following reasons:

- Standard form of construction;

- Suitable for impact and vibration hammering;
- High resistance to damage from accidental vessel impact;
- High bending moment and shear capacity;
- Ease of handling shorter lengths;
- Ease of extending and trimming;
- Speed of construction;
- Ease of maintenance and application of corrosion prevention;
- Readily available long lengths of steel piles.

Timber piles were not selected as they are potentially susceptible to marine borers and therefore subject to decay, with associated maintenance difficulties. In addition, they are unfeasible as they are not suitable for deep penetrations into the ground and are both difficult to adapt (extend or trim) and to source.

Similarly, concrete piles were as being unfeasible, due to unsuitability for deep penetrations into the ground, and therefore not selected. Concrete piles are also considered difficult to maintain and apply corrosion resistance within this setting and are difficult to adapt during construction. In addition, concrete piles would be a relatively heavy weight material to crane and load onto barges.

Tubular sheet piles are therefore selected on the basis of their feasibility to support the open jetty structures at this site, with no suitable, or environmentally better, alternative material identified.

<u>Closed Jetty Structures and Quay Walls</u>

The alternative designs, and associated materials, considered were sheet pile combi-walls (steel, concrete or timber sheet piles) or gravity concrete quay walls.

Sheet Pile Combi-Walls comprise of sheet piles and king piles.

Steel was selected for the following reasons:

- Standard form of construction;
- Suitable for impact and vibration hammering;
- High resistance to damage from accidental vessel impact;
- High bending moment and shear capacity;
- Ease of handling shorter lengths;
- Ease of extending and trimming;
- Speed of construction;
- Ease of maintenance and application of corrosion prevention;
- Readily available long lengths of steel piles.

Neither concrete sheet piles, nor timber sheet piles, were selected as they are generally not suitable for deep foundations.

Gravity concrete quay walls have not been selected as the retention height is too high and the seabed material would not have adequate bearing capacity.

Steel Sheet Pile Combi-Walls are therefore selected on the basis of their feasibility to support the closed jetty structures and form the Quay Walls at this site, with no suitable, or environmentally better, alternative material identified.

Foundations for Crane Rails

The alternative materials considered were tubular steel, timber or concrete.

Tubular steel piles have been selected for the crane rail foundations for the following reasons:

- Standard form of construction;
- Suitable for impact and vibration hammering;
- High bearing capacity;
- High buckling capacity;
- Ease of handling shorter lengths;
- Ease of extending and trimming;
- Speed of construction;
- Readily available long lengths of steel piles.

Timber piles were not selected as they are potentially susceptible to marine borers and therefore subject to decay, with associated maintenance difficulties. In addition, they are unfeasible as they are not suitable for deep penetrations into the ground and are both difficult to adapt (extend or trim) and to source.

Similarly, concrete piles were not selected as being unfeasible due to unsuitability for deep penetrations into the ground. Concrete piles are also considered difficult to adapt during construction in this setting. In addition, concrete piles would be a relatively heavy weight material to crane.

Tubular sheet piles are therefore selected on the basis of their feasibility as foundation support for the crane rails, with no suitable, or environmentally better, alternative material identified.

Foundations for Landside Structures - Pedestrian Underpass / Gantries / Substation / High Mast Lighting

The construction of the foundations for these landside structures are considered to be conventional techniques.

Precast driven pile foundations have been selected for the Pedestrian Underpass / Gantries / Substation / Toilet Block / Check-In Booths for the following reasons:

- Standard form of construction;
- Ensures sufficient embedment to resist overturning moments in particular for High Mast Lighting and Gantries;

- Minimises footprint of the foundation;
- Relatively quick to install when compared with other piling methods.

Conventional precast driven pile foundations are therefore selected on the basis of their feasibility as landside structure foundations, with no environmentally better alternative construction form identified.

Foundations for Landside Buildings – Toilet Blocks / Check-in Booths and Canopies

The construction of the foundations for these landside buildings are considered to be conventional techniques, using raft foundations rather than piled foundations.

Shallow raft foundations were selected for the Toilet block/Check-in Booths and Canopies for the following reasons:

- Traditional form of construction;
- Ease of construction;
- Speed of construction;
- Loads are relatively small.

Conventional raft foundations are therefore selected on the basis of their feasibility as landside building foundations, with no environmentally better alternative construction form identified.

4.3.10.3 Design Progression One (Final Design) – Alternative Technologies

The consideration of materials identified tubular sheet piles as the preferred material for the open jetty structures and crane rails, with Steel Sheet Pile Combi-Walls selected for closed jetties and quay walls. Landside structures and buildings utilise conventional driven pile foundations and raft foundations.

The following alternative piling methodologies were assessed for the installation of the tubular and sheet piles:

Vibrodriving

Vibrodriving comprises attaching a vibration hammer to the tubular pile or sheet pile head. The system works best in cohesionless soils, but becomes ineffective in the firm clays and dense granular materials found underlying Dublin Port. Vibrodriving was therefore not feasible as a standalone alternative piling technology.

Press-in Pressing

Press-in piling utilises static forces for the installation of sheet piles. It is generally used in confined sites or soft cohesive and granular materials. This method of piling is ineffective in the firm clays and dense granular materials found underlying Dublin Port unless water-jetting is used. The proposed pile lengths for MP2 will be in excess of 35m. Pile pressing is generally limited to circa 22m in practice. Press-in piling was therefore not feasible as a standalone alternative piling technology.

Impact Driving

Impact driving comprises drop hammers which strike the top of the pile. They are most commonly used for large diameter or long piling elements. It is also suitable for driving piles through the firm clays found underlying Dublin

Port. Previous experience in the Port has found that impact driving is the most efficient form of pile driving. Impact driving was therefore identified as a feasible technology.

Combined Piling Methods

Vibrodriving can be used to drive tubular piles through the softer upper layers of sediment at the seabed before deploying impact driving for the deeper firmed layers. Vibrodriving is also suitable for the driving of steel sheetpiles where they are driven to a specified depth and not required to achieve a high bearing capacity.

Similarly Press-In Pressing and impact driving can be combined, however the combined vibro-piling and impact piling solution is preferred as these construction methods are more compatible, and better suited to the pile lengths required for the MP2 Project.

A combination of vibrodriving and impact driving has been successfully used for the ABR Project and is therefore tried and tested in similar ground conditions. This combined solution is feasible and preferred in terms of potential noise and vibration impacts and will therefore be used, where ground conditions are suited, alongside impact driving.

Of the technologies available to install these piles, a combination of vibrodriving and impact driving methods was selected with no suitable, or environmentally better, alternative technology identified.

Environmental Effects

This further alternatives assessment addresses the interaction of piling materials and piling technologies considered within the design evolution process. The full environmental effect of the MP2 Project elements, including piling/raft foundations, has been assessed in Sections 4.3.3 to 4.3.8. Within the full assessment each of these elements, the potential impacts of the foundation works, on Flora & Fauna, Fisheries, Landscape & Visual, Cultural Heritage, Material Assets, Human Beings, Water, Coastal Processes, Air Quality/Noise and Vibration are taken into account.

4.3.10.4 Piling Works Final Design

Design Progression One has been selected as the preferred option for foundation works. This entails tubular sheet piles as the preferred material for the open jetty structures and crane rails, with Steel Sheet Pile Combi-Walls selected for closed jetties and quay walls. A combination of vibrodriving and impact driving methods was selected. The following marine piling works are required:

- Berth 53 – 406m long structure with vertical and raking piles;
- Berth 52 – 168m of cellular sheet pile wall, 204m of steel sheet pile combi wall (including for return walls at the linkspan)
- Berth 50A – 120m of steel sheet pile combi wall;
- Oil Berth 3 – 239m of steel sheet pile combi wall;
- Jetty Road Quay Wall – 120m of steel sheet pile combi wall

Landside structures and buildings utilise conventional driven pile foundations and raft foundations.

The selection of feasible materials and technologies, and therefore the final design, has been largely dictated by the site ground conditions with no better environmental alternative. This option has been incorporated into the design of the MP2 Project owing to the absence of technically feasible alternatives.

There would be potential temporary negative impacts during construction on biodiversity and in relation to noise and vibration. There would also be potential short term disruption to navigation during the works. In the operational phase there would be a loss of benthos in the pile footprint, offset by increased pile surface area as a potential benthos habitat. Whilst the piling works final design has some potential environmental effects which are comparatively less favourable than those associated with do-nothing scenario, the positive long-term impacts of this development upon the economy; particularly with regard to the creation of jobs and the prosperity of the region through trade, tax and other investment, is the principle reason for this decision. The negative environmental effects of the works can be mitigated.

These piling and foundations works are of a similar nature and magnitude to ongoing construction works within the ABR Project. The detailed assessment of the MP2 Project will ensure that appropriate environmental mitigation is included, as was also the case for the ABR Project. Extensive environmental monitoring is ongoing with respect to the ABR Project activities and is reported to Dublin City Council on a monthly basis. Annual Environmental Reports are also submitted to Dublin City Council and are available for 2017 and 2018. The results of the monitoring to date shows that there have been no noise breaches associated with piling activity for the ABR Project and no noise related complaints have been received to date. Underwater noise surveys undertaken during the piling activity has also demonstrated the accuracy of underwater noise levels used in the environmental impact assessments with respect to marine mammals and fishlife. The residual environmental effects of the MP2 Project foundation works, which are not significant, can therefore be mitigated as demonstrated by the ABR Project.

4.4 Summary of Consideration of Alternative Options

At strategic level, the Masterplan identified that the MP2 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 MP2 Project is concluded to be an essential step in achieving the Port's ambitious throughput objective. The consolidation of the passenger ferry facilities and cargo shipments would allow optimisation of land-use for these activities. Such facilities need access to berths and must therefore be located accordingly. The use of existing access and facilities also supports the location selected at the north port's eastern extent.

At detailed design level the evolution of both the proposed marine and landside structural works, and the associated widening, dredging and infill works was considered to achieve the MP2 Project's objectives. The MP2 Project design evolution was carried out by ABL, supported by navigational and morphological studies and in consultation with the RPS environmental team.

The design team's approach to developing and progressing the scheme design was based on examining layouts of key infrastructure elements that avoided or minimised any adverse environmental impacts while meeting the requirements of the project brief. This design process and evolution was carried out in the context of a do-nothing scenario as a baseline case. This was informed by expert inputs, navigation simulation and morphological modelling to refine the design layouts.

There is a strong relationship between Berths 49, 52 and 53 and the channel widening area. This interrelationship required that all these elements were examined both separately and in combination in order to also determine the needs of the dredging and disposal activities.

- Berth 53 - The design of Berth 53 was developed via an iterative process, considering a wide range of environmental matters along with navigational safety within the port. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design. The structural form, overall dimensions and location were evolved as part of the design and environmental collaborative process. The final design chosen had the least significant impact upon sediment movement. Resultantly, the low-tide feeding area of the nearby SPA will experience no significant impacts and thus there will be no significant impacts upon dependent bird populations.
- Berth 52 / 49 - The proposed works at Berth 52 / 49 will comprise modification of Berth 52 and Berth 49, which was previously granted permission (An Bord Pleanála ref. PL29N.PA0034), by adjusting Berth 52's orientation to accommodate Berth 53 and encompassing the dolphins for Berth 49. The orientation was evolved as part of the design and environmental collaborative process. There are no significant impacts of this design choice; which is optimal, in terms of technical feasibility and environmental sustainability.
- Berth 50A - The design progression for this element of the MP2 Project was conventional in nature and thus no other alternatives were considered. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design.
- Oil Berth 3 and 4 - The overall design progression for this element of the MP2 Project (including an associated New Quay Wall at Jetty Road) was conventional in nature and thus no other alternatives were considered. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design.
- Landside Works - The design progression for these landside elements of the MP2 Project was conventional in nature and there were no other alternatives were considered. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design. The area will be flexible as the usage of the port evolves and will generally be split into stacking areas for accompanied heavy goods vehicles (HGVs), accompanied cars and unaccompanied trailers with circulation routes indicated to route vehicles to each zone and to and from the berths.

- Channel Widening - A suitable location and configuration was established taking account of operational and navigation requirements and also environmental design constraints. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated. Design refinements resulted in a small area of channel widening with a wash protection structure proposed at Berth 53. The lack of impact of the design upon the nearby SPA, and associated dependent protected bird species, coupled with positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically), was the reason for choosing to pursue this design. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design.
- Dredging & Disposal/Re-use Works - The total volume of material to be dredged is 424,644m^3. A number of alternative dredging and disposal options were examined including: do-nothing; beneficial re-use; disposal on land; incineration and disposal at sea. The 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 sampling and analysis programme, confirmed the sediments were not contaminated and thereby suitable for the safe disposal at sea. No significant environmental impacts of this design choice were identified.
- Piling Works – there are a number of MP2 Project elements that require piled foundations. Alternatives were examined including: do-nothing; alternative materials and associated alternative technologies, with different associated construction forms (such as concrete piles and gravity walls). The further alternatives assessment selected tubular sheet piles (open jetty structures and crane rails), with Steel Sheet Pile Combi-Walls (closed jetties and quay walls). A combination of vibrodriving and impact driving methods was selected. Landside structures and buildings utilise conventional driven pile foundations and raft foundations. A number of potential environmental impacts of this choice are less favourable than the do-nothing scenario, however these may be mitigated with good practice, which is demonstrated by the ongoing ABR Project piling works. The positive impacts of this aspect of the project upon the prosperity of the population (regionally and nationally as well as socially and economically) were the reason for choosing to pursue this design.

The key environmental considerations which supported the assessment of alternatives and contributed to the design evolution process for the MP2 project elements are set out below:

- The construction of Berth 53 has been a key environmental consideration due to its close proximity to the South Dublin and Tolka Estuary SPA and its potential impact on views, notably from Clontarf.
  - Berth 53 with demarcate the most easterly development of the Dublin Port Estate. Its development will eliminate the requirement for future land reclamation within the Tolka Estuary.
  - A combination of detailed baseline surveys, computational modelling studies, consultation with statutory bodies including Dublin City Council and National Parks & Wildlife Service, consultation with local community groups and the general public, interaction between the DPC engineering design team and planning & environmental team has resulted in a design evolution of Berth 53 which satisfies the key environmental constraints identified during the scoping and consultation phase of the MP2 Project.

  - Berth 53 has been designed as an open-piled structure whose footprint lies outside the boundary of the SPA. The design minimises the impact of the structure on the natural tidal flows between the Liffey channel and the Tolka estuary. As a result, there will be no significant change to the coastal processes including the morphology of the Tolka estuary. Potential changes to the feeding grounds of waterbirds at extreme low spring tides are therefore expected to *de minimis.*
  - The potential impact on the SPA as a result of dredging the berthing pocket and approach channel to Berth 53 together with the use of bow thrusters used to manoeuvre vessel's to and from the berth have also been considered. Mitigation by engineering design has been used to prevent changes to the morphology of the Tolka estuary including the use of mattresses on the side slopes of the berthing pocket to provide additional bank stability and wash protection structures attached to the open piled structure to reduce flow rates arising from the bow thrusters and thereby prevent scouring.
  - Berth 53 has also been designed to minimise disturbance to feeding waterbirds. Screens have been incorporated into the design of the jetty structure and the functionality of the berth has been reduced whereby passengers will be directly transferred to the vessel for embarkation by coach. Gates will also be operated on the Greenway to prevent its use during periods of extreme low spring tides when feeding grounds in the vicinity of Berth 53 become available. Appropriate signage will be used to explain to the public the importance of this mitigation measure to the protection of the Tolka estuary's bird life.
  - The length of Berth 53 has been designed to be kept as short as possible to both minimise its impact on the morphology of the Tolka estuary and minimise its impact on views from Clontarf, the North Bull Wall and the Great South Wall. Activities on the jetty will be restricted to vessel berthing; the movement of Ro-Ro traffic and passengers to and from the berthed vessel via a linkspan located at the root of the jetty; and maintenance purposes.

- The potential impact on the Great South Wall has been a key environmental consideration due to its status as both a Protected Structure and Monument and its amenity value to the people of Dublin.
  - The original design of the MP2 Project included a manoeuvring area for vessels to turn in close proximity to the proposed berths at the eastern end of the Dublin Port Estate. To avoid encroachment into the South Dublin & Tolka Estuary SPA, the manoeuvring area was designed to include an area of foreshore directly to the north of the Great South Wall.
  - Consultation with the Department of Culture, Heritage & Gaeltacht and Dublin City Council confirmed the importance of the Great South Wall and the range of studies which would need to be undertaken to demonstrate that the construction and operation of the MP2 Project would have no impact on the integrity of the Great South Wall.
  - Subsequent studies, including the potential impact of vessel's using bow thrusters whilst turning and moving forward into the navigation channel found that engineering intervention measures between the manoeuvring area and the Great South Wall would be required to safeguard the integrity of the Great South Wall. To eliminate this potential risk, in the absence of an over-arching Heritage Plan for the Great South Wall, DPC decided to remove the manoeuvring area from the scope of the MP2

Project. This resulted in an alternative design comprising limited channel widening to the east of the Poolbeg Oil Jetty.

  - The alternative design safeguards the integrity and stability of the Great South Wall. No impacts are proposed.

- The proposal for a Unified Ferry Terminal within the footprint of the MP2 Project has been a key environmental consideration due to the Health & Safety implications of drawing passengers into an area in close proximity to existing COMAH sites.
  - The original design of the MP2 Project included the design of a new Unified Ferry Terminal Building and multi-storey carpark in close vicinity to the existing Calor Gas COMAH site. Consultations with the Health & Safety Authority with respect to the potential risk of major accidents determined that the proposed site of the Unified Ferry Terminal and multi-storey carpark was not suitable from a health & safety perspective. DPC therefore decided to remove the Unified Ferry Terminal and multi-storey carpark from the scope of the MP2 Project. This resulted in an alternative design comprising the demolition of the Terminal 2 and 5 buildings and the use of the existing Terminal 1 building as a Unified Terminal Building. Terminal use studies confirmed the suitability of the existing Terminal 1 Building for this use.
  - This change to the proposed design of the terminal buildings also assisted in maximising the flexibility required for the operational use of the MP2 Project land area in order to accommodate potential future changes as a result of a potential hard Brexit.

- The construction of Berth 50A and Oil Berth 3 has been a key environmental consideration due to the required demolition of the 19th Century Pier Head of the Eastern Breakwater of Alexandra Basin which marked the most easterly extent of Dublin Port within that era. The construction methodology of the Pier Head is of particular cultural heritage interest being designed by Port Engineer, Bindon Blood Stoney.
  - Extensive consultation was undertaken with the Department of Culture, Heritage & Gaeltacht and Dublin City Council with regard to the archaeological recording of the Pier Head and the opportunity to recover exemplars of Bindon Blood Stoney's work, and to understand more fully the construction process developed to create the 19th Century deep water basin.
  - Heritage gain proposals were also discussed in detail with the Department of Culture, Heritage & Gaeltacht and Dublin City Council. DPC will create a public realm visitor experience at the new eastern limit of the Dublin Port Estate that includes the re-use of the granite blocks and related elements of the Eastern Breakwater Pier Head and the Breakwater Lighthouse (demolished circa 20 years ago), reconceived as an experiential place where walkers and cyclists can learn about the cultural and natural heritage of the Port. The former location of the Pier Head will be marked with inscribed commemorative text, to ensure that there is a permanent in situ record of its former presence.

5 PROJECT SCOPING & CONSULTATION

5.1 Introduction

The MP2 Project is the second project to be brought forward for development consent from the Dublin Port Masterplan 2040, revised 2018. The evolution of the MP2 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 MP2 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 prescribed and other 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.

5.2 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:

<u>Stage 1: 2017 Masterplan Review Consultation Process</u>

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, 13th February 2017];

    [East Wall Public Information Day held at Sean O'Casey Community Centre, 15th February 2017];

    [Ringsend Public Information Day held at Clanna Gael Fontenoy GAA, 16th 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).

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 (DCCAE), 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 side of the River Liffey as part of the overall Masterplan, including the MP2 Project.

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 24th 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 side of the River Liffey including the MP2 Project 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.

<u>Stage 2: 2018 Masterplan Review Consultation Process</u>

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, including the MP2 Project, 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.
- 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 17th April 2018 to 25th 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. Whilst no specific issues were raised with regards to the MP2 Project, the consultation responses have nevertheless provided an over-arching context to the scoping of environmental issues to be addressed within the EIAR for the MP2 Project.

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.
- 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 Unified Ferry Terminal, on Port lands on the north side of the River Liffey, while Section 10 references the environmental mitigation measures that will be implemented in the developments that come from the Masterplan, including the MP2 Project, to prevent or reduce any potential significant impacts on the environment. Section 4.1.2 of the SEA Statement also provides a strategic level commentary of the proposed developments in the implementation of the Masterplan 2040, reviewed 2018, which includes the MP2 Project.

5.3 Consultation and the MP2 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 MP2 Project in the course of developing the current proposal.

5.3.1 Pre-application Consultation Meetings with An Bord Pleanála (December 2017 – July 2018)

Three pre-application meetings took place with An Bord Pleanála (the Board) between December 2017 and July 2018.

The first meeting with the Board took place on 1st December 2017. The purpose of the meeting was to facilitate the Board's consultation team obtaining information from DPC on the proposed development. DPC submitted details of the MP2 Project to the Board including a description of the nature and scale of the project and DPC's assessment of how the MP2 Project constitutes strategic infrastructure in the context of the Planning Acts.

DPC were of the view that the MP2 Project falls within the scope of the relevant class of development set out in the Seventh Schedule of the Planning Acts on a number of specific grounds which include:

- The site will make provision for an intermodal transhipment facility which will exceed 5 ha in size.
- It will involve the construction of one or more quays exceeding 100m in length.
- It will enable a vessel of over 1,350 tonnes to enter within it.

The second meeting with the Board took place on 24th April 2018. DPC provided an update on progress in relation to environmental baseline surveys and studies and how the findings where influencing the evolution of the project design process.

The third meeting with the Board took place on 2nd July 2018. DPC provided a further update on how the proposed MP2 Project had gone through further iterations of design evolution from the original proposal through consultations, engagement, feedback and relevant assessments and studies. At this stage the Board considered that it had sufficient information to make a determination whether the MP2 Project constituted Strategic Infrastructure Development.

Following the meeting, DPC formally requested to close the pre-application consultation phase with the Board. The Board reverted with its determination to confirm that the MP2 Project did constitute Strategic Infrastructure Development. The Inspectors Report supporting the Board's determination provided advice with respect to the scope of the EIAR which is summarised below:

- Clearly state the rational and justification for the proposed development.
- The request for a 15-year planning permission should be justified.
- Scale and rational for the proposed new jetty (Berth 53) should be clearly stated and the need justified; consult with NPWS in relation to potential impacts on the South Dublin Bay and Tolka Estuary SPA; and potential visual impacts should be assessed.
- Detailed assessment of construction and design of the new jetty (Berth 53) is required along with layout and servicing details including boundary treatment, buffers, landscaping and phasing.
- Have regard to current national advice in relation to the implementation of EIA Directive 2014/52/EU in relation to EIS developments.

- A comprehensive and detailed EIAR should be prepared which has particular regard to the impact of the proposed development on coastal processes, ecology (aquatic and terrestrial), archaeology, industrial heritage, water quality, flood risk and traffic management (including any new or modified road or rail proposals such as a Luas extension).
- A comprehensive and detailed Natura Impact Statement (NIS) should be prepared having regard to the presence of several European sites in the surrounding area.
- Due consideration should be given to in-combination effects on the environment with other proposed developments in the wider area.
- Public consultation should be as extensive as possible, and consultations should take place with Prescribed Bodies and the local community.

The minutes of the pre-application meetings, the Board's determination that the proposal constitutes Strategic Infrastructure Development and the Inspectors Report are available on the An Bord Pleanála website (Project Reference 29N.PC0252) and in Volume 3, Appendix 5-1 of this EIAR for ease of reference.

5.3.2 Pre-application Consultation Meetings with Dublin City Council (March – September 2018)

The following consultation meetings took place with Dublin City Council (DCC), the Planning Authority, presented in Table 5-1. Records of the meetings are presented in Volume 3, Appendix 5-2 of this EIAR.

Table 5-1 Consultation Meetings with Dublin City Council

Consultation Meetings with Dublin City Council	Date
DCC Planning and Property Development Section, Meeting 1	29th March 2018
DCC Noise and Air Quality Sections	2nd May 2018
DCC Marine Archaeology Section	14th May 2018
DCC Water Quality and Waste Sections	17th May 2018
DCC Archaeology, Conservation & Heritage Section	31st May 2018
DCC Traffic & Transportation Section	25th June 2018
DCC Planning and Property Development Section, Meeting 2	3rd July 2018
DCC Parks and Biodiversity Sections	6th September 2018

The following observations were made during the consultation meetings which have fed into the scoping of the EIAR and NIS.

Planning (Meeting 1 & 2)

- DCC highlighted the importance of dispelling any future migration of the port eastwards by fleshing out the absolute capacity of the port and once this has been reached then alternative locations for port activities will need to be selected.

- DCC also highlighted the importance of consulting with National Parks and Wildlife Service (NPWS) with respect to any potential significant effects on the qualifying interests of the adjacent Natura 2000 sites.
- Consultations with the Department of Culture, Heritage and the Gaeltacht (DCHG) – Marine Archaeology and Built Heritage were also recommended, particularly with regard to any potential significant effects on the Great South Wall.
- DCC recommended that the Landscape and Visual Impact Assessment should include views from the Great South Wall and ensure that views from Clontarf are orientated towards the project.
- DCC sought confirmation that the existing Terminal 1 is sufficient to cater for the expected growth in passenger numbers.
- DCC asked that sufficient information be provided on how the site will operate - stacking, accompanied /unaccompanied trailer parking, security boundaries, checking-in booths and circulations.
- DCC confirmed that sites notices would be required on entrances to the port north and south of the River Liffey. The Site Notice should reference adjacent Seveso sites.

Noise and Air Quality

- DPC confirmed they were undertaking noise and dust measurements through the ABR Project monitoring programme and additional air quality monitoring programmes for NOx, SOx and PM. This information would be used to support the MP2 Project application for consent. DCC expressed interest in the DPC monitoring and suggested it should be reviewed in the context of DCC and EPA monitoring results and the Corporate Average Fuel Economy (CAFÉ) Directive.
- The nature and locations for noise monitoring stations were discussed. The existing ABR Project monitoring locations will be retained. The monitoring site at Poolbeg Marina was agreed with DCC as appropriate for noise monitoring for nearest sensitive receptors on the south side of the Liffey. DCC suggested that baseline monitoring should also be carried out at Clontarf. Monitoring sites at Poolbeg Marine and at Clontarf were agreed for baseline noise monitoring for the MP2 Project.
- DCC suggested use of the single event level formula and comparison with noise maps. Other useful parameters that could be addressed in an application included Leq, L90, L(day, evening and night). Data should address normal port operations, current and anticipated noise levels. Tonal/frequency analysis may prove useful for addressing residents' concerns about nuisance noise sources.
- DCC have prepared a Best Practice for Construction guidance document and recommended that it should be closely adhered to and cited in the MP2 Project application for consent. It also deals with vibration limits. DCC suggested that it may be useful to obtain some baseline vibration data on the south side of the river in the vicinity of sensitive receptors at Pigeon House Road.

Marine Archaeology, Conservation and Built Heritage

- DPC outlined the main elements of the MP2 Project and the proposed approach to Marine Archaeology, Conservation and Built Heritage

- – The extension of riverside berth (Berth 50A) entails removal of a quay structure, known as Pier Head, which has mostly granite finishes and dates to the 19th century. It marks the original entrance to Dublin Port in that era. It is proposed that the structure will be scanned and surveyed. The lantern house and bell from the lighthouse that stood on this site are in storage and it is proposed to re-use them appropriately to form a heritage link between the 19th century end of the port with the proposed new and final end of the port.
- – The creation of a manoeuvring area for vessels within the inner Liffey channel has the potential to impact on the Great South Wall which is a protected structure and recorded Monument. At the time of consultation, engineering mitigation was proposed which was remote from the Great South Wall and not visible at low tide. DCC recommended that additional studies be undertaken of potential impacts of bow thruster wash arising during vessel manoeuvring operations and the potential to cause erosion of sediments at the Great South Wall.
- – Capital dredging is required to create the manoeuvring area and berthing pockets. It is proposed to undertake a marine archaeology geophysical survey and dive surveys to confirm the presence of any features of archaeology interest in advance of submission of the application for consent.

- DCC confirmed that the approach being taken to Marine Archaeology, Conservation and Built Heritage by DPC was appropriate.
- DCC suggested that DPC should consider a commitment to preparing an over-arching Heritage Plan for the entire Port Estate.

Note: Further to the consultation meeting, DPC undertook the additional studies recommended by DCC to determine the potential impacts of bow thruster wash arising during vessel manoeuvring operations and the potential to cause erosion of sediments at the Great South Wall. The results of the studies showed a potential risk to the integrity of the Great South Wall in the absence of additional intervention measures. To eliminate this potential risk, in the absence of an over-arching Heritage Plan for the Great South Wall, DPC decided to remove the manoeuvring area from the scope of the MP2 Project. An alternative design is proposed comprising limited channel widening to the east of the Poolbeg Oil Jetty as described in Chapter 3 (Project Description) and Chapter 4 (Examination of Alternatives) of this EIAR.

Water Quality and Waste

- An overview was provided of the water quality monitoring being undertaken by DPC for the ABR Project which was being overseen by an experienced full-time on-site Facilities Manager. The monitoring programme comprises:
  - – 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 is measured at three depths at each location). This is complemented by continuous wave climate and tidal current measurements.

- DPC proposed to use the results of the water quality monitoring programme as part of the environmental baseline studies required for the MP2 Project EIAR and NIS. DCC confirmed that the existing water quality monitoring programme was comprehensive.
- DCC recommended that DPC should refer to DCC's Waste Management Best Practice Guidance for Construction Activities.

Traffic & Transportation

- DPC set out the proposed methodology for the Traffic and Transportation Study for the MP2 Project:
  - Traffic surveys were carried out on the 23rd May 2018 for 24 junctions on the Northern Lands and along East Wall Road (24 hours surveys at each junction with classified turning movements). This information will be used to build the base traffic flow model;
  - Three peak hours will be considered; the AM peak within the port which tends to be 5:45am to 6:45am due to the accompanied Ro-Ro vessels facilitating freight vehicles to enter and leave Dublin City Centre before the cordon becomes active at 7:00am; the typical external AM peak hour of 8:00am to 9:00am; and the typical PM peak hour of 5:00pm to 6:00pm. The arrival of the large Ro-Ros combined with traffic exiting the Eastpoint Business Park in the evening makes this the single PM peak hour;
  - The traffic surveyed would be adjusted for the planned movement of Seatruck to the western side of the port; and the planned movement of P&O to the eastern side of the port;
  - A growth factor of 3.3% will be applied to the internal port network, and the traffic growth rates from the TII Project Appraisal Guidelines for Dublin will be applied to the external road network. The flows will be assessed in a Linked LinSig traffic model;
  - The objective is to demonstrate that the internal road, cycle and pedestrian network that received planning permission in 2016 can accommodate the traffic generated by the port in the Northern Lands up to the end of the Masterplan.
- DCC confirmed that the approach being taken to Traffic and Transportation by DPC was appropriate.
- A key issue identified by DCC was to ensure no intensification of traffic on East Wall Road, Upper Sheriff Street and Castleforbes Road. It was suggested that there was the potential for intensification at the existing entrance to P&O if Seatruck and P&O operate from adjacent sites as a result of the phasing of the works for a period of time.
- It was noted that there would be an intensification of passengers at the Eastern End of the North Port Estate. A multi-modal Mobility Management Plan (MMP) was required for both staff and passengers.
- DPC would also like to see confirmation of the Public Transport provision for the Unified Ferry Terminal.

Biodiversity

- DCC commented positively on the extent of the monitoring being undertaken by DPC and the value of the data being produced. The role of the Liaison Group set up to oversee the ABR Project construction phase was also welcomed.
- DCC asked about invasive alien species (IAS) records. DPC pointed out that site surveys in the ABR Project sites had detected none but that the presence of Japanese knotweed on the Poolbeg peninsula was noted. DCC commented on the presence of sea buckthorn on the Poolbeg Peninsula and noted the spread of Japanese knotweed along the Tolka River and Royal Canal.
- DCC mentioned bioremediation works being undertaken in other ports. The University of Maryland, USA are trialling floating treatment beds in Boston for nutrient removal. The possibility of piloting something similar at Dublin Port was discussed.
- DCC also raised the potential for biodiversity enhancement particularly in relation to the use of protection mattresses on channel slopes. DPC confirmed that they are already a member of the Steering Group overseeing the *Ecostructure* research project (Ireland-Wales Co-operation Programme 2014-2020) with a view to improving fishery habitat within Dublin Harbour.
- DCC pointed out that photomontages should include a vantage from the Bull Wall to allow assessment of visual impact on the National Special Amenity Area at North Bull Island.
- DCC commented on the value of the data being produced by DPC and the possibility of sharing data through the Biosphere structures. DCC referred to the Dublin Bay Biosphere Biodiversity Conservation and Research Strategy 2016-2020.

5.3.3 Pre-application Consultation Meetings with Statutory Bodies (May 2018 – January 2019)

The following meetings took place with the following statutory bodies, presented Table 5-2. Records of the meetings are presented in Volume 3, Appendix 5-3 of this EIAR.

Table 5-2 Consultation Meetings with Statutory Bodies

Consultation Meetings with Statutory Bodies	Date
Department of Culture, Heritage and the Gaeltacht (DCHG) – Marine Archaeology and Built Heritage	30th May 2018
EPA, Office of Environmental Sustainability	5th June 2018
Health & Safety Authority (HSA)	11th June 2018
Department of Housing, Planning & Local Government (DHPLG), Foreshore Unit and Marine Institute	5th July 2018
Inland Fisheries Ireland	6th July 2018
Department of Culture, Heritage and the Gaeltacht (DCHG) – National Parks & Wildlife Service	2nd August 2018
ESB Networks	12th June 2018, 31st July 2018, 8th January 2019

The following issues were raised during the consultation meetings which have fed into the scoping of the EIAR and NIS and evolution of the MP2 Project.

DCHG Archaeology and Built Heritage

- DPC outlined the main elements of the MP2 Project and the proposed approach to Marine Archaeology, Conservation and Built Heritage
  - The extension of riverside berth (Berth 50A) entails removal of a quay structure, known as Pier Head, which is mostly granite and dates to the 19th century. It marks the original entrance to Dublin Port during that era. It is proposed that the structure will be scanned and surveyed. The lantern house and bell from the lighthouse that stood on this site are in storage and it is proposed to re-use them appropriately to form a heritage link between the 19th century end of the port with the proposed new and final end of the port.
  - The creation of a manoeuvring area for vessels within the inner Liffey channel has the potential to impact on the Great South Wall which is a protected structure and recorded Monument. At the time of consultation, engineering mitigation was proposed which was remote from the Great South Wall and not visible at low tide.
  - Capital dredging is required to create the manoeuvring area and berthing pockets. It is proposed to undertake a marine archaeology geophysical survey and dive surveys to confirm the presence of any features of archaeology interest in advance of submission of the application for consent.
- DCHG confirmed that the approach being taken to Marine Archaeology, Conservation and Built Heritage by DPC was appropriate.
- DCHG suggested that DPC should consider a commitment to preparing an over-arching Heritage Plan for the entire Port Estate.

Note: Further to the consultation meeting, DPC undertook additional studies recommended by DCC to determine the potential impacts of bow thruster wash arising during vessel manoeuvring operations and the potential to cause erosion of sediments at the Great South Wall. The results of the studies showed a potential risk to the integrity of the Great South Wall in the absence of additional intervention measures. To eliminate this potential risk, in the absence of an over-arching Heritage Plan for the Great South Wall, DPC decided to remove the manoeuvring area from the scope of the MP2 Project. An alternative design is proposed comprising limited channel widening to the east of the Poolbeg Oil Jetty as described in Chapter 3 (Project Description) and Chapter 4 (Examination of Alternatives) of this EIAR.

EPA, Office of Environmental Sustainability

- The EPA confirmed that a Dumping at Sea Permit Application was required for the capital dredging associated with the MP2 Project, subject to the dredged material being suitable for dumping at sea.
- The Alternatives Section of the EIAR should include an assessment of alternative uses of the dredged material, not only dumping at sea.
- All material produced for consenting purposes should also accompany the Dumping at Sea Permit Application.

- The EPA preferred a sequential approach of waiting until development consent is granted prior to lodging a Dumping at Sea Permit Application. Of note, the start date of dredging activities must be specified in the Public Notice.

Health and Safety Authority

- HSA confirmed the presence of Control of Major Accident Hazards (COMAH) sites within the Port Estate which created constraints on future land use planning within the MP2 application boundary.
- By far, the largest constraint is imposed by the location of the Calor Gas site which lies adjacent to the northern end of MP2 application boundary. A future Unified Ferry Terminal Building or multi-storey carpark in close proximity to the Calor Gas site would not be deemed suitable.
- HSA confirmed that a COMAH Land Use Planning Assessment of the MP2 Project was required to support the application for consent, prepared in accordance with HSA's COMAH land use planning guidance.

DHPLG (Foreshore Unit) & Marine Institute

- DPC provided an overview of the ABR Project capital dredging being undertaken under Dumping at Sea Permit S0024-01 and Foreshore Licence MB/2016/01725 and the results reported in the Annual Environmental Report (AER) 2017. DPC proposed to use the results of the monitoring programme as part of the environmental baseline studies required for the EIAR and NIS.
- The Foreshore Unit and Marine Institute were pleased to hear that the results of the monitoring were consistent with the models which demonstrated that the ABR Project Season 1 dredging activity (October 2017 – March 2018) had no discernible impact on turbidity levels within Dublin Bay.
- The Foreshore Unit and Marine Institute welcomed the fact that DPC had decided to deploy the four monitoring Buoys within Dublin Bay continuously until April 2021 (including the summer months).
- The Foreshore Unit and Marine Institute were satisfied that the EIAR and AA prepared for the MP2 Project application for consent would be sufficient also for the foreshore consent application.

Inland Fisheries Ireland (IFI)

- IFI noted the following
  - The inner Liffey channel hosts 28 species of fish (both resident and migratory species)surveys were carried out on the 23rd May 2018 for 24 junctions on the Northern Lands and along East Wall Road (24 hours surveys at each junction with classified turning movements). This information will be used to build the base traffic flow model;
  - There has been a marked long-term decline in the number of salmon migrating through the inner Liffey channel. Numbers were now as low as 2,500. The causes of the decline are unknown.
  - The above facts highlighted the sensitivity of the inner Liffey channel and the importance of protecting its fishery interests.

  - The creation of hard structures such as piles, new quays and protection mattresses were considered a positive measure for creating fishery habitat. Rough surfaces were best at encouraging marine growth.
  - There was an expectation that the fishery mitigation measures applied to the ABR Project would also be applied to the MP2 Project
- DPC outlined the fisheries research being undertaken within the port:
  - DPC is working with University College Dublin to test treated tiles which encourage marine growth (part of the World Harbour Project)
  - DPC is a member of the Steering Group overseeing the Eco-structure Project with a view to improving fishery habitat on the North Bull Wall and Great South Wall (Ireland-Wales Co-operation Programme 2014-2020)
- IFI welcomed the initiatives being undertaken. DPC confirmed that they will consider fishery enhancement measures for the MP2 Project as an additional means of offsetting the loss of benthic habitat within the Oil Berth 4 Basin.

DCHG National Parks and Wildlife Service (NPWS)

- DPC provided an overview of the ecological monitoring being undertaken for the ABR Project and the key findings to date which was being overseen by a full time on-site Marine Ecologist. The monitoring programme comprises:
  - 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 licensed 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 will be used to support the preparation of the EIAR and NIS for the MP2 Project.
- NPWS confirmed that a NIS would be required for the MP2 project. The NIS should reference both Irish and EU case law.

- The biodiversity chapter of the EIAR should include an assessment of Annex 1 species Bats and Otters and Flora Protection Species.
- It was concluded that the approach to the EIAR and NIS appeared to be robust and that there were no major concerns at this stage in the process, subject to NPWS detailed review post-submission.

ESB Networks

- Consultation with ESB Networks focussed on the existing 220kV high voltage cables and ducts that cross under the River Liffey and emerge at Berth 50A and Breakwater Road South, within the footprint of the MP2 Project.
- ESB Networks and DPC engaged in a process of information exchange, including the provision of engineering drawings demarcating the location of the 220kV high voltage cables and ducts and the provision of MP2 Project engineering drawings designed to ensure the integrity and protection of the cables and ducts.
- Discussions also took place with regard to the proposed capital dredging works in the vicinity of the Poolbeg Generating Station cooling water discharge channel and weir. ESB Networks confirmed that they had no concerns regarding the revised capital dredging works proposed for the MP2 Project.

5.3.4 Pre-application Consultation with other Statutory and Non-Statutory Bodies

A letter and information pack on the MP2 Project was issued to 43 statutory and non-statutory bodies listed in Table 5-3 in June 2018. 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 and NIS.

Table 5-3 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	South Dublin County Council
Fingal County Council	Dun Laoghaire Rathdown County Council	Eastern and Midland Regional Assembly
Dept. of Transport, Tourism and Sport	National Transport Authority	Transport Infrastructure Ireland
Commission for Railway Regulation	Irish Rail	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
Irish Water	Eircom	Electricity Supply Board (ESB)

Consultee List		
Gas Networks Ireland	Department of Education and Skills	Department of Business, Enterprise and Innovation
Dept. of Foreign Affairs & Trade	Department of Health	Health Service Executive
Office of Radiological Protection	Coillte	Development Applications Unit, Dept. of Culture, Heritage and the Gaeltacht
Inland Fisheries Ireland	Dublin City Council	

Responses were received from eleven 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 5-4. The full submissions are presented in Volume 3, Appendix 5-4 of this EIAR.

Table 5-4 Summary of Written Responses from Consultees

Consultee	Date Sent	Date Reply	Reply Format			Comments
			☎	✉	🖱	
South Dublin County Council (SDCC)	04/06/18	19/7/2018		X		• SDCC wish to state that they are supportive of the MP2 Project and welcome investment from DPC to deliver necessary infrastructure within Dublin Port. • SDCC provided scoping assistance in terms of topics such as planning, sustainable transport, climate change and other environmental topics.
Transport Infrastructure Ireland	04/06/18	28/6/2018		X		Guidance was provided on the following topics relating to the MP2 Project: 1. Dublin Port & National Road Infrastructure 2. M50 Dublin Tunnel 3. Eastern Bypass and M50 South Port Access 4. Assessment Scoping, the developer should have regard to - DOECLG Spatial Planning and National Roads Guidelines for Planning Authorities 2012 - The Dublin Eastern Bypass Corridor Protection Study Sector A - Clearly identify proposed haul and operation routes and fully assess the national road and Luas network to be traversed - TII Traffic and Transport Assessment Guidelines 2014 - Assessments and design and construction and maintenance standards and guidance available at TII Publications TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences
Fáilte Ireland	04/06/18	10/7/2018			X	• Fáilte Ireland is supportive of DPC plans to consolidate and reconfigure ferry terminals at the

Consultee	Date Sent	Date Reply	Reply Format			Comments
			☎	✉	🖱	
						port. • As DPC is a key access point to Ireland for visitors, it is important that the visitor experience is of a high quality and standard. • Fáilte Ireland provided guidelines for addressing tourism in an EIAR.
Irish Seal Sanctuary	04/06/18	11/06/18			X	• Suggestion to increase the Community Gain proposal to include for the provision of seal rescue facilities, outreach and educational aspects.
Irish Water	04/06/18	20/7/2018		X		• If there is a proposal to connect to the public water supply network, then information will be required before Irish Water can assess if there is adequate water capacity. • Any connection to a public water or wastewater supply must be subject to a connection agreement with Irish Water. • Infrastructure must be designed in accordance with Irish Water Standards and Codes of Practise. • DPC must be cognisant of the existing outfall in the vicinity of the development.
Irish Water	04/06/18	21/11/2018		X		• Subject to a valid connection agreement being put in place, a connection by Dublin Port Company can be facilitated by Irish Water. • Details were provided by Irish Water for the process to be followed in terms of applying for a connection.
Gas Networks Ireland	04/06/18	08/06/18			x	• Gas Networks Ireland provided a map showing their infrastructure in the vicinity of the MP2 Project. • Gas Networks Ireland provided “Code of Practise booklet 2015” and “Safety Advice Booklet”.
Department of Business, Enterprise & Innovation	04/06/18	12/06/18		X		• Letter will be brought to attention of the Minister at the earliest opportunity.
Health Service Executive	04/06/18	26/6/2018		X		• Letter has been passed onto an HSE contact whose remit this project comes under.
Department of Culture, Heritage & the Gaeltacht, Development Applications Unit	04/06/18	14/6/2018		X		• Response from National Parks and Wildlife Service providing guidance on the requirements of the EIAR and NIS.
ESB Networks	04/06/18	26/09/2018		X		• Having examined the proposed works at Berth 50A, ESB Networks do not have an objection in principal to the proposal
Department of Housing, Planning and Local	10/09/18	12/09/2018		x		• DHPLG acknowledge receipt of the pre-application consultation package from Dublin Port Company. • DHPLG confirm that they have no objection to Dublin

Consultee	Date Sent	Date Reply	Reply Format			Comments
Government (DHPLG)						Port Company making an application for consent in respect of the proposed development. • DHPLG state that no works can be undertaken on the foreshore until appropriate foreshore approval has been obtained.
Dublin City Council	Dates between 24/9/2019 and 21/6/2019	Dates between 24/9/2019 and 21/6/2019			X	• Email trail of correspondence between the design engineers for the MP2 Project and DCC engineers regarding management of drainage water arising from the MP2 Project.

5.3.5 Public Consultation (April 2018 – July 2018)

An extensive programme of public consultation was undertaken between April and July 2018 to seek the views of the wider public on the MP2 Project and the proposed community gain initiative to be advanced as part of the project.

The community gain initiative, proposed as a key part of this project, involves the making of a cash contribution towards a Trust to be established to set up and run an urban farm at East Wall.

The consultation process involved:

- The publication of a community newsletter on the MP2 Project and the community gain element, presented in Volume 3, Appendix 5-5 of this EIAR, which was circulated to over 36,800 homes in areas adjacent to the port.
- Meetings with local community groups in areas directly adjacent to the port.
- Briefings with local public representatives on the MP2 Project and the community gain element – these meetings included one to one briefings with individual public representatives and also with the local Area Committee of Dublin City Council.
- A dedicated community consultation process to seek views on both the MP2 Project and the Community Gain initiative – the consultation process sought respondents' views in general but also invited responses around specific questions about the project and the Community Gain proposal.
- An extensive media campaign to publicise the project which secured wide coverage in all national and local print, broadcast, online media outlets. A social media campaign across Facebook and Twitter to support same.

<u>Issues raised during the public consultation exercise</u>

- The consultation process on MP2 Project and the community gain secured written responses from 11 parties. Most of the feedback concerned the Community Gain proposal – given the nature of the MP2 Project as essentially a reorientation of existing facilities within the current Port Estate there were few comments submitted on the substantive development proposals.

- A number of specific comments/issues were raised during the consultation process which have been addressed in the applications for development consent and in the EIAR, where relevant, including:
  - A general welcome for the MP2 Project describing it as progressive, timely and forward thinking
  - In relation to the Community Gain City Farm proposal there were a number of comments made by respondents;
  - There were some concerns expressed about the nature of “an animal farm” or “petting farm” from an animal rights perspective.
  - Support was expressed for a City Farm with facilities for local growers to participate in both producing crops and selling their produce.
  - Some suggestions were advanced on how the City Farm could play an important role in helping to use waste to facilitate vegetable cultivation on a sustainable basis.
  - There was recognition that a City Farm could represent a “little oasis” in a built City environment.
  - A suggestion that a City Farm would promote and encourage wildlife and use environmentally friendly energy to limit its carbon footprint.
  - Strong support for the involvement of children in the operation of a City Farm – both as a place of learning and leisure.
  - An invitation to explore opportunities to co-operate with other farms with an educational and recreational outlook in the Greater Dublin area.
  - A request that the Community Gain project involve a community garden with natural play areas rather than an urban farm

5.3.6 Additional Consultations (January 2019 – June 2019)

Additional consultation has taken place in the lead up to the application during 2019 including ongoing interactions with Dublin Port tenants, Community Groups, Dublin City Council and St Joseph’s Co-Educational National School with respect to the Community Gain proposal and discussions with government bodies with respect to Brexit. The range of ongoing consultations is presented in Table 5-5.

Table 5-5 Summary of Additional Consultations (January 2019 – June 2019)

Date	Consultee	Subject
Ongoing interactions	Docklands Consultative Council	Outline of the MP2 Project and developments within Dublin Port generally
Ongoing interactions	Dublin City Council Parks Department	Ongoing engagement on Community Gain proposal
Ongoing interactions	Board of Management, St Joseph’s Co-Educational National School, East Wall	Ongoing engagement on Community Gain proposal for St Joseph’s School
Ongoing interactions	Central Government Groups assessing Brexit impact (Cross Department and inter agency groups)	Consultation on the impact of Brexit on Port Operations and the implications of Brexit for future Port Development Projects including the MP2 Project

Date	Consultee	Subject
Ongoing interactions	Calor/Irish Tar, Irish Rail, Petrogas, Valero, Topaz (Circle K)	Ongoing consultation on MP2 Project
Ongoing interactions	Irish Ferries, Stena line	Ongoing consultation on MP2 Project
Ongoing interactions	ABR Project Liaison Group	Quarterly updates on ABR Project but including the MP2 Project
6 March 2019	Irish Planning Institute	Presentation including question & answer session on ABR Project and the MP2 Project including site visit
12 April 2019	Chartered Institution of Water & Environmental Management (CIWEM)	Presentation including question & answer session on ABR Project and the MP2 Project including site visit
30 April 2019	Clontarf Residents Association	Consultation on boundary treatment impacting on the MP2 Project
17 May 2019	ESB Networks	Further consultation on the outline of the MP2 Project

5.3.7 Proposed Public Consultation Post Submission of MP2 Project Application for Consent

In addition to the significant level of consultation undertaken in the development of the Masterplan and in relation to the MP2 Project to date, a major public information exercise will be undertaken to inform all stakeholders of the MP2 Project when the application is submitted with An Bord Pleánala. The purpose of this information exercise, which is in addition to the statutory notification procedures required in relation to the project, will be to inform the public of the development proposals, the impacts arising and to ensure that they are aware of the opportunities available to them to participate in the development assessment process. A public information campaign will be implemented, including:

- Public notices
- Advertisements
- Public consultation sessions in local community centres
- A newsletter circulated to local residents
- A mail-shot to public representatives and local community/residents/social and environmental groups
- A media information campaign including national and local media through multiple formats.

5.3.8 Conclusions

The development proposals advanced in the MP2 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 MP2 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 MP2 Project.

5.4 Scoping

5.4.1 Scoping Approach

Detailed scoping has been undertaken in respect to the MP2 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 in 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 guidance45 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 Notes47 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 MP2 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 MP2 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 MP2 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 MP2 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 MP2 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.

5.4.2 Extent of Environmental Appraisals

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

- Examination of Alternatives
- Risk of Major Accidents
- Biodiversity, Flora and Fauna
- Soils, Geology and Hydrogeology
- Water Quality and Flood Risk
- Noise & Vibration
- Material Assets – Coastal Processes
- Material Assets – Traffic and Transportation
- Archaeology and Cultural Heritage
- The Landscape and Visual Impacts
- Population and Human Health
- Waste
- 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 MP2 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.

Two potential issues have been screened out as a result of the scoping process

- Material Assets – Services; and

- Water Quality – Discharges from vessels.

The reasons why these two topics were screened out are set out in Table 5-5.

Table 5-6 Topics screened out during the scoping process

Topic	Reasons for screening topic out
MATERIAL ASSETS - SERVICES	
Water Supply	The supply of potable water to the Dublin Port Estate is provided by Irish Water. Water is used in the port for a variety of uses including; - :Supply of water to passenger terminals and administration buildings; - Supply of water to vessels to re-stock their internal water tanks; - Washing down facilities Irish Water has confirmed that it can meet the water demand requirements of the MP2 Project with no impact on the water supply to tenants within the Dublin Port Estate or on the neighbouring communities
Electricity Supply	The electricity supply to the Dublin Port Estate is provided by ESB Networks. The current electricity supply to the port is robust and provides ample capacity to the Dublin Port Estate. ESB Networks has confirmed that it can meet the electricity demand requirements of the MP2 Project with no impact on the electricity supply to tenants within the Dublin Port Estate or on the neighbouring communities
Natural Gas Supply	The area within the MP2 Project application boundary is not currently connected to the natural gas network, The MP2 Project will therefore have no impact on the natural gas supply to the neighbouring communities.
Wastewater	Separate foul and storm water drainage systems are in existence within the Dublin Port Estate. The existing set-up will continue within the footprint of the MP2 Project in that surface water will be directed to a storm water drainage system and wastewater will be directed to the existing sewerage network. The sewerage network is in turn connected to the municipal wastewater system for Dublin City which is operated and managed by Irish Water. It is not anticipated that there will be any increase in the peak wastewater discharge to the public sewer as a result of the MP2 Project. The wastewater demand requirements of the MP2 Project will therefore not impact on the wastewater demand of tenants within the Dublin Port Estate or of the neighbouring communities

Topic	Reasons for screening topic out
WATER QUALITY – DISCHARGE FROM VESSELS	
Discharge from vessels	Ships arriving and departing from Dublin Port are strictly forbidden to discharge wastewater of any sort within the basins or approach waters to Dublin Port. This includes - Foul sewage; - Bilge Water; and - Ballast Water There are currently no pump-out facilities for vessels at the port and there are no plans for same as a result of the MP2 Project.

6 RISKS OF MAJOR ACCIDENTS & DISASTERS

6.1 Introduction

This chapter of the EIAR describes the assessment undertaken of the potential individual and societal risk presented to the MP2 Project. It also describes other events (natural and other external) that could contribute to (cause or exacerbate) a major accident at a COMAH establishment within the Port, or directly impact on the MP2 Project, as well as the potential for a major accident at the MP2 Project site to impact on the adjacent parts of the Port and the COMAH establishments. In light of the nature of the activities that will take place at the MP2 Project site, and the nature of the surrounding environment, the most significant risks of major accidents and disasters are associated with the COMAH establishments.

There are three ferry terminal buildings located within the MP2 Project application boundary. Terminal 2 is used by Stena Line, Terminal 5 is used by Seatruck and Terminal 1 is used by Irish Ferries, with seasonal use by Isle of Man Steam Packet Company.Terminal 2 and Terminal 5 will be demolished as part of the works, with the existing Terminal 1 Building being used as a unified terminal building thereafter. The development is within the vicinity of several establishments that fall within the scope of the *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations*, 2015 (the COMAH Regulations), in particular the Calor establishment and the Indaver establishment, to the west of the development on the northern side of Tolka Quay Road.

Byrne Ó Cléirigh conducted a COMAH land use planning assessment for the MP2 Project, the purpose of which was to examine the development in the context of the Health and Safety Authority's COMAH land use planning guidance, and to identify the types of development that may be compatible with the COMAH risk zones around the Calor (and other COMAH) establishments.

6.2 Context

6.2.1 COMAH Regulations

6.2.1.1 Overview

The COMAH Regulations have been made under the Chemicals Acts 2008 and 2010 to transpose Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC ("the SEVESO III Directive"). The purpose of the COMAH Regulations is to lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents when they occur, with the overall objective of providing a high level of protection in a consistent and effective manner.

The COMAH Regulations place an obligation on operators of establishments that store, handle or process dangerous substances above certain thresholds to take all necessary measures to prevent major accidents and to limit the consequences for human health and the environment. Under the Regulations, an establishment may qualify as upper tier or lower tier, depending on the inventory of dangerous substances; sites that store, handle or process dangerous substances below a certain threshold do not qualify as establishments under the Regulations.

The types of dangerous substance that contribute to an establishment's inventory include flammable substances (such as liquefied petroleum gas, gasoline / petrol, kerosene, and certain solvents), toxic substances, and substances that are hazardous to the aquatic environment. The types of establishment that may fall within the scope of the Regulations (depending on their inventories) include oil storage & distribution sites, LPG storage & distribution sites, pharmaceutical plants, and sites that manufacture and / or store certain types of fertiliser.

To assist the competent authorities in their consideration of the applications for development consent in respect of the proposed development, a COMAH land use planning assessment of the development has been prepared in accordance with the *Policy & Approach of the Health & Safety Authority to COMAH Risk-based Land-use Planning* (2010), and is described in this chapter of the EIAR. Consultation with the HSA during this process is documented in Chapter 5 of the EIAR.

6.2.1.2 Establishments

The COMAH establishments within Dublin Port (on the north side of the River Liffey) are listed in Table 6-1 and shown on the drawing in Appendix 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 in vicinity of the MP2 Project[1]

Establishment	Location	Tier	Activity	Consultation Distance[2]
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

[1] The HSA publishes details of upper tier and lower tier establishments on its website, www.hsa.ie.

[2] The Dublin City Development Plan 2016 – 2022 includes the consultation distances for the COMAH establishments.

Establishment	Location	Tier	Activity	Consultation Distance[2]
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
Iarnród Éireann Note 1	Alexandra Road, North Wall, Dublin 1	Lower	Oil storage	300 m
Topaz Energy Limited Note 2	Terminal 1, Alexandra Road, Dublin Port, Dublin 1	Lower	Oil storage & distribution	400 m
Topaz Energy Limited Note 2	Yard 3, Alexandra Road, Dublin Port, Dublin 1	Lower	Oil storage	300 m

Note 1: The HSA's list of COMAH establishments and the Public Information notices under Regulation 25 (available on the HSA website) refer to the registered name of the operator as Iarnród Éireann.

Note 2: In April 2018, Topaz was rebranded as Circle K. However, the HSA's list of COMAH establishments and the Public Information notices under Regulation 25 (available on the HSA website) refer to the registered name of the operator as Topaz Energy Group.

There are also three COMAH establishments on the south side of the River: the two National Oil Reserves Agency (NORA) upper tier establishments at Ringsend and Poolbeg, and the Dublin Bay Power lower tier establishment. The NORA Ringsend establishment stores Class III petroleum, the NORA Poolbeg establishment (which is being refurbished) will store Class II and Class III petroleum, and the Dublin Bay Power establishment stores Class III petroleum as a backup fuel for its natural gas supply. The potential impacts from a major accident at any of these three establishments are not significant at receptors in the north of the Port and therefore they have been screened out of the assessment described in Section 6.5.

Calor Gas

The Calor establishment comprises seventeen aboveground and four semi-mounded LPG tanks, together with a road tanker loading facility from which LPG is distributed to domestic, commercial and industrial consumers via road tanker. The site is divided in two by Tolka Quay Road. The bulk storage installation and bulk breaking facilities are located on the northern half of the site, and the southern half of the site accommodates the administration building and services building (the workshop and garage).

The storage vessels are located on the northern half of the site. Of the 21 tanks, 17 are aboveground tanks (two of which are not in service), and the remaining four tanks are located to the north west of the northern part of the site and are semi-mounded. The road tanker loading area is located to the east of the northern part of the site.

Indaver Ireland

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 in Ireland and abroad for disposal / recovery / recycling. The facility is located to the north of Tolka Quay Road at the junction with Fire Access Road (opposite Breakwater Road North), and to the west of the Calor establishment. 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.

Oil Storage & Distribution Facilities

The oil storage sites, other than ESB and Iarnród Éireann, store a variety of petroleum products (Classes[3] I, II and III) and distribute them via road tanker. ESB has the capacity to store Class III petroleum (gas oil) as a backup fuel for the North Wall Generating Station, while Iarnród Éireann stores Class III petroleum (diesel) for distribution to its regional depots via road tanker.

6.2.1.3 Land Use Planning

The EU's guidelines on Land Use Planning[4] (LUP) describe the ideal LUP technical advice system:

In principle all risk assessment methods without regard to individual applications have the same relevant elements; these are:

- definition of scope, objectives and risk criteria,
- description of the object or area of concern,
- identification of hazards,
- identification of vulnerable targets,
- assumption of source terms or hazardous incidents,
- development of escalation scenarios,
- estimation of consequences,
- estimation of likelihood,
- presentation of resulting risk and comparison with established tolerability criteria,
- identification of mitigation measures, and
- acceptance of result, modification or abandoning.

Besides these elements a proper risk assessment should furthermore ensure:

- a level of detail proportional to the severity of consequences,

[3] Petroleum products are classified as Class I, Class II or Class III depending on their flash point (the minimum temperature at which a liquid, under specific test conditions, gives off sufficient flammable vapour to ignite momentarily on the application of an ignition source). Class I products include gasoline / petrol, Class II products include kerosene, and Class III products include diesel / gas oil.

[4] *Land use Planning Guidelines in the Context of Directives 96/82/EC and 105/2003/EC*

- the use of acknowledged methods (or it must be demonstrated that these are equivalent),
- reliability of data and relevant information, and
- transparency of the process.

The HSA has set out its policy and approach to conducting land use planning assessments in its guidance: *Policy & Approach of the Health & Safety Authority to COMAH Risk-based Land-use Planning* (19 March 2010).

6.2.1.4 Planning Permissions

Table 6-2 summarises the recent planning history for the current and prospective COMAH establishments and identifies COMAH-related developments for which planning permission has been granted but which have not yet commenced or are not yet operational.

Table 6-2 Planning Permissions for COMAH Establishments

Establishment	Reference	Description	Status
Fareplay Energy Ltd., Yard 2	1460/08	The development will consist of (in the area of waste ground located at the northern end of the yard): the construction of a retention bund with reinforced concrete base and walls, construction of two above-ground vertical steel petroleum product storage tanks, and installation of associated equipment including; pipework, pumps, access platforms, fire monitors and underground interceptor within the confines of the bund. The tanks will comprise of 5171 tes motor spirit tank, 26.42 metres diameter by 14.63 metres high, and a 8139 tes auto diesel tank, 30.06 metres diameter by 14.63 metres high. Preparation of the waste ground for construction of the concrete bund, tanks and their foundations will require digging and/or removal of existing ground material in the area. The development will raise Yard 2 form an S.I. 74 of 2006, European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2006, 'lower tier' establishment to an 'upper tier' establishment.	Final grant of permission on 03-Dec-08
Tedcastles Oil Products, Yard 2	1761/08/x1	The development consists of the construction of a new above ground vertical, steel petroleum product storage tank, located at the North end of the existing bund in Yard 2 for Class 1 motor spirit, 9600 tes, 33 m dia × 4.8 m high. It will also consist of the installation of new pipe work, pumps, fire defence system and associated works	Extension of time to 16-Jan-19

Establishment	Reference	Description	Status
Tedcastles Oil Products, Yard 1	3820/08/x1	Planning permission for development is outlined hereunder. The development will consist of the construction of a new bund in the north end of Yard 1, 35 m × 40 m × 0.3 m high, including all associated works to prepare ground and construct foundation. It will also consist of the construction of a new aboveground, vertical, double skinned, steel petroleum product storage tank, located within the newly constructed bund in Yard 1 for Class II Kerosene, 6283 tes, 26.5 m dia × 14.6 m high with an outer shell 30.5 m dia × 12.5 m high. It will further consist of the installation of new pipework, pumps, fire defence system and associated works.	Extension of time to 13-Aug-19
Topaz Energy Limited	3221/14	Permission for development at New Topaz Terminal, Promenade Road, Dublin Port, Dublin 3, bounded to the south by Tolka Quay Road, to the west by TOP Yard 2, and to the east by an access lane. The development will consist of modifications to previously approved planning permission, Reference 3171/12. The modifications will consist of the following: 1. Re-designation of Tank 6 (T406) to store Jet A 1/Kerosene instead of Ethanol; 2. Re-designation of Tanks 7 and 8 (T407 and T408) to store ethanol instead of unleaded gasoline (ULG); 3. Tanks 1, 2, 3, 4, 5 and 6 to be located in one bund instead of two bunds; 4. Tanks 7, 8 and 9 to be double-skin tanks with a single bund wall instead of single-skin tanks with two bund walls; 5. Deletion of the 3m high secondary containment (inner) concrete wall around Tanks 7, 8 and 9; 6. Reduction of the height of the tertiary containment concrete walls of the bunds and of the perimeter walls from 3 metres to 2 metres. There will also be palisade fencing on the boundary. These changes will reduce the storage capacity for Class I liquids by approximately 30 %. The total storage capacity of all hydrocarbons will be unchanged. The development will be an Upper Tier Seveso site and comes within the meaning of Part 11 of the planning regulations. An Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS) will be submitted to the planning authority with the	Final grant of permission on 14-Nov-14

Establishment	Reference	Description	Status
		planning application and the EIS and NIS will be available for inspection or purchase.	

The development at the Fareplay Yard 2 has not been progressed and the planning permission has not been extended and has, accordingly, ceased to have effect. Therefore, this development has not been included in this assessment.

Construction on the development at Tedcastle Oil Products Yard 1 has commenced, and the permission for the development at Yard 2 has been extended to August 2019. Therefore, both developments are included in this assessment.

The development of the proposed new Topaz Energy Limited[5] terminal has not commenced and the timeframe for the planning permission has not expired[6]. However, the area for the proposed development of the terminal has since been developed under separate planning permission (reference 2429/17) comprising:

> *The demolition of 3 no. existing buildings comprising Building A (c. 283 sq.m), Building B (c. 303 sq.m) and Building C (c. 112 sq.m) and removal of all structural and infrastructural elements, vegetation, plinths, fences etc; new concrete surface treatment across entire site including underground drainage and electricity infrastructure; 4 no. CCTV (approx. 18m); new lighting (including 6 no. lighting towers (approx. 30 m)); new approx. 4 m high security fence to northern, eastern and southern (Tolka Quay Road) boundaries; and new substation. An existing substation on site will be retained. The development also includes the closure of the existing (eastern) vehicular entrance and widening of the existing western entrance to provide a 12 m sliding gate on Tolka Quay Road. All development to take place on site of approx. 2.8 hectares.*

The planning inspector's report noted that the area had been subject to previous planning applications, including for the construction of the new terminal. While the planning inspector's report makes no reference to the expiration, or otherwise, of the planning permission for the terminal, it notes the following in relation to the use of the area under the latest development:

> *It is assumed from the layout and nature of the proposed development is likely to be a Lo/Lo container park facility.*

Based on the latest development of this part of Dublin Port, the information provided in the planning application for the development, and the information set out in the planning inspector's report, we consider that it is unlikely that the Topaz Energy Limited terminal will be developed under the current planning permission (3221/14) given the anticipated expiration in November 2019. Nonetheless, based on our understanding of the HSA's requirements for COMAH land use planning assessments, the development of the new Topaz terminal has been included in this assessment.

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[5] In April 2018, Topaz was rebranded as Circle K.

[6] The grant of permission does not specify a period for the duration of the permission and therefore we have interpreted the appropriate period under Section 40(3)(b) of the *Planning & Development Act* 2000, as amended (five years from the date of grant).

6.2.2 An Bord Pleanála

In December 2011, the HSA and An Bord Pleanála (ABP) signed a Memorandum of Understanding (MOU) to facilitate the co-operation between the two bodies in the processing of applications for planning permission under planning legislation, and in particular direct applications to ABP under the *Planning and Development (Strategic Infrastructure) Act* 2006 (the SIA[7]).

The MOU noted that the HSA is obliged to provide technical land use planning advice relating to developments that qualify as COMAH establishments, or relating to developments in the vicinity of COMAH establishments, and that this advice must be provided to ABP on request and within prescribed timeframes. It also recognised that assessments by the HSA of planning applications from COMAH establishments, or of developments in the vicinity of COMAH establishments, can take a considerable amount of time and therefore sufficient lead time should be afforded to the HSA to formulate its technical advice to ABP.

In this context, ABP undertook to ensure that details of any proposed planning applications under the SIA, and on which ABP may seek technical advice from the HSA, are made available to the HSA at the earliest opportunity. In addition, ABP noted that it will request that such details are provided to the HSA at the pre-application consultation stage by the (prospective) applicant.

6.2.3 Guidelines for Environmental Impact Assessment

6.2.3.1 European Commission

Section 1.3.3 of the European Commission's *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report* (2017) identifies two key considerations arising from Annex IV of Directive 2014/52/EU:

- *the Project's potential to cause accidents and / or disasters, and*
- *the vulnerability of the project to potential disaster / accident.*

The guidance notes that relevant information on these topics may be available from risk assessments pursuant to other EU legislation, such as the COMAH legislation on the control of major accident hazards involving dangerous substances.

6.2.3.2 Department of Housing, Planning and Local Government

Parts 4.28 to 4.30 of the Department of Housing, Planning and Local Government's *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018) requires that an EIAR include:

> *…the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project. Where appropriate, the description of expected significant effects should include details of the preparedness for and proposed response to such emergencies*

The guidelines note that there are two key considerations, namely:

[7] Subsequently amended by the *Planning and Development (Amendment) Act* 2010

- The potential of the project to cause accidents and / or disasters, including implications for human health, cultural heritage, and the environment.
- The vulnerability of the project to potential disasters / accidents, including the risk to the project of both natural disasters (e.g. flooding) and man-made disasters (e.g. technological disasters).

The guidelines also note that these considerations are separate to any assessment of the project required under the COMAH Directive (and corresponding Irish legislation), which is likely to include a detailed risk assessment.

6.2.3.3 Environmental Protection Agency

The Environmental Protection Agency (EPA) has also produced *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (draft, August 2017). In the context of major accidents and disasters, Section 3.7 describes the requirements for the impact assessment, noting that the EIAR should contain:

> *A description of the likely significant effects of the project on the environment resulting from, inter alia:*
>
> > *d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);*
>
> *The description of the likely significant effects on the [environmental] factors should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project.*

6.3 Port & Environs

6.3.1 Port Activities

The Port covers approximately 265 hectares to the north and south of the River Liffey, within which the following activities and operations take place:

- load-on / load-off (Lo / Lo) terminals,
- roll-on / roll-off (Ro / Ro) terminals, for both freight and passenger traffic,
- storage facilities for petroleum products, LPG and molasses,
- common oil pipeline linking the oil berths with the petroleum, LPG and molasses storage facilities,
- dry bulk handling facilities for a wide variety of materials, including peat, grain, animal feedstuff, fertiliser, sand, coal, petroleum coke, slags, scrap metals and cement,
- warehouse space,
- vehicle storage facilities,
- cruise liner operations, and
- leisure craft mooring and movements at Poolbeg (south of the river) and Dublin City Marinas.

6.3.2 Populations

6.3.2.1 Summary

The population within Dublin Port comprises:

- workers at the respective industrial and commercial sites (at both the COMAH establishments and non-COMAH facilities);
- vehicle traffic using the Port road network, which includes:
  - workers commuting to and from their place of work within the Port, and
  - goods vehicle drivers that operate to / from the Port, including those associated with:
    - direct Port activities (e.g. delivering / collecting cargo, such as containers or trailers, shipped to / from the Port);
    - import / export related activities from facilities within the Port (e.g. fuel distribution from the oil / LPG facilities that import oil / LPG, car distributors that import vehicles for sale on the Irish market, waste facilities that collect / blend hazardous wastes for export); and
    - non-Port related activities that are located within the Port estate.
- HGV and passenger vehicle traffic departing from / arriving at the Ro-Ro / ferry terminals, together with private and public transport serving the cruise liner traffic;
- other traffic that may access parts of the road network (primarily the western end of the Port), for example the service station at the junction of Promenade Road and Bond Drive Extension;
- shipping traffic at the berths along the north and south quays;
- cruise liner passengers (and crew) arriving at / departing from the multi-purpose berths;
- passengers arriving / departing on the ferries operating from Terminals 1 & 2 (and the eastern end of the Port); and
- HGV / goods traffic arriving / departing on the ferries operating from Terminals 1, 2, 3 / 4 and 5.

There are also several residential areas to the north and west of the Port estate, at Clontarf and East Wall. These areas are approximately 400 m to 750 m from the northern and western parts of the Port estate and are at least 800 m from the MP2 Project.

To assess the societal risk presented by the COMAH establishments in the Port it is necessary to quantify the population that may be exposed to potential major accidents.

Estimating the number of people that may be exposed is relatively straightforward, as the number of people is known (e.g. from census data) and there is little or no temporal or spatial variation (the population is present at a fixed location for a discernible proportion of time). The residential populations to the north and west of the Port fall into this category, as do the populations at the commercial and industrial facilities to a lesser extent.

Other populations, however, are more difficult to characterise and quantify as they vary in terms of:

- the number of people present at any one time (e.g. the number of passengers on a ferry),
- the location of the people (e.g. people using the road network), and
- when people are present, which can vary over the course of a day, week and year (e.g. peak and off-peak traffic patterns, non-regular shipping & cruise berthing, and intermittent embarkation / disembarkation at the passenger ferry terminals).

Both the road traffic and, to a lesser extent, the ferry and shipping traffic, falls into this latter category, as these populations are both transient and mobile.

Nonetheless, for this assessment, we have examined the population data available from Dublin Port and the Central Statistics Office, and have quantified the number of people that may be exposed to potential major accident hazards at the COMAH establishments.

In the following sub-sections, we describe the source of the population data we have used in our assessment, how we have characterised and quantified the populations, and our assessment of the conservative nature of the assumptions we have made. The objective of this exercise is to develop a representative population for the Port and surrounding area, rather than to develop a detailed population and transport model. The population data used in this assessment is summarised in Appendix 6-2.

6.3.2.2 Residential Areas

The closest residential areas to the northern and western parts of the Port are:

- to the north, in Clontarf along Clontarf Road and the adjoining roads (approximately 625 m to the north across the River Tolka Estuary). This area also includes:
  - residential buildings (houses and apartments),
  - a school (Holy Faith Secondary School),
  - a church (Church of St. John the Baptist),
  - a convent (Convent of the Holy Faith),
  - a presbytery (St. John the Baptist Presbytery),
  - Clontarf Yacht & Boat Club,
  - Clontarf Lawn Tennis Club, and
  - Dublin Bus garage.
- To the west, in East Wall to the west and south of East Wall Road (approximately 200 m from the western boundary of the Port estate, 550 m from the nearest COMAH establishment, and approximately 2 km from the MP2 Project).

The latest population data from the CSO is from the 2016 census, with population data available at a variety of geographic levels:

- Constituency,
- County,
- Electoral Division,
- Gaeltacht Area,
- Limistéir Pleanála Teanga (Language Planning Areas),
- Local Electoral Area,
- Province,
- NUTS3 Region,
- Settlement, and
- Small Area.

For the residential population around the Port we have used the data from the Small Areas; these are areas of population generally comprising between 80 and 120 dwellings and are designed as the lowest[8] level of geography for the compilation of statistics. There are 18,641 Small Areas from the 2016 census, 67[9] of which are within approximately 2 km of the nominal centre of risk from the COMAH establishments in the North Port. These have been used in this assessment.

6.3.2.3 Commercial & Industrial

Based on the 2016 census data, the CSO has published data on the 'day-time population' of areas, referred to as workplace zones. The day-time population includes everyone who indicated they worked or studied in the area, along with persons in that area who do not work or study (and are therefore there during the day). These zones were created by the CSO by amalgamating and / or splitting the Small Areas output from the census.

There are four workplace zones covering the COMAH establishments and surrounding areas in the northern part of the Port estate, and while they provide an indication of the population during daytime hours, they do not lend themselves to characterising the Port population to assess the societal risk as they cover too large an area. We have therefore used population survey data provided by DPC, which includes an estimate of both indoor and outdoor populations. The total daytime population from DPC's data is approximately 1,140, excluding the transient populations (passengers) at the ferry terminals.

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[8] The CSO describes Small Areas as "the lowest level of geography for the compilation of statistics in line with data protection". In urban areas, with a relatively high population density, Small Areas also represent the *smallest* (in area) level of geography.

[9] One of the Small Areas – 268108026 / 268108027 – covers the area occupied by the DPC estate and has a population of 922 people. However, the residential population assigned to this Small Area is located outside the DPC estate and therefore we have centred this Small Area outside the Port estate.

6.3.2.4 Road Traffic

Twenty Four (24) junctions including the North Port estate, East Wall Road and the Dublin Port Tunnel, were surveyed for 24 hours on 23 May 2018 for a typical day with only a relatively small cruise vessel in Cruise Berth 18. Classified traffic turning count surveys were carried out, and supplemented with the following existing information:

- Existing queue length surveys;
- Dublin Port Tunnel and Toll Plaza surveys carried out in November 2017 for the Strategic Transportation Study;
- Camera footage of each junction,
- Traffic signal controller information from DCC for each signalised junction,
- Manifest of vessel movements at Dublin Port for the survey day;
- The websites www.vesselfinder.com and www.marinetraffic.com to monitor the vessel movements.

The purpose of the traffic surveys was to characterise and quantify the volume of traffic, rather than to quantify the number of people within the Port, and therefore it did not include the occupancy of the vehicles. Therefore, to quantify the number of people that may be present in vehicles using the Port, we have assumed the following (summarised in Table 6-3):

- Car traffic accounts for workers. Data from Dublin City Council and the National Transport Authority shows that the average car occupancy is 1.2 per vehicle[10]. We have therefore assumed that the weighted average occupancy is 1.2 people per car, equivalent to 1.26 people per car during peak times and 1 person per car during off-peak times (refer to Table 6-3):

$$Average\ Occupancy = Occ_{PEAK} \times Freq_{PEAK} + Occ_{OFFPEAK} \times Freq_{OFFPEAK}$$

$$1.2 = 1.26 \times 77.3\% + 1.00 \times 22.7\%$$

- The car traffic associated with the ferry terminals is accounted for under the ferry traffic data in Section 6.3.2.7.
- Goods vehicles (LGV, OGV1 and OGV2) are assumed to have a driver and no passengers.
- Buses accessing the port include Dublin Bus serving the ferry terminals (typically a double decker bus with a capacity up to 95 passengers), and private coach services (typically with a capacity up to 55 passengers) either serving the ferry terminals / cruise liners or arriving / departing on the ferries. However, as the majority of passengers using the public or private bus services are arriving or departing passengers, they are accounted for in either the cruise liner traffic or ferry traffic data (refer to Sections 6.3.2.6 and 6.3.2.7 respectively), and they are therefore not included in the road traffic population data. This eliminates / minimises the potential for double counting of the same population.

[10] *Report on trends in mode share of vehicles and people crossing the Canal Cordon, 2006 to 2014*.

- Cars and motorcycles travel at an average of 90% of the speed limit (50 km/h) during off-peak (quiet times) and at an average of 75% of the speed limit during peak times.
- Goods vehicles and large passenger vehicles travel at an average of 75% of the speed limit during off-peak times and at an average of 50% of the speed limit during peak times.
- Bicycles travel at an average speed of 10 km/h.

Table 6-3 Vehicle occupancy, average speed & breakdown by peak/off-peak times

Vehicle type	No. Occupants		Average speed (km/h)		% of total traffic		% of traffic		
	Peak	Off Peak	Peak	Off Peak	Peak	Off Peak	Peak	Off Peak	Total
Car	1.26	1	37.5	45	59.4%	59.5%	77.3%	22.7%	**100%**
LGV	1	1	25	37.5	7.9%	5.6%	82.7%	17.3%	**100%**
OGV1	1	1	25	37.5	5.9%	6.8%	74.7%	25.3%	**100%**
OGV2	1	1	25	37.5	19.9%	22.2%	75.3%	24.7%	**100%**
Bus	-	-	25	37.5	3.8%	3.3%	79.9%	20.1%	**100%**
Motorcycle	1	1	37.5	45	1.5%	1.3%	80.0%	20.0%	**100%**
Bicycle	1	1	10	10	1.6%	1.3%	80.2%	19.8%	**100%**
Total	**-**	**-**	**-**	**-**	**100%**	**100%**	**-**	**-**	**-**

During peak times there are approximately 85 people in vehicles on the Port roads at any one time, and during off-peak times there are approximately 16 people in vehicles at any one time, excluding vehicle traffic departing from / arriving at the ferry terminals (refer to Section 6.3.2.7).

The detailed results from the traffic surveys are incorporated into the assessment of the potential impact on people using the Port. The general profile of traffic within the Port over a 24-hour period is shown in Figure 6-1, together with the ferry departure and arrival timeframes for Irish Ferries and StenaLine via Terminals 1 & 2 (the main passenger ferry terminals), shown in red and green, respectively. Figure 6-1 shows, for example:

- that two ferries arrive every day of the week (one at 05:45 and one at 05:55) and that vehicles disembark the ferries between 05:45 and 06:55 (assuming a 1-hour disembarkation time for each ferry); and
- that two ferries depart every day of the week (one at 20:40 and one at 20:55) and that vehicles start to arrive in the Port 90 minutes before the departure times (starting at 19:10).

The current timetables for the operators at Terminals 1, 2 and 5 are summarised in Table 6-4 in Section 6.3.2.7.

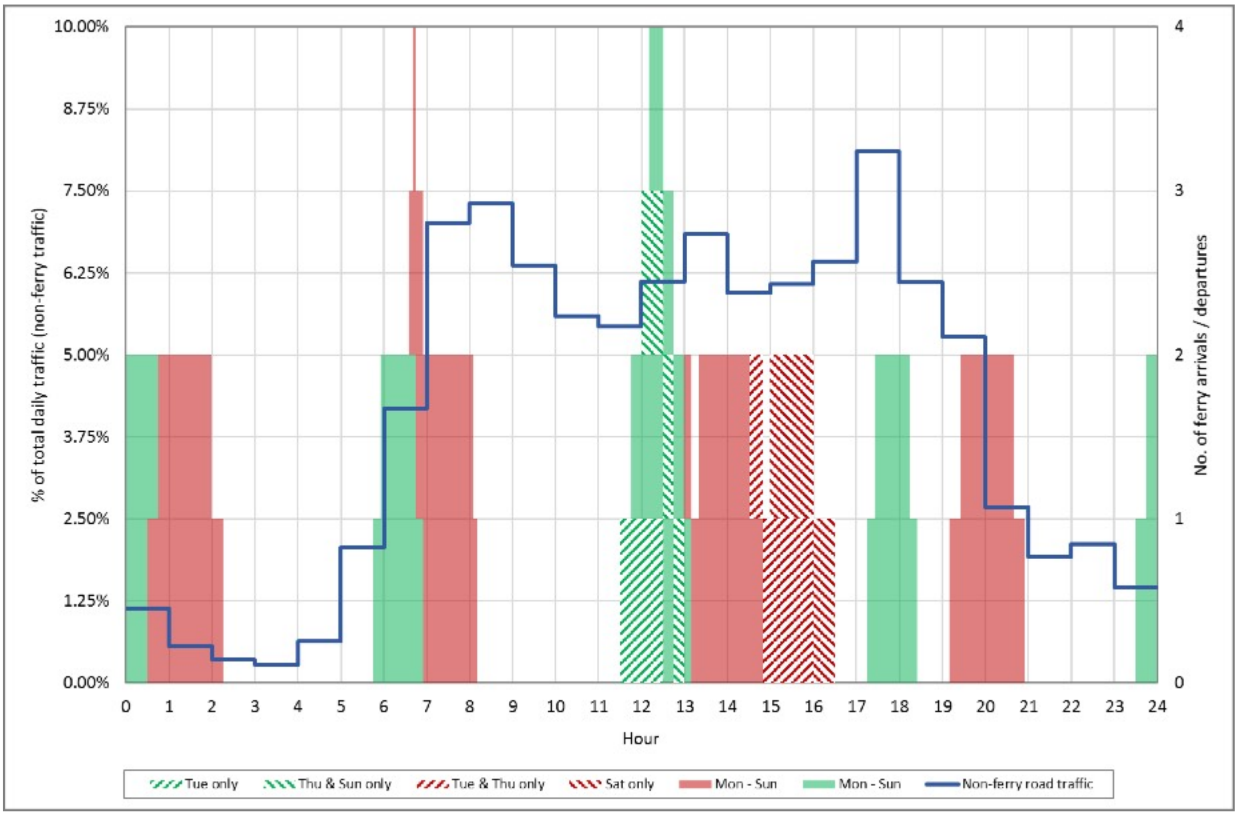

Figure 6-1 Typical 24-hour traffic profile in Dublin Port

6.3.2.5 Shipping Traffic

Data from DPC[11] shows that there were appropriately 8,000 vessel arrivals and departures (approximately 16,000 vessel movements, excluding movements between berths) in the Port in 2018. These comprise Ro-Ro passenger vessels (ferries), cruise liners, bulk carriers, container vessels, general & Ro-Ro cargo ships, oil & LPG tankers, vehicle carriers, and a wide range of other vessels. Passenger ferries accounted for approximately half of all vessel movements, with Ro-Ro cargo vessels accounting for approximately 20%, container vessels accounting for approximately 13%, and oil/LPG tankers accounting for approximately 6.5%. The population associated with the shipping traffic (excluding cruise liners and passenger ferries, which are accounted for in Sections 6.3.2.6 and 6.3.2.7 respectively) is summarised in Appendix 6-2.

6.3.2.6 Cruise Liners

During 2018, approximately 155 cruise liners berthed in the Port, comprising 65 different vessels ranging in capacity from 87 (the Hebridean Princess) to 6,036 (the MSC Meraviglia). Data from DPC shows that a total of 177,641 cruise liner passengers visited the Port during the year, with the peak visitor numbers during the second (27.5%) and third (37.7%) quarters.

The majority of cruise liners berthed at Ocean Pier 33 (approximately 41%) and Cruise 18 (approximately 25%), with the remainder berthing at Alexandra Basin East 39, Alexandra Basin West 30, D.L.2, D.L.4, Deep Water Berth 46, Ocean Pier 35, Ocean Pier 36, Ocean Pier 37, Sir JRQ 8 and SJR Quay 9. Ocean Pier 33 is

[11] http://booking.dublinport.ie/webx/

approximately 1.2 km southwest of the MP2 Project and 360 m southwest of the nearest COMAH establishment (the class III storage tanks at ESB Northwall). Cruise 18 is located to the east of the Eastlink Bridge, approximately 1.9 km west-southwest of the MP2 Project and approximately 850 m southwest of the nearest COMAH establishment (Topaz Yard 1).

The estimated cruise liner population is summarised in Appendix 6-2. For the assessment of societal risk, it is conservatively assumed that the passengers remain onboard while the vessel is berthed; due to the distance between the cruise liner berths and the sources of risk at the COMAH establishments, this assumption does not have a significant impact on the assessment.

6.3.2.7 Ferry Traffic

There are four ferry terminals within the Port, summarised in Table 6-4.

Table 6-4 Dublin Port Terminals

Terminal	Operator	Traffic
1	Irish Ferries Isle of Man Steam Packet Company (seasonal)	Passenger & Ro-Ro Passenger
2	StenaLine	Passenger & Ro-Ro
3	P&O Ferries	Predominantly Ro-Ro, with some passenger
5	Seatruck Ferries	Ro-Ro

Terminals 1, 2 and 5 for Ro-Ro traffic, including passenger ferries, are located at the eastern end of the Port and are accessed via the main entrance on East Wall Road on to Promenade Road. As access to these terminals is via Tolka Quay Road, all ferry traffic passes the majority of the COMAH establishments on Promenade Road / Tolka Quay Road / Alexandra Road. Terminal 3 is located at the western end of the Port and is accessed via a dedicated gate on East Wall Road north of the East Link Toll Bridge.

Table 6-5 summarises the services operating from Terminals 1, 2 and 5 (the most relevant terminals for this COMAH land use planning assessment); the passenger traffic associated with the cruise liners is included under the shipping traffic data in Section 6.3.2.5.

Table 6-5 Summary of Dublin Port Ferry Services

Operator	Vessel	Destination	Capacity		Weekly sailings (peak) (arrivals + departures)
			Passengers	Cars	
Irish Ferries	Ulysses	Holyhead	1,875	1,342	28
	Epsilon	Holyhead	500	70	18
	Swift	Holyhead	900	251	28
	Epsilon	Cherbourg	500	70	2
	W.B. Yeats Note 1	Cherbourg	1,885	1,200	4
StenaLine	Adventurer	Holyhead	1,500	500	28
	Superfast	Holyhead	1,200	500	28
P&O Note 1	Norbank / Norbay	Liverpool	114	Note 3	18
	Mistral Note 2	Liverpool	12	Note 3	18
Seatruck Note 3	FSG / P / R class	Liverpool	12	Note 3	32
	FSG / P / R class	Heysham	12	Note 3	11
Isle of Man Note 4	Manannan	Douglas	850	200	2
	Ben-my-Chree	Douglas	630	275	2

Note 1: The W.B. Yeats entered service in January 2019

Note 2: In April 2019, P&O Ferries sold the European Endeavour, which had operated on the Dublin-Liverpool route. The service has been replaced by the Mistral.

Note 3: P&O's and Seatruck's service is predominantly for freight (accompanied and unaccompanied HGVs / trailers) with little or no capacity for passenger vehicles.

Note 4: The Isle of Man Steam Packet Company operates a seasonal (summer) service from Terminal 1.

Table 6-6 2018 Timetables for Terminals 1, 2 and 5 (arrival & departure times in Dublin Port)

Operator	Route	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Irish Ferries	Dublin – Holyhead	02:00	02:00	02:00	02:00	02:00	02:00	02:00
		08:05	08:05	08:05	08:05	08:05	08:05	08:05
		14:30	14:30	14:30	14:30	14:30	14:30	14:30
		20:55	20:55	20:55	20:55	20:55	20:55	20:55
	Holyhead – Dublin	05:55	05:55	05:55	05:55	05:55	05:55	05:55
		11:45	11:45	11:45	11:45	11:45	11:45	11:45
		17:25	17:25	17:25	17:25	17:25	17:25	17:25
		23:30	23:30	23:30	23:30	23:30	23:30	23:30

Operator	Route	Mon	Tue	Wed	Thu	Fri	Sat	Sun
	Dublin – Cherbourg	-	16:00	-	16:00	-	16:30	-
	Cherbourg – Dublin	11:30	-	-	12:00	-	12:00	-
Stena	Dublin – Holyhead	02:15	02:15	02:15	02:15	02:15	02:15	02:15
		08:10	08:10	08:10	08:10	08:10	08:10	08:10
		14:50	14:50	14:50	14:50	14:50	14:50	14:50
		20:40	20:40	20:40	20:40	20:40	20:40	20:40
	Holyhead – Dublin	05:45	05:45	05:45	05:45	05:45	05:45	05:45
		12:10	12:10	12:10	12:10	12:10	12:10	12:10
		17:15	17:15	17:15	17:15	17:15	17:15	17:15
		23:45	23:45	23:45	23:45	23:45	23:45	23:45
Seatruck	Dublin – Liverpool	15:30	06:00	06:00	06:00	06:00	09:30	20:30
		21:00	09:30	09:30	09:30	09:30	18:00	-
		-	15:30	15:30	15:30	15:30	21:00	-
		-	21:00	21:00	21:00	21:00	-	-
	Liverpool – Dublin	05:00	02:00	02:00	02:00	02:00	02:00	06:00
		-	05:00	06:00	06:00	06:00	06:00	20:00
		-	11:30	12:30	12:30	12:30	17:00	-
		-	17:30	17:30	17:30	17:30	-	-
	Dublin – Heysham	13:30	13:30	13:30	13:30	13:30	13:30	-
	Heysham – Dublin	-	10:30	10:30	10:30	10:30	10:30	10:30
IOM Steam Packet	Dublin – Isle of Man	11:30	11:45	-	10:45	-	-	-
	Isle of Man – Dublin	-	11:05	-	10:20	-	-	10:20

The largest passenger ferries operating regularly to / from the Port are the W.B. Yeats with a capacity of 1,885 passengers, and the MV Ulysses with a capacity of 1,875 passengers, with the slightly larger MS Isle of Inishmore (2,200 passengers) occasionally operating to / from the Port. The other ferries have passenger capacities of between 110 and 1,800 passengers.

Data from DPC for 2017 shows that approximately 1.8 million passengers and 488,000 tourist vehicles passed through Terminals 1 & 2 (approximately 50% arriving and 50% departing), yielding an average vehicle occupancy of 3.67. In addition, approximately 458,000 HGVs passed through Terminals 1 & 2, approximately 60% of which were accompanied (with the driver present) and 40% of which were unaccompanied (with only the trailers present; loaded onto / removed from the ferry by tug / shunter).

Figure 6-2 Vehicle arrivals and departures (2017)

shows the seasonal trend in HGV (blue) and tourist (red) vehicle arrivals (dark) and departures (light). Figure 6-3 shows the corresponding number of people (HGV drivers and tourists / passengers) arriving and departing.

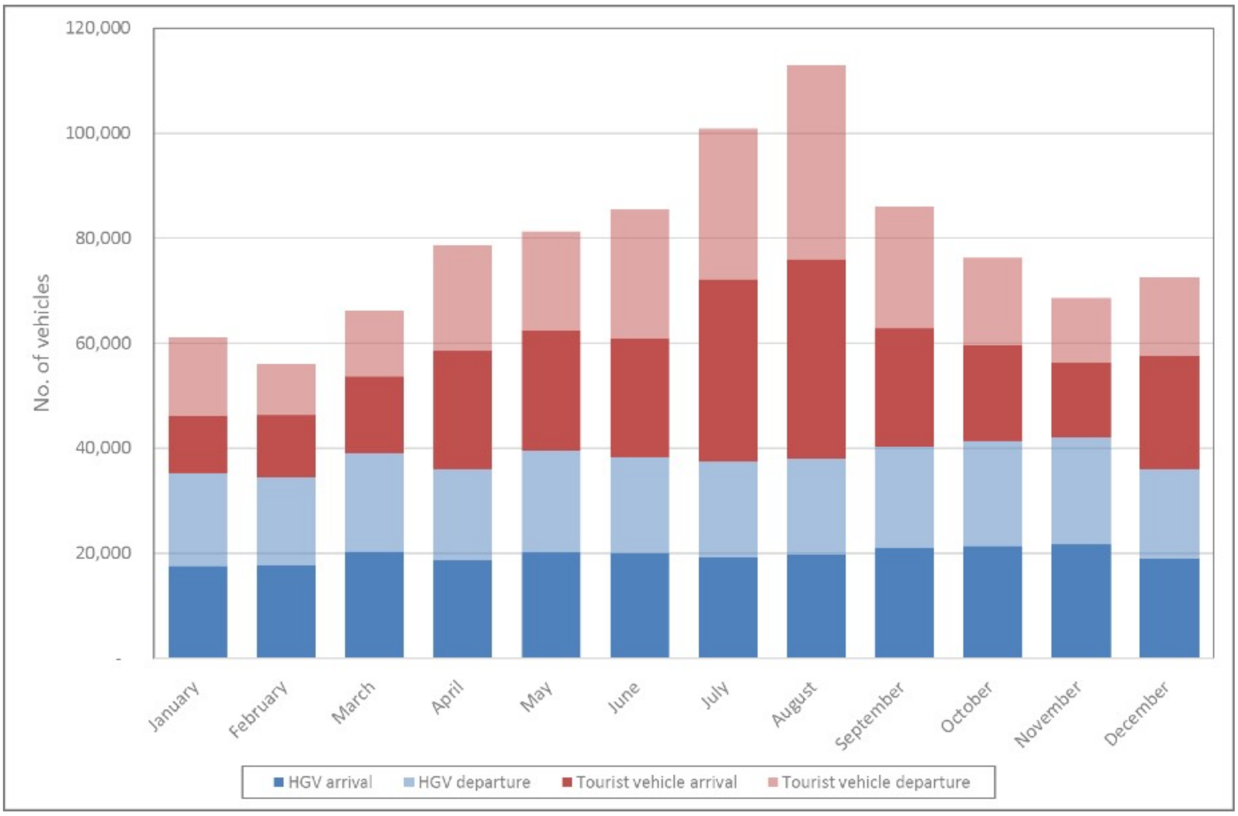

Figure 6-2 Vehicle arrivals and departures (2017)

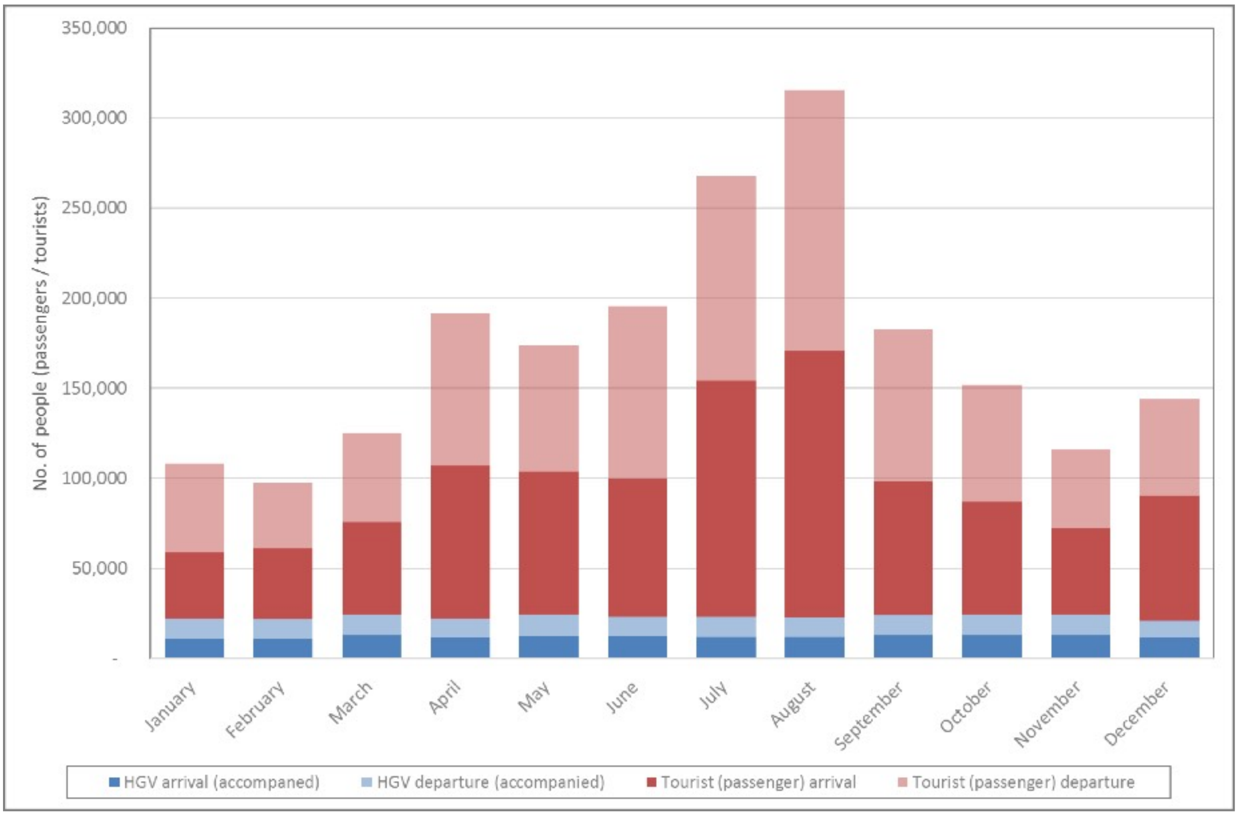

Figure 6-3 Passenger / tourist number arrivals and departures (2017)

To account for the transient and mobile ferry passenger population in the assessment of societal risk, we have assumed that:

- For departures, the majority of vehicles start to arrive at the terminals approximately 90 minutes prior to the sailing, and they travel at an average of 50% of the speed limit (25 km/h). This yields a certain number of people on the road network at any one time over a 90-minute period; the balance of the passengers travelling on the ferry are assumed to be located at the check-in / assembly area at the terminal. In practice, the number of passengers at the check-in / assembly area will vary over the period, starting from zero and increasing to the ferry complement; our approach is therefore conservative.
- For arrivals, it takes up to 60 minutes for all traffic to disembark the ferry and exit the Port, again assuming that the vehicles travel at an average of 50% of the speed limit. This yields a certain number of people on the road network at any one time over a 60-minute period; the balance of the passengers arriving on the ferry are assumed to be located at the ferry. As in the case of ferry departures, our approach to characterising the transient and mobile population is conservative.

6.3.2.8 Timeframes

Table 6-7 summarises the timeframes that we have used to characterise the population within and around the Port.

Table 6-7 Population Timeframes

Category	Period	Hour/day	Day/week	Hour/week	% of time
Daytime peak traffic	09:00 – 17:00	8	5	40	**23.8%**
Daytime off-peak traffic	n/a	0	5	0	**0.0%**
Non-daytime peak traffic	07:00 – 09:00 17:00 – 19:00	4	5	20	**11.9%**
Non-daytime off-peak traffic	19:00 – 07:00	12	5	60	**35.7%**
Weekend peak traffic	07:00 – 19:00	12	2	24	**14.3%**
Weekend off-peak traffic	19:00 – 07:00	12	2	24	**14.3%**
Other timeframes	Other timeframes for certain populations based on, for example, ferry timetables, berth occupancy data, and other non-standard occupancies that do not fit within the other six categories. The other timeframes are apportioned across the other six categories on a pro-rata basis. For example, if a shipping berth is occupied, on average, for 40% of the year, this occupancy is apportioned between the other six timeframes at the corresponding percentages (23.8%, 0%, 11.9%, 35.7%, 14.3% & 14.3%)				
Total	**-**	**-**	**-**	**168**	**100%**

6.4 Natural Events

6.4.1 Introduction

As outlined in Section 6.1, there are risks other than from COMAH establishments that may impact on the MP2 Project, including natural events (such as earthquakes, lightning strikes, extreme weather events, etc.) and other external events (such as aircraft impacts) that may cause or exacerbate a major accident at a COMAH establishment, which may in turn impact on the MP2 Project. These events are outlined in the following subsections, both in the context of the MP2 Project and the individual COMAH establishments.

6.4.2 Earthquakes

The School of Cosmic Physics (part of the Dublin Institute for Advanced Studies – DIAS) operates the Irish National Seismic Network (INSN), which comprises a series of monitoring stations around the country. Figure 6-4 shows the location and magnitude of historic and recorded seismic events in Ireland since 1980. This shows that while there have been several recorded seismic events, they are all of low or very low magnitude (typically less than magnitude 1.9).

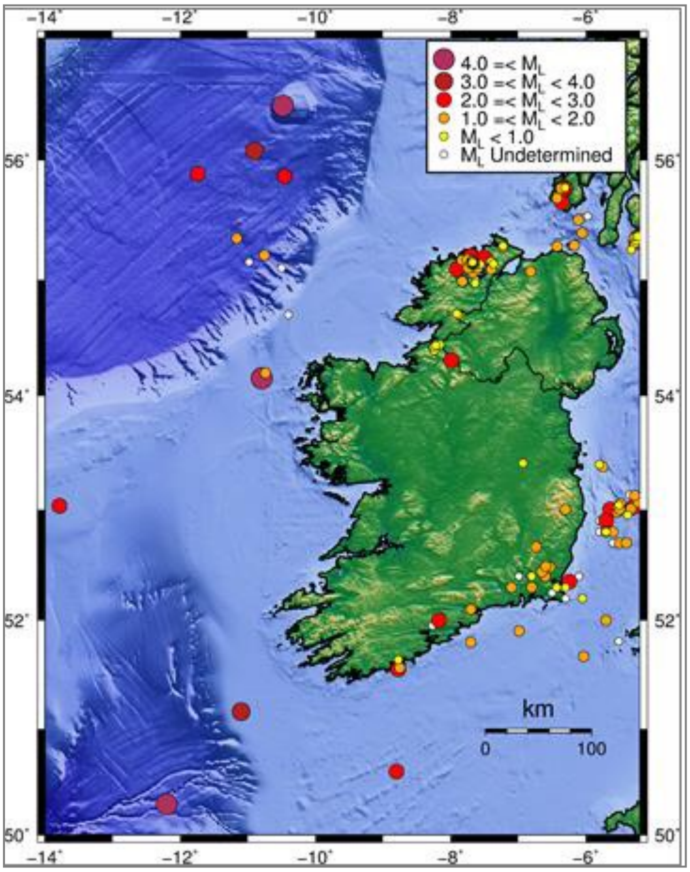

Figure 6-4 Historical & Recorded Seismic Events since 1980

The Seismic Hazard Harmonization in Europe (SHARE) project, comprising eighteen European partner institutions, has compiled two European Earthquake Catalogues, one for the period 1000 to 1899, and one for the period 1900 to 2006, which show the locations of seismic events across Europe. The map for the period 1900 to 2006 is shown in Figure 6-5. It indicates that there is relatively little seismic activity in Ireland.

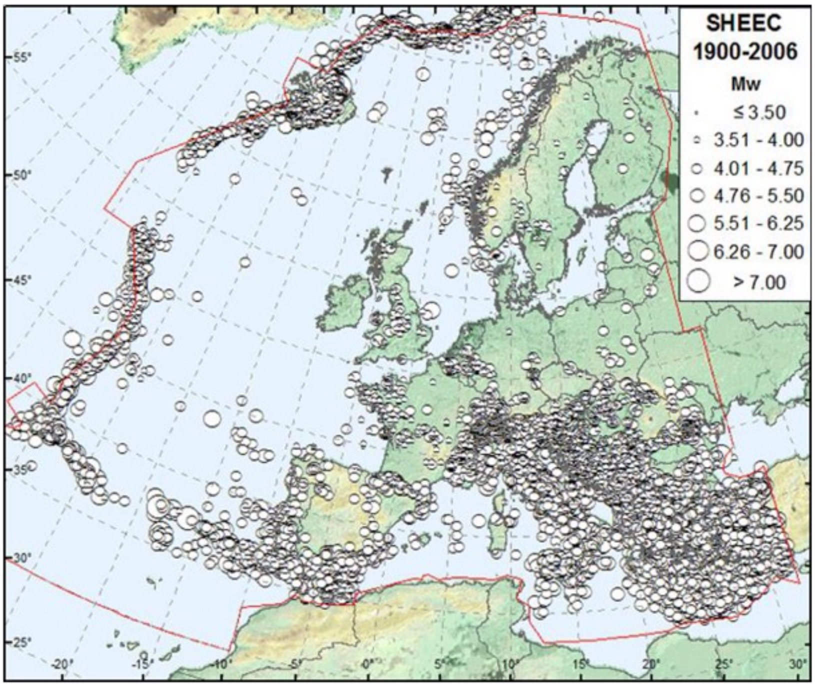

Figure 6-5 SHARE European Earthquake Catalogue (1900 to 2006)

The SHARE project has also developed a European Seismic Hazard Map, shown in Figure 6-6.

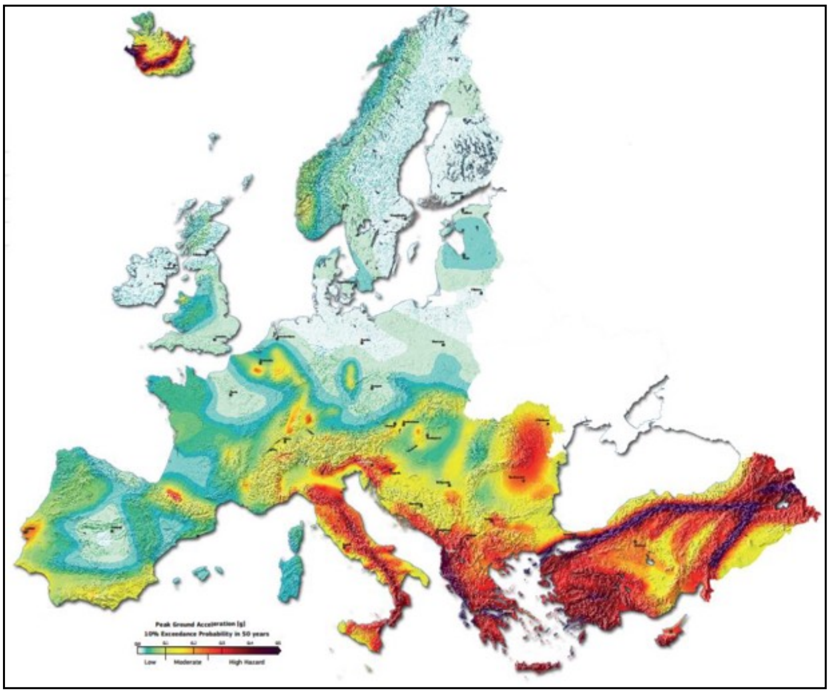

Figure 6-6 European Seismic Hazard Map

This shows the peak horizontal ground acceleration (measured in *g* – gravitational acceleration) predicted to be reached or exceeded with a 10% probability in 50 years. This corresponds to the average recurrence of such ground motions every 475 years, as prescribed by the national building codes in Europe for standard buildings. Low hazard areas (PGA ≤ 0.1 g) are coloured in blue-green, moderate hazard areas in yellow-orange and high hazard areas (PGA > 0.25 g) in red. As can be seen from Figure 6-6, Ireland is a low hazard area.

6.4.3 Lightning Strikes

The UK Met Office has operated a lightning location network since 1987 (in its current form known as ATDnet), which allows for the detection of lightning activity across Europe and in turn the development of maps showing the density of lightning strikes. A 2014 research paper[12] analysed the data from the network and produced the lightning flash density map shown in Figure 6-7. This shows that, in general, Ireland is an area of relatively low lightning activity, with the paper noting that:

> *Over the UK, Ireland and Scandinavia the densities are generally lower than the rest of Europe. Some of the lowest densities are observed over the Atlantic, North Sea and Baltic Sea.*

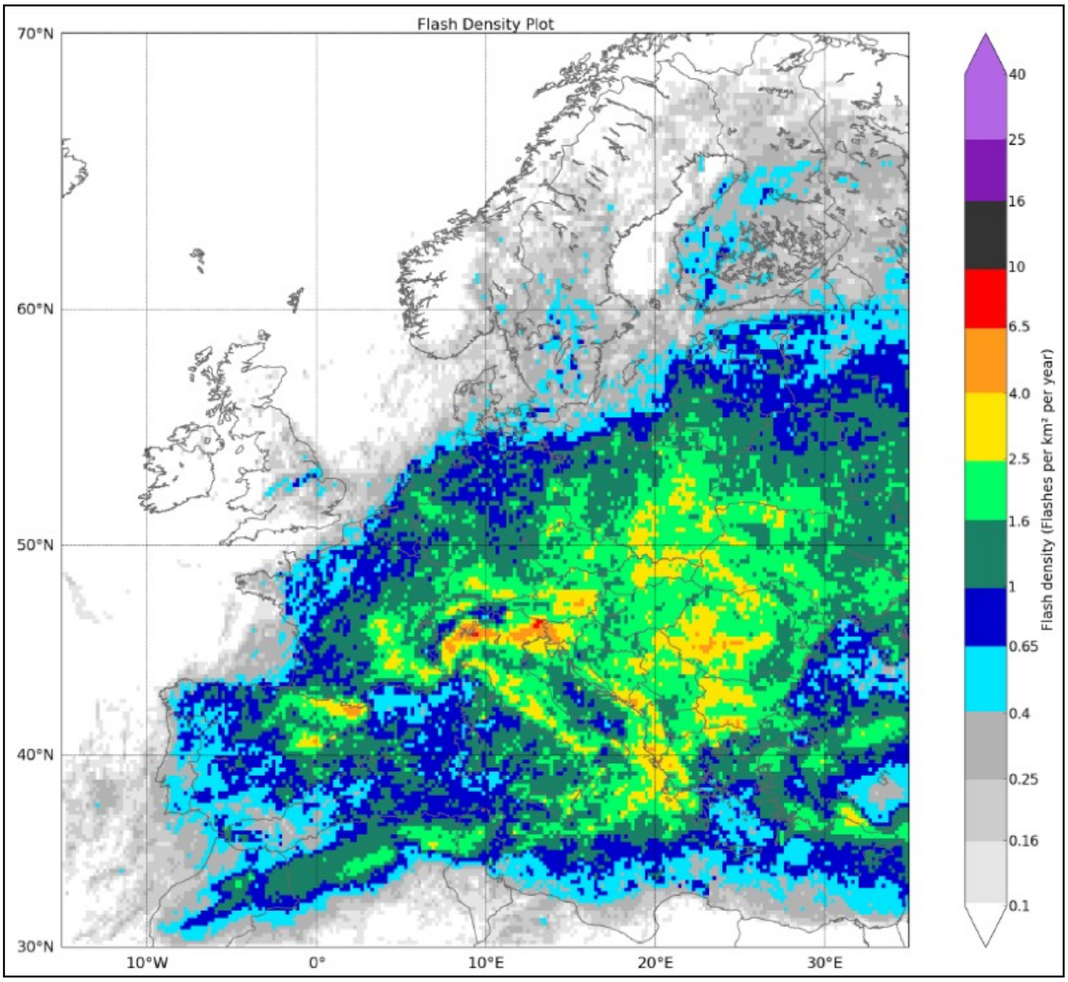

Figure 6-7 Annual Detected Lightning Flash Density (2008 – 2012)

A separate, volunteer organisation also operates a series of lightning monitoring stations across Europe (Blitzortung), with the data that is collected also used to generate lightning density maps[13]. The lightning density map for Ireland and the UK for 2018 (the most recent complete year of data) is shown in Figure 6-8. This also shows that Ireland is, in general, an area of low lightning activity.

[12] G. Anderson & D Klugman, 2014, *A European lightning density analysis using 5 years of ATDnet data*

[13] Available at www.lightningmaps.org.

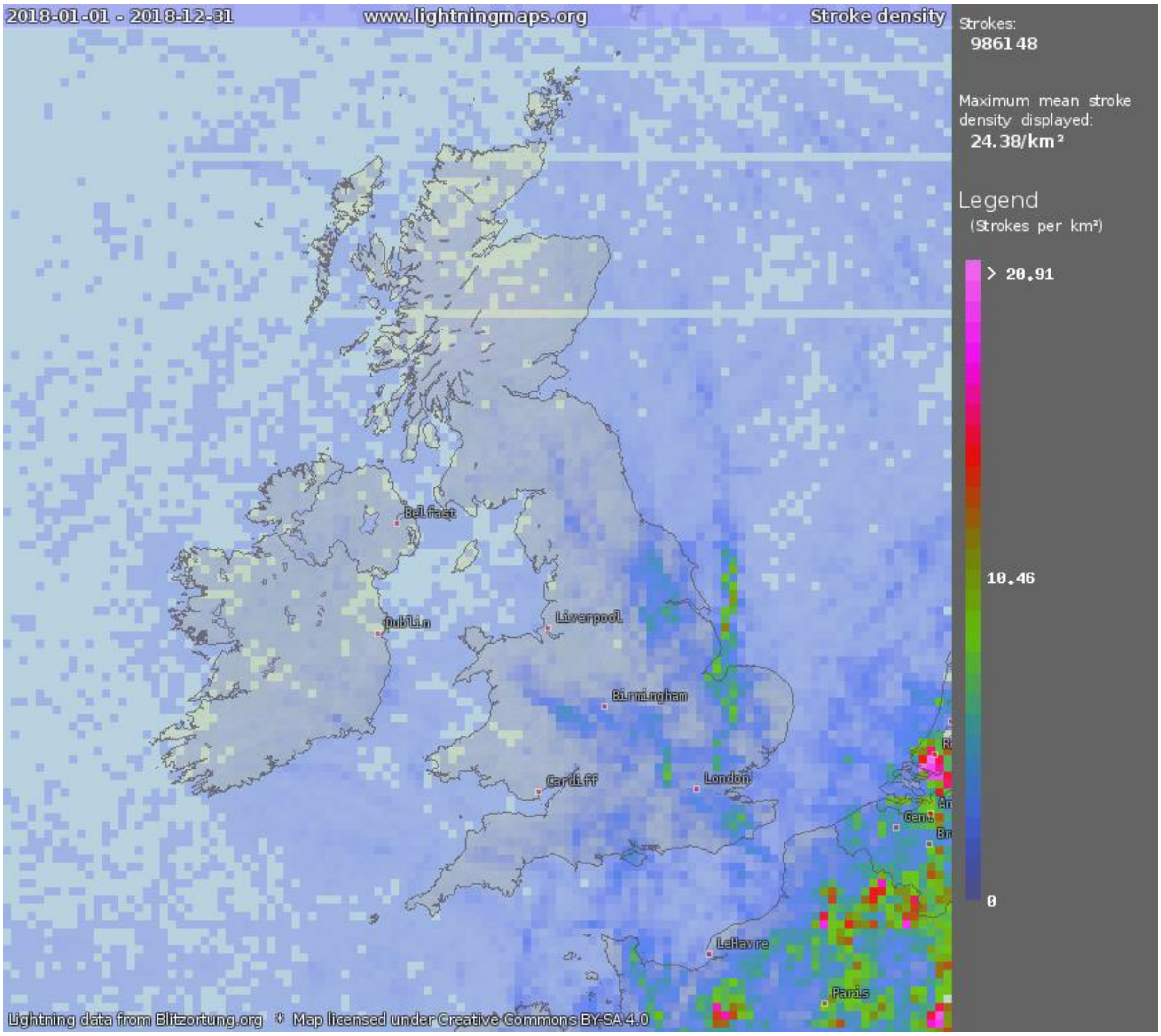

Figure 6-8 Lightning Mean Stroke Density (strokes / km^2) for 2018

6.4.4 Flooding

The Office of Public Works (OPW) National Flood Hazard Mapping system provides details of historic flooding incidents throughout the country. For the Dublin Port estate, the system identifies multiple flood events within approximately 2.5 km of the Port, none of which are within the Port estate or in the vicinity of the MP2 Project. In the Dublin Port Masterplan 2040, reviewed 2018, it is noted that several historic flood events have been recorded near to or in the vicinity of the Port estate, acknowledging that it is generally considered that flood risk will continue to increase in line with predicted climate change.

In 2011, the Eastern Catchment Flood Risk Assessment and Management (CFRAM) study commenced in the Eastern district (the catchment area covering the Dublin Port estate and the area of the MP2 Project). One of the outputs from the study is a series of flood maps that show the predicted flood extent for flood events with a range of estimated probabilities of occurrence (0.1%, 0.5%, 1% Annual Exceedance Probability – AEP). The AEP represent the probability of an event of this, or greater, severity occurring in any given year. For the area of the MP2 Project and surrounding environment, flood maps are shown for both coastal and fluvial (river) events. The maps indicate that the area is not at risk from fluvial flood events, but that parts of it may experience flooding under the low probability (0.1% AEP) and medium probability (0.5% AEP) coastal flood events, with water depths of up to 1 m.

Other parts of the Port are also shown to be at risk from the low probability coastal flood event, including parts of the Calor Indaver and Tedcastle Oil Products (Yards 1 and 2) sites, although there is no history of flooding at the COMAH establishments. If flooding did occur at a COMAH establishment, it is not expected to give rise to a major accident that could impact on the MP2 Project (or other areas of the Port), although it is likely that it would disrupt normal operational activities at the particular site for the duration of the event.

A Flood Risk Assessment for the MP2 Project is presented in Chapter 9 of this EIAR.

6.4.5 Extreme Weather Events

6.4.5.1 Temperature

The maximum daily air temperature at the Dublin Airport weather station over the period 2009 to 2018 (the latest 10-year period) was 26.7°C (occurring on 23rd July 2018), with a minimum daily air temperature of -12.2°C (on 25th December 2010). The largest daily temperature range over the period was 19.4°C, varying from a low of -0.7°C to a high of +18.7°C (on 28th March 2012).

Met Éireann defines a heatwave as five consecutive days or more with a maximum temperature over 25°C. No heatwaves have been recorded at Dublin Airport in the last 30-years, although there have been several periods during which the maximum daily temperatures have been above 20°C for more than five days. There is no equivalent definition for a prolonged cold period (‘cold spell’); over the period 2009 to 2018 there have been multiple periods of low minimum temperatures (less than 0°C) on consecutive days, the longest of which was over 16 days between 24th November and 9th December 2010 and coincided with a period of prolonged snowfall / snow accumulation.

6.4.5.2 Wind

Wind data (speed and direction) from the Dublin Airport weather station is summarised in Table 6-8 and shown in Figure 6-9 for the period 2009 to 2018. This shows that the prevailing wind direction is from the west and southwest. The mean wind speed over the period was 10.85 knots (5.6 m/s); the mean wind speed over the period 1981 to 2010 was 10.3 knots (5.3 m/s).

Table 6-8 Wind Data for Dublin Airport (2009 – 2018)

Direction (from)	All wind speeds	0 – 2 m/s (0 – 7.2 km/h)	2 – 5 m/s (7.2 – 18 km/h)	5 – 10 m/s (18 – 36 km/h)	> 10 m/s (> 36 km/h)
North	4.9%	0.9%	2.7%	1.3%	0.1%
North east	5.0%	0.4%	2.6%	2.0%	0.1%
East	9.0%	0.7%	5.2%	2.8%	0.3%
South east	13.3%	0.9%	6.0%	5.7%	0.7%
South	8.5%	0.8%	3.4%	3.7%	0.5%

Direction (from)	All wind speeds	0 – 2 m/s (0 – 7.2 km/h)	2 – 5 m/s (7.2 – 18 km/h)	5 – 10 m/s (18 – 36 km/h)	> 10 m/s (> 36 km/h)
South west	23.2%	0.5%	6.4%	13.6%	2.6%
West	28.4%	1.0%	9.6%	14.7%	3.1%
North west	7.7%	0.7%	3.9%	3.0%	0.1%
Total	100%	5.9%	39.8%	46.8%	7.5%

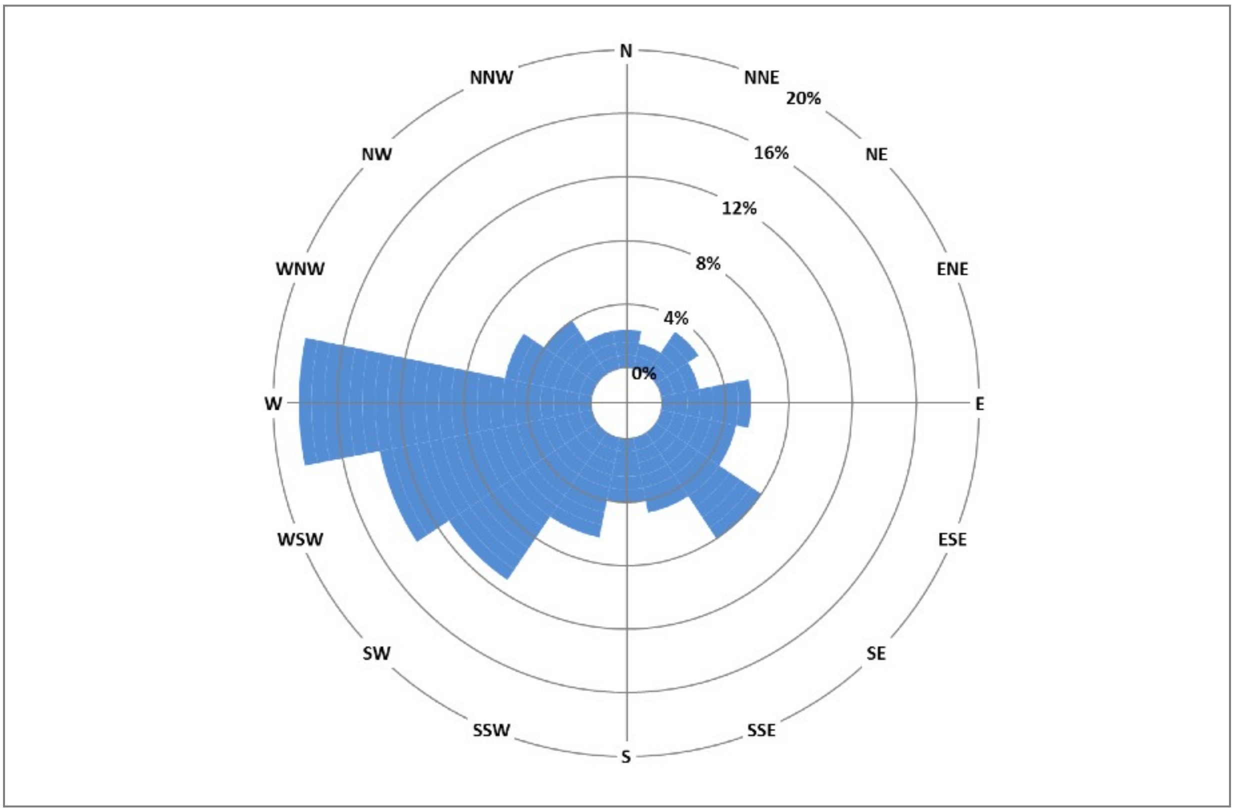

Figure 6-9 Wind Rose for Dublin Airport (2009 – 2018)

Data from Met Éireann shows that the typical maximum gust speeds for a 50-year return period are in the range up to 50 m/s (180 km/h) depending on the location of the site in Ireland. For the Dublin Port estate, the estimated speed for this return period is 45 m/s (160 km/h). The historic meteorological data from the Dublin Airport weather station shows that the highest 10-minute mean wind speed over the period 2009 to 2018 was 48 knots (approximately 90 km/h), with a maximum gust of 66 knots (approximately 122 km/h).

6.4.5.3 Rainfall

The total rainfall at Dublin Airport over the last three years (2016 to 2018) was between 660.7 mm (in 2017) and 713.6 mm (in 2016), with a 30-year annual average (1981 to 2010) of 758 mm. The highest total daily rainfall over the last 10 years was 84 mm, recorded on 2nd August 2014, and the longest prolonged period of wet weather (days on which precipitation was recorded) was 20 days, which occurred between 25th October and 13th November 2010 during which 73.9 mm of rainfall was recorded. The longest period during which no rainfall occurred was over a period of 24 days between 21st June and 14th July 2018.

6.4.6 Aircraft Impact

In 2005, Environmental Resources Management (ERM) carried out a risk investigation to define Public Safety Zones (PSZ) at the three main airports in Ireland, including Dublin Airport, on behalf of the Department of Transport and the Department of the Environment, Heritage and Local Government. The objective of the PSZ is to protect people on the ground from the risk of aircraft impact by implementing land use planning controls on developments in the vicinity of airports. The PSZ proposed for Dublin Airport are shown in Figure 6-10 (for the current airport configuration) and in Figure 6-11 (for a proposed configuration incorporating expanded facilities at the airport).

Figure 6-10 Proposed PSZ around Dublin Airport (existing runways) (Source: ERM)

Based on Ordnance Survey Ireland Permit No. 7643, © Ordnance Survey Ireland & Government of Ireland

Figure 6-11 Proposed PSZ around Dublin Airport (existing & proposed runway 10L/28)

Figure 6-10 and Figure 6-11 show that Dublin Port and the area of the MP2 Project is outside the PSZ (the yellow lines) for both configurations and is well outside the main risk zone posed by the airport (the blue lines).

There is no available data on the probability of aircraft impact at locations in Ireland not in the vicinity of airports. Crash statistics for fixed and rotary wing aircraft in Britain and Northern Ireland between 1981 and 1992 indicate that the annual likelihood of impact in areas not in the vicinity of airports / airfields is approximately 6.3×10^{-7} per hectare per annum[14]. The total area of the DPC estate is approximately 265 ha, yielding a probability of aircraft impact across the estate as a whole of 1.67×10^{-4} per annum.

There is a helipad located approximately 1.5 km north-west of the MP2 Project area, near the junction of Promenade Road and Bond Road. Aircraft operating to or from the helipad are restricted from flying over the oil terminals and storage areas; all helicopter pilots must operate in accordance with the *Irish Aviation Authority (Rules of the Air) Order*.

In its guidance *Heliports – Guidelines for Heliport Site Owners/Occupiers and for Heliport Site-keepers*, the Irish Aviation Authority (IAA) notes that the *Rules of the Air* apply to all helicopter flights made over congested areas (such as Dublin Port) and non-congested areas by all types of helicopter, and that the height requirement under the Order restricts single-engine helicopter flights over congested areas to a far greater extent than multi-engine helicopters.

[14] *A method for estimating the risk posed to UK sites by civil aircraft accidents*, Civil Aviation Authority, 1993

6.4.7 Summary

Ireland is an area of relatively low seismic activity and low lightning activity, and in general is not subject to extreme weather events. In light of the nature of the hazards at the COMAH establishments, and the potential major accident scenarios, we do not consider that these natural events significantly increase the likelihood of a major accident arising at a COMAH establishment and impacting on the area of the MP2 Project. As noted in Section 6.5.1.3, the probability data that has been applied in this assessment is from the HSA's guidance, which the HSA considers to be conservative, and it is not considered that the potential natural and external events that could occur within the Port require the application of additional or different probability data.

Similarly, it is not considered that the events outlined in this sub-section present a significant risk to the MP2 Project. Nonetheless, if these events occurred, they could be disruptive to the normal operation within the Port and may require implementation of a relevant mitigation measure (e.g. snow clearance, flood control, adjustment to the normal traffic management).

From a COMAH establishment perspective, it is not considered that the development of the MP2 Project introduces any new risks that could cause or exacerbate a major accident, nor is it considered that the MP2 Project significantly alters the current risks presented to the establishments from normal Port operations. However, an incident or accident at the MP2 Project, or generally within the Port, could be disruptive to the COMAH establishments depending on the nature and location of the event and, if such an event coincided with a major accident, it may also be disruptive to the emergency response. Accordingly, Section 6.7 of this Chapter provides a description of Dublin Port's Emergency Response Management Plan.

6.5 COMAH Events

6.5.1 Assessment Methodology

6.5.1.1 Context

For COMAH-related risks, the HSA's policy and approach to conducting land use planning assessments is to adopt a conservative and consistent approach. The HSA notes that its proposed risk-based approach is not intended to be as detailed as that required for a full quantified risk assessment (QRA), but rather is based on the consideration of a smaller number of representative events which are the most significant in terms of off-site land use planning.

In assessing the risk, the HSA examines both the individual risk (described in Sections 6.5.1.3) and the societal risk (described in Section 6.5.1.4). In both cases, the risk is estimated based on the HSA's guidance and is compared against the HSA's assessment criteria.

6.5.1.2 Criteria

Individual Risk

The level of individual risk is assessed using a three-zone traffic light system shown in Table 6-9.

Table 6-9 Risk Based Contour Zones for Individual Risk

Zone	Risk of fatality per year		
Inner	1×10^{-5}	1 in 100,000	0.001%
Middle	1×10^{-6}	1 in 1 million	0.0001%
Outer	1×10^{-7}	1 in 10 million	0.00001%

These three zones have been determined for the COMAH establishments in the Port based on the scenarios identified in Section 6.5.1.3, and on the results from the consequence assessment as described in Section 6.5.1.4.

Societal Risk

Overview

Societal risk is a measure of the risk of large numbers of people being affected in a single accident[15]. The HSA's guidance notes that:

> *Societal Risk is examined as part of the assessment and this may be by the use of screening tools – such as the ARI as a screening tool in relation to the siting of new establishments. Where further assessment of societal risk is necessary, Expectation Value (EV) / Potential Loss of Life (PLL) or an FN curve will be used*

[15] Policy & Approach of the Health & Safety Authority to COMAH Risk-based Land-use Planning (19 March 2010)

to determine the level of societal risk as considered appropriate. Where societal risk is in the intolerable region (an upper societal risk criterion value of 1 in 5000 for 50 fatalities will be used) the advice should be 'against', in the broadly acceptable region (1 in 100,000 for 10 fatalities) it should be 'not against' and in the significant risk region (which is between these 2 values) the planning authority should be advised of that fact and the need for the planning authority to weigh this into their planning decision, using Cost Benefit Analysis (CBA) and taking into account any socioeconomic benefits as necessary.

The HSA also notes that:

There are relatively few widely accepted societal risk criteria for land use planning, as it is generally considered that, if the individual risks for particular types of development are adequately controlled, then the societal risks will also be controlled adequately. However, this is not always the case, particularly for hazards such as pipelines or some major toxic risks, where the societal risks may be significant even though the individual risks are relatively low.

In this context, the HSA outlines several metrics for estimating and assessing societal risk:

- the Societal Risk Index (SRI), also referred to as the Scaled Risk Integral;
- the Risk Integral (RI), which can be expressed in several forms:
  - The RI_{COMAH}, which is the form of the RI used when assessing COMAH establishments.
  - The ARI_{COMAH}, the Approximate RI, which is used when assessing COMAH establishments, and is a simplified version of the RI_{COMAH}.
  - The RI_{LUP}, which is the form of the RI for land use planning purposes.
  - The ARI_{LUP}, which is the Approximate RI for land use planning purposes (a simplified version of the RI_{LUP}).

Although the HSA's guidance does not describe the use of the Expectation Value (EV), the Potential Loss of Life (PLL), or FN-curves for assessing societal risks, it recognises that such approaches may be appropriate. The application and relevance of these metrics to the societal risk attributable to the COMAH establishments in the Port, and to the MP2 Project, are described in the following subsections.

Scaled Risk Integral

The Scaled Risk Integral (SRI) is described by Carter (1995) and Hirst & Carter (2000) as a derivative of the Risk Integral. It was developed for use when considering proposals for new developments close to existing (COMAH) establishments and takes the form:

$$SRI = \frac{P \times R \times T}{A}$$

Where:

- *P* is the population factor, defined as $(n+n^2)/2$.
- *n* is the number of persons at the development.
- *R* is the average estimated level of individual risk (in 'chances per million', CPM).

- *T* is the proportion of time the development is occupied by *n* persons.
- *A* is the area of the development (in hectares).

As the SRI is generally intended to be applied to non-COMAH developments in the vicinity of COMAH installations (establishments), it may be considered a suitable approach to assess the risk to the MP2 Project. However, very large sites or oddly shaped sites where the population may not be evenly distributed may not be suitable for assessment using the SRI approximation[16]. Therefore, the SRI has not been applied in this assessment.

Risk Integral

The risk integral (or enhanced expectation value) can be used when assessing major hazard installations and is defined as:

$$RI_{COMAH} = \sum_{N=1}^{N_{MAX}} f(N)N^{a}$$

Where:

- *f(N)* is the frequency (*f*) of events leading to *N* fatalities.
- *a* is a constant that represents a scale aversion and is assigned a value of 1.4.

The RI is calculated over the range of individual major accident scenarios that can give rise to *N* fatalities, and is assessed against criteria of 2,000 (broadly acceptable) and 500,000 (significant).

The approximate risk integral (ARI) can be determined based on the worst-case event, depending on whether the worst-case event is omni-directional (the same consequences in all directions) or uni-directional (the consequences vary by direction). For a single site, the worst-case scenario can be identified as the event that gives rise to the largest number of fatalities. However, as ten different COMAH establishments contribute to the overall risk within the Port, a single worst-case event at a particular site is not representative as it would not account for the contributions from all sites. Therefore, it is more appropriate to apply the RI_{COMAH} rather than the ARI_{COMAH}.

The HSA's guidance also describes the RI_{LUP}, which has a greater degree of scale aversion than the RI_{COMAH}, expressed as:

$$RI_{LUP} = \sum (F \times N) = \sum \left(f \times \frac{n + n^2}{2} \right)$$

[16] *The Scaled Risk Integral – A Simple Numerical Representation of Case Societal Risk for Land Use Planning in the Vicinity of Major Accident Hazards*, Loss Prevention and Safety Promotion in the Process Industries, Volume II, 1995

However, both the HSA's guidance and the underlying research by Hirst & Carter (2000) only provide a single criterion against which to assess the RI_{LUP}, namely a value of 10,000 that corresponds to the broadly acceptable area. Therefore, for this assessment the RI metric has been used to estimate and assess the societal risk.

Expectation Value

In its *Guidance on 'Significant Modifications' Under the COMAH Regulations* (2019), the HSA describes the Expectation Value (EV) as one of the simpler measures of societal risk, noting that it is (broadly) the product of the individual level of risk (expressed in CPM) and the number of people affected. It is also sometimes referred to as the Potential Loss of Life (PLL). The HSA's guidance on significant modification sets an assessment criterion for the EV as:

> *The expectation value under the lower criterion line of the FN curve from N = 1 to N = 100 is approximately 450 and an increase of this order will trigger a requirement for a more detailed societal risk evaluation by the operator in the form of an FN curve: evaluation of that curve will determine whether the CCA will refer the modification to the planning authority.*
>
> *Modifications increasing the Expectation Value by 450 will require a more detailed assessment by the operator.*

However, the HSA's guidance also notes that the EV does not reflect aversion to large casualty events or the events affecting sensitive populations. For this assessment, the RI is considered to be a more appropriate metric to estimate and assess the societal risk, and the EV has not been used.

FN-Curve

In its guidance on societal risks and indices, the HSA notes that:

> *Whilst the SRI or ARI_{LUP} are used to provide a rapid initial assessment of the societal risk, it must be emphasized that a full consideration of the FN curve is probably a more robust approach.*

An FN curve shows the relationship between the frequency of an outcome and the cumulative severity of the outcome, typically plotted on a log-log scale to account for the range of values for both the frequency of occurrence and the severity of the outcome. It can take one of two forms[17]:

1. Non-cumulative frequency basis: for these graphs, called f-N curves (lower case 'f'), the value plotted on the y-axis is the discrete frequency of experiencing *exactly* N fatalities.
2. Cumulative frequency basis: for these graphs, called F-N curves (upper case 'F'), the value plotted on the y-axis is the cumulative frequency of experiencing N *or more* fatalities.

When assessing whether the level of societal risk may be regarded as tolerable, it is necessary to select appropriate criteria. In its guidance, the HSA identifies two criterion lines for FN (cumulative frequency) curves:

- an upper criterion of 1 in 5,000 for 50 fatalities; and
- a lower criterion line of 1 in 100,000 for 10 fatalities.

[17] Guidelines for Developing Quantitative Safety Risk Criteria, Centre for Chemical Process Safety, 2009

Figure 6-12 shows the general format of an FN curve, with the number of (potential) fatalities, *N*, on the x-axis and the probability of at least *N* fatalities on the y-axis, *F*, together with the two criterion lines. The area above the upper criterion is considered to be the intolerable region and the area below the lower criterion line is considered to be the broadly acceptable region. The area between the two lines is generally considered to be the ALARP region, where the risk may be considered to be 'tolerable' provided that it is As Low As Reasonably Practicable (ALARP)[18]

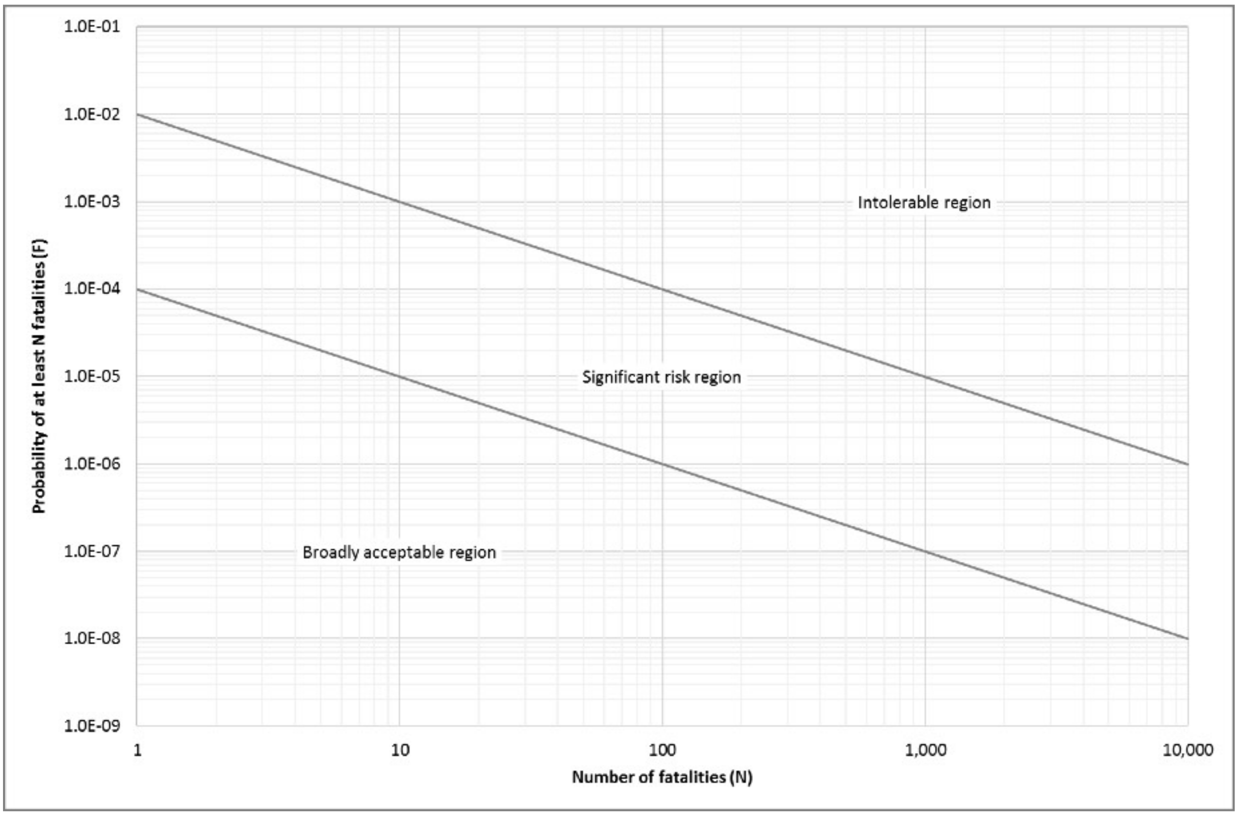

Figure 6-12 Criterion Lines for FN Curves

There are other reference sources for the criteria that may be used to assess whether the level of societal risk is tolerable or not. In their review of societal risks and the use of FN curves and 'criterion lines' for the UK Health and Safety Executive (HSE), Ball and Floyd[19] note that:

> *Societal risk criteria should not, in other words, be viewed as more than broad indicators of a desirable objective, with many other, non-technical factors needing to be weighed in any final decision.*

[18] The UK HSE comments on the use of the terms *so far as is reasonably practicable* (SFAIRP) and *as low as reasonably practicable* (ALARP). It notes that SFAIRP is most often used in the context of workplace health and safety legislation and that ALARP is used by risk specialists. The HSE uses the term ALARP in its COMAH guidance and, in its view, considers that the two terms are (generally) interchangeable.

[19] *Societal Risks – a report prepared for the Health and Safety Executive*, 1998

> *…In short, the estimation of societal risks, in all their dimensions, is fraught with numerous uncertainties. For this reason, it is eminently sensible to regard societal risk criteria as no more than indicators.*
>
> *… the proposal here is that societal risk criteria should not be used in a 'prescriptive mode'.... given the degree of uncertainty associated with the determination of societal risks, it is widely accepted that societal risk criteria (in the form of FN lines) should be regarded as no more than indicators or guidelines.*

For this assessment, we have estimated the combined FN curve across the ten COMAH establishments and have assessed it against the two criterion lines identified in the HSA's guidance, which in turn are based on the guidance used by the UK HSE.

6.5.1.3 Scenarios

Overview

The HSA's land use planning guidance outlines the types of scenario to be considered as part of a COMAH land use planning assessment. The scenarios are based on the types of hazard at the respective installations and are intended to account for the worst-case scenario in each case. The COMAH establishments included in this assessment, and the COMAH substances that may give rise to major accident scenarios, are summarised in Table 6-10.

The HSA also provides guidance on the probability (frequency) of occurrence applicable to each of the accident scenarios, as set out in Table 6-11, which the HSA notes are estimated conservatively. For certain scenarios, the HSA identifies risk reduction measures that, if applicable to and applied at the particular establishment, yield reduced probabilities for the relevant scenario. For example, in the case of large-scale petroleum storage facilities that present a risk of a vapour cloud explosion (VCE), the HSA advises that the probability of occurrence can be reduced from the 'default' by an order of magnitude if the establishment has implemented the recommendations from the Buncefield Report[20]. The risk reduction measures in the Buncefield Report are applicable to the oil storage sites in the Port that store Class I petroleum (gasoline), and the HSA has advised that it is reasonable to apply the corresponding reduction in risk.

Table 6-10 COMAH establishments & substances

Establishment	Location	Tier	COMAH Substances
Calor Teoranta	Tolka Quay Road, Dublin 1	Upper	Class 0 (LPG) Class III
Fareplay Energy Ltd. (under the Topaz Energy Group)	Tankfarm 1, Alexandra Road, Dublin Port, Dublin 1	Upper	Class I, II & III
	Tankfarm 2, Tolka Quay Road, Dublin Port, Dublin 1		Class I, II & III
Indaver Ireland Ltd.	Tolka Quay Road, Dublin Port, Dublin	Upper	Flammables & toxics

[20] *Safety and environmental standards for fuel storage sites*, Process Safety Leadership Group, Final Report, 2009

Establishment	Location	Tier	COMAH Substances
Tedcastles Oil Products	Yard 1, Promenade Road, Parish of St. Thomas, Dublin Port, Dublin 1	Upper	Class I, II & III
Tedcastles Oil Products	Yard 2, Tolka Quay Road, Parish of St. Thomas, Dublin Port, Dublin 1	Upper	Class I & III
Valero Energy Ireland Ltd.	Alexandra Road, Dublin Port, Dublin 1	Upper	Class I, II & III
Electricity Supply Board	North Wall Generating Station, Alexandra Road, Dublin 1	Lower	Class III
Iarnród Éireann	Alexandra Road, North Wall, Dublin 1	Lower	Class III
Topaz Energy Limited	Terminal 1, Alexandra Road, Dublin Port, Dublin 1	Lower	Class I & II
Topaz Energy Limited	Yard 3, Alexandra Road, Dublin Port, Dublin 1	Lower	Class III

Table 6-11 Major Accident Scenarios from HSA Guidance

Installation type	Establishment	Scenario	HSA reference / default probability	Potential risk reduction measure	Probability used in assessment
LPG (HSA §3.1)	Calor	BLEVE	1×10^{-4} / year per site or 1×10^{-5} / year per vessel	Intumescent coating on vessels	1×10^{-6} / year per vessel
Large scale flammable storage (VCE risk) (Class I) (HSA §3.2)	Topaz 1 Valero (north) Fareplay 1 Fareplay 2 TOP 1 TOP 2 Topaz (see Table 6-2)	VCE	1×10^{-4} / year per site 1×10^{-5} / year per tank	Implementation of Buncefield recommendations	1×10^{-6} / year per tank
		Unbunded pool fire	1×10^{-4} / year per small installation 1×10^{-4} / 100π per metre / year	High flashpoint (e.g. kerosene) Reduction of overtopping	1×10^{-5} / 100π per metre / year
		Bund fire	1×10^{-3} / year per bund	High flashpoint (e.g. kerosene)	1×10^{-4} / year per bund
Large scale flammable storage (no VCE risk) (Class I with no VCE risk, or Class II) (HSA §3.3)	Topaz 1 Valero (north) Fareplay 1 Fareplay 2 TOP 1 TOP 2 Topaz (see Table 6-2)	Unbunded pool fire	1×10^{-4} / year per small installation 1×10^{-4} / 100π per metre / year	High flashpoint (e.g. kerosene) Reduction of overtopping	1×10^{-5} / 100π per metre / year
		Bund fire	1×10^{-3} / year per bund	High flashpoint (e.g. kerosene)	1×10^{-4} / year per bund
Storage of Class III(1) petroleum products (HSA §3.4)	ESB Iarnród Éireann Topaz Yard 3 Valero (south)	Unbunded pool fire not contained at the site (off-site fire)	1×10^{-5} / year per small installation 1×10^{-5} / 100π per metre / year	None	1×10^{-5} / 100π per metre / year

Installation type	Establishment	Scenario	HSA reference / default probability	Potential risk reduction measure	Probability used in assessment
Warehouses (HSA §3.6 & §3.7)	Indaver	Release from drum of toxic material	1×10^{-4} / year	None	1×10^{-4} / year
		Pool fire from drum of flammable material	1×10^{-4} / year	None	1×10^{-4} / year
		Bund fire	1×10^{-3} / year per bund	None	Not applicable – non-credible event
		Warehouse fire	1×10^{-4} / year	None	1×10^{-4} / year

LPG Releases

The worst-case event for an LPG site is a BLEVE of a storage tank, with a frequency of 1×10^{-5} per vessel per year as per the HSA's guidance. To reflect the different sizes of tanks at the Calor establishment, we have accounted for BLEVE of the four larger semi-mounded tanks to the north west of the site and the 15 aboveground tanks to the centre / east of the site separately. As the aboveground tanks and the exposed end caps of the semi-mounded tanks are protected by means of a fire-proof insulation, we have applied the lower likelihood of 1×10^{-6} per vessel per year.

Bund Fires

A bund fire may arise following the release of petroleum product from a tank (the primary containment). The probability of fire in a bund storing Class I material is 1×10^{-3} per year, and for a bund storing Class II material is an order of magnitude less (1×10^{-4} per year). The high flash point of Class III products means that there is effectively no risk of ignition following a spill where it is confined within the bund area.

For bunds that contain more than one class of petroleum product (e.g. Class I and Class II), the assessment is based on the higher (more volatile) class of product. Therefore, for a bund containing both Class I and Class III tanks, the scenario has been modelled as a Class I fire.

The storage tanks in the solvent blending area of the Indaver establishment are double skinned tanks and therefore catastrophic failure of a tank resulting in a bund fire has been discounted as a credible scenario.

Unbunded Fire

In the event of a catastrophic failure of a storage tank in which the full contents of the tank are released, the material may have sufficient momentum to 'overtop' the bund wall resulting in an uncontained pool of material. The extent to which the pool may spread depends on multiple factors, including the volume of material released, the momentum of the material, the type of material, and the nature and topography of the surrounding area. As it is not practicable or reasonable to estimate the probability of each potential pool size for each tank, we have adopted the HSA's guidance and have estimated the size of an unconfined pool as:

$R = 6.85 \times V^{0.44537}$

In this formula, R is the radius of the pool (in metres) and V is the volume of material (in cubic metres). As per the HSA's guidance, the size of an unconfined pool is subject to a maximum diameter of 100 m (a radius of 50 m).

The HSA's guidance describes the approach for assessing the risk from unbunded fires in the context of a single bund, rather than for a site with multiple bunds, or, as in the case of the Port, multiple sites with multiple bunds. Therefore, there are two possible approaches to calculating the frequency of an unbunded fire across the Port:

1. To calculate the frequency of an unbunded fire for each of the individual bunds at each of the sites, using the perimeter of the bund as the input to the frequency:

$$f = \frac{1 \times 10^{-4}}{100\pi} \times bund\ perimeter$$

2. To calculate the frequency of an unbunded fire for each of the individual sites, using the nominal perimeter of the combined bunded area of the site as the perimeter

$$f = \frac{1 \times 10^{-4}}{100\pi} \times nominal\ perimeter\ of\ total\ bunded\ area$$

We have assessed the results under both approaches and there is little difference in the overall calculated risk. This assessment is based on the second approach, which we consider is more consistent with the HSA's guidance, and based on the configuration of the sites within the Port it is the more conservative of the two.

In applying the second approach, we have taken the direction of release following failure of a tank to be to the north, east, south or west, with an equal probability for each direction (25%). To reflect the configuration of the bunds within the port and the proximity of the oil storage sites to one another, we have also assumed that if product from one site (or bund) overtops towards another site (or bund), the material will be contained within the second site (or bund) and will not migrate further. In such cases, the size of the pool is taken to be that of the second bund.

For Class III product, the high flash point means that where a spill does not migrate beyond the boundary of the COMAH establishment or beyond another COMAH establishment, then there is effectively no risk of ignition. If the Class III material does migrate beyond the site boundary into an area in which there are no controls on ignition sources (e.g. onto a road), we conservatively assume that the unbunded material ignites.

The storage tanks in the solvent blending area of the Indaver establishment are double skinned tanks and therefore catastrophic failure of a tank resulting in overtopping of the bund wall has been discounted as a credible scenario.

Vapour Cloud Explosion

A vapour cloud explosion (VCE) is a credible scenario at an installation that stores bulk flammable liquids that meets the following criteria:

- it is used for the storage of Class I petroleum (petrol),
- it is in vertical, cylindrical, non-refrigerated, above-ground storage tanks,
- with side walls greater than 5 m in height, and
- at filling rates greater than 100 m^3 per hour.

The HSA's guidance advises that the probability of a VCE occurring at such an establishment can conservatively be taken as 1×10^{-4} per site per annum, or as 1×10^{-5} per tank per annum. However, this can be adjusted to take account of protection systems and other controls that may be in place. If a site has implemented all the recommendations arising from the Buncefield investigation, the likelihood of a VCE arising can be reduced by an order of magnitude to 1×10^{-5} per establishment per annum, or to 1×10^{-6} per tank per annum.

In light of the number of Class I storage tanks within the Port, we have applied the probability of 1 × 10^{-6} per tank per annum and we have assumed that the measures in place at the bulk storage installations storing Class I petroleum in the Port satisfy the Buncefield recommendations.

Warehouse Fire

The probability of a warehouse fire is dependent on a variety of factors, including the nature of the materials stored (whether they are flammable), the volume of materials stored and the size of individual containers and storage areas, and the systems in place to protect against a fire. For this assessment, we have conservatively assumed the probability of a fire within the flammable drum store at the Indaver establishment to be 1 × 10^{-4} per annum, as per the HSA's guidance for a major fire involving 100% of the inventory of a flammable goods warehouse.

Toxic Releases

The Indaver establishment handles a variety of hazardous wastes, with materials classified as toxic typically handled in 200 litre drums. The probability of a release of a toxic material is based on several factors, including the number of drums / containers and the number of drum movements. For this assessment, we have conservatively assumed that the probability of a release of the full contents of a drum is 2 × 10^{-6} per drum per annum.

In addition, the probability of exposure to the released material is dependent on the weather conditions at the time of the release. For this assessment, the evaporation and dispersion of a pool of dilute hydrofluoric acid (the representative worst-case toxic substance at the establishment) was modelled under the following weather conditions:

- Typical conditions (D5): a wind speed of 5 m/s and a Pasquill stability class[21] of D.
- Calm conditions (F2): a wind speed of 2 m/s and a Pasquill stability class of F.

The frequency of these conditions occurring at Dublin Airport (the closest meteorological station) is approximately 80% of the time for class D stability conditions, and approximately 20% of the time for class F stability conditions.

6.5.1.4 Consequences

Risk of Fatality

The risk of fatality arising from a major accident hazard can be related to the consequences of the event (e.g. exposure to thermal radiation, a blast overpressure, or a toxic substance) by means of probit functions and other derived relations.

As described in the UK HSE's *Methods of approximation and determination of human vulnerability for offshore major accident hazard assessment*, probits account for the variation in tolerance to harm for an

[21] A measure of the stability / instability of the atmosphere, ranging from A (extremely unstable) to G (extremely stable).

exposed population, with the fatality rate of personnel exposed to harmful agents over a given period of time calculated using a probit function of the general form:

$$Y = k_1 + k_2 \ln(V)$$

where:

- Y is the probit, a measure of the percentage of the vulnerable resource that might sustain damage (the probability of fatality).
- k_1 & k_2 are constants depending upon the type of harm that the population is exposed to (thermal, pressure, toxic effects).
- V is the product of intensity (I) or concentration (C) of the received hazardous agent to an exponent n and the duration of exposure in seconds or minutes (t). In other words, $V = C^n \cdot t$.

The probit function can be used to calculate the risk to people exposed to the hazardous agent (thermal radiation, overpressure or concentration of toxic substance), expressed as a probability of lethal impacts, as follows:

$$Probability = \frac{1}{\sqrt{2\pi}} \int_{u=-\infty}^{u=Y-5} exp\left(-\frac{u^2}{2}\right) du$$

The relationship between the probability of fatality and the probit value is shown in Figure 6-13. This shows that, for example, a probit value of 5 corresponds to a probability of fatality of 50%. Similarly, probit values of 3.72 and 6.28 correspond to probabilities of fatality of 10% and 90%, respectively.

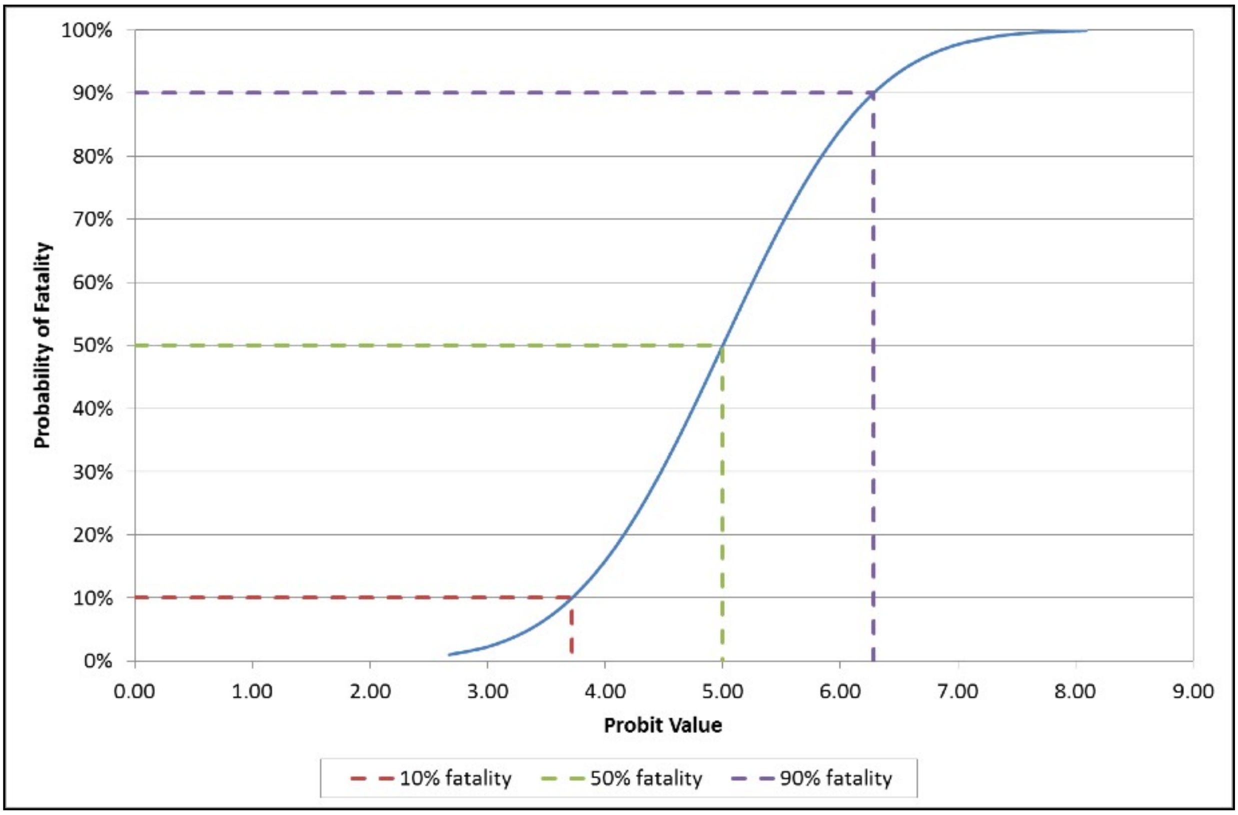

Figure 6-13 Probit Value versus Probability of Fatality

Thermal Effects

The probit function for thermal effects is:

$$Y = -14.9 + 2.56 \cdot \ln\left(I^{4/3} \cdot t\right)$$

In this equation, *I* is the thermal flux expressed in kilowatts per square metre (kW/m^2) and the time *t* is expressed in seconds. For short duration fire events, such as a fireball from a BLEVE at an LPG facility, the time during which people may be exposed to the thermal radiation is set at the duration of the event. For longer duration events, such as bund and pool fires, the duration is typically set at 75 seconds to take account of the time required for people to escape from the area.

In accordance with the HSA's (and other) guidance, the bunded and unbunded fires have been modelled using the following surface emissive powers:

- Class I: 52 kW/m^2.
- Class II and III: 25 kW/m^2.
- Solvent: 40% of the combustion heat is radiated.

For people located indoors, the HSA advises that the building may provide some protection from the fire and that this should be taken into account.

- For exposure to fluxes in excess of 25.6 kW/m^2, the building is conservatively assumed to catch fire quickly and a 100% fatality risk is applied.
- For exposure to fluxes less than 12.7 kW/m^2, the people inside the building are assumed to be protected and a 0% fatality risk is applied.
- For exposure to fluxes in between these two values, people are assumed to escape outdoors and, therefore, have a risk of fatality corresponding to that outdoors.

We have estimated the proportion of people that may be indoors and outdoors based on the particular receptor, which range from 100% indoors for certain offices and other workplaces, to 100% outdoors for the majority of outdoor occupied places within the Port. For residential areas, we have assumed that, on average, people are indoors for 90% of the time and outdoors for 10% of the time.

For vessels berthed in the Port, we have assumed a 50:50 split for people indoors and outdoors, and for vehicles travelling through the Port we have conservatively assumed that the occupants would be subject to similar thermal effects to people outdoors. We have also conservatively assumed that vehicle occupants could be exposed to the corresponding thermal fluxes for 75 seconds.

Overpressure Effects

Unlike the probit for thermal effects, the probit for overpressure effects is only related to the overpressure (*P*); the probit function (with pressure expressed in pounds per square inch – psi) is:

$$Y = 1.47 + 1.35 \cdot \ln(P)$$

For the VCE events at the Class I product storage tanks, the relationship between the overpressure arising from the event and the distance from the source are based on the UK HSE's *Review of significance of societal risk for proposed revision to land use planning arrangements for large scale petroleum storage sites* (RR512, 2007), shown in Table 6-12.

Table 6-12 Distance versus Overpressure for 'Buncefield' Type Events

Distance (m)	Overpressure (mbar)
Up to 50 (near field)	1,000
97	600
264	140
447	70
2,000	13

Toxic Effects

The probit function for toxic effects takes the general form:

$$Y = k_1 + k_2 \ln(C^n \times t)$$

The constants k_1, k_2 and the exponent n are dependent on the particular toxic substance. For dilute hydrofluoric acid (the representative worst-case scenario for the Indaver establishment), the probit takes the form:

$$Y = -8.4 + 1 \times \ln(C^{1.5} \cdot t)$$

In this case, the time *t* is expressed in minutes and, as per the HSA's guidance, is set at 30 minutes.

6.5.2 Results

6.5.2.1 Individual Risk

The aggregated risk contours for the inner, middle and outer zones around the COMAH establishments are shown in Appendix 6-3. The risk contours show that the inner zone (the red contour) extends over the COMAH establishments and adjacent areas along Tolka Quay Road and Alexandra Road, and includes part of the area of the MP2 Project. It also shows that parts of the current road network are located in the inner (red contour), middle (yellow contour) and outer (green contour) zones.

The Sensitivity Level 1 areas associated with the MP2 Project (as described in Section 6.5.3) lie within the inner, middle and outer zones and, as per the HSA's guidance (refer to Section 6.5.1.2), they satisfy the individual risk criteria.

The Sensitivity Level 2 areas associated with the MP2 Project – namely parts of the reconfigured road layout and traffic lanes to and from the ferry terminals also lie within the inner, middle and outer zones. Although the HSA's guidance indicates that Sensitivity Level 2 developments should be advised against if they lie within the inner zone, it is important to recognise that these elements of the development are not new to the Port; rather, they are parts of the existing Port infrastructure that are being relocated as part of the development. In this context, we consider that the Sensitivity Level 2 areas are consistent with the HSA's guidance, taking into account the assessment of the societal risk (described in Section 6.5.2.2).

The Sensitivity Level 3 areas associated with the MP2 Project – namely the passenger and coach check-in areas – lie within the outer zone and therefore satisfy the HSA's individual risk criteria. During peak times, parts of the traffic queue that may accumulate at the check-in booths could enter the middle zone (to the east along Alexandra Road Extension). However, the HSE's guidance on development sensitivity levels, from which the HSA has developed its guidance, permits small parts of developments to straddle zones, as follows:

> *Development Types that 'straddle' zone boundaries will normally be considered as being in the innermost zone to the major hazard unless either of the two following conditions applies. The Development Type will be considered to be in the OUTERMOST of the zones if:*

- less than 10% of the area marked on the application for that particular development type is inside that boundary, or
- it is only car parking, landscaping (including gardens of housing), parks and open spaces, golf greens and fairways or access roads etc. associated with the development; that are in the inner of the zones.

In the case of traffic queueing at the passenger vehicle check-in booths, we estimate that approximately 10% of the queue could lie within the middle zone during normal peak activities, falling within the first of the two criteria for a development that straddles two zones.

Overall, it is considered that the constituent parts of the MP2 Project and their locations relative to the individual risk contours satisfy the HSA's individual risk criteria under its land use planning guidance.

6.5.2.2 Societal Risk

Overview

In this section we examine the societal risk within the Port associated with the MP2 Project. As described in Section 6.5.2.1, the MP2 Project will result in the relocation of existing activities and traffic routes from other areas of the Port currently serving Terminals 1, 2 and 5; the development is not introducing new activities. Therefore, to assess the societal risk, it is reasonable to examine the difference in societal risk between the current Port configuration and the configuration following the MP2 Project.

Risk Integrals

Current Port Layout

There are 1,545 individual events that contribute to the risk across the Port from the individual COMAH establishments, taking into account:

- the generic types of events relevant to each site (e.g. bund fire, VCE, BLEVE);
- the different directions in which certain events may arise (e.g. unbunded pool fires, which may arise from overtopping a bund in one of four directions); and
- the time of day and week when the event may occur and therefore the population (number of people) that may be exposed at that time.

For each individual event there is a probability of occurrence (*f*) and the number of potential fatalities (*N*) (based on the application of the probit function). This data allows the risk integral to be calculated:

$$RI_{COMAH} = \sum_{N=1}^{N_{MAX}} f(N)N^a$$

As per the HSA's guidance, the value of *a* (the degree of risk aversion) is set as 1.4, which yields a conservative estimate for the RI of 101,708 for the current layout. This lies above the lower comparison value of 2,000, below which the risk is considered to be broadly acceptable, and substantially below the upper comparison value of 500,000, above which the risk is considered to be significant.

Post-MP2 Project Port Layout

The RI for the post-MP2 Project is conservatively estimated at 99,062, which is a reduction from the current layout. It also lies between the two criteria of 2,000 (broadly acceptable) and 500,000 (significant).

The reduction in the RI can be attributed to several factors, including the relocation of check-in facilities, queueing and stacking areas for both tourist vehicles and goods vehicles further away from the sources of major accident hazards (the COMAH establishments), as well as the overall reconfiguration of the road network in the eastern end of the Port. Overall, the societal risk for the post-MP2 Project satisfies the HSA's criteria for societal risk as it lies below the significant region, and represents a reduction in societal risk compared to the current Port configuration.

FN Curves

Current Port Layout

As outlined in Section 6.5.1.2, the societal risk can also be assessed by means of an FN curve. Using the same set of data underlying the risk integral (1,545 events, each with a probability of occurrence, *f*, and an estimated number of fatalities, *N*), yields the FN curve for the current layout of the Port shown in

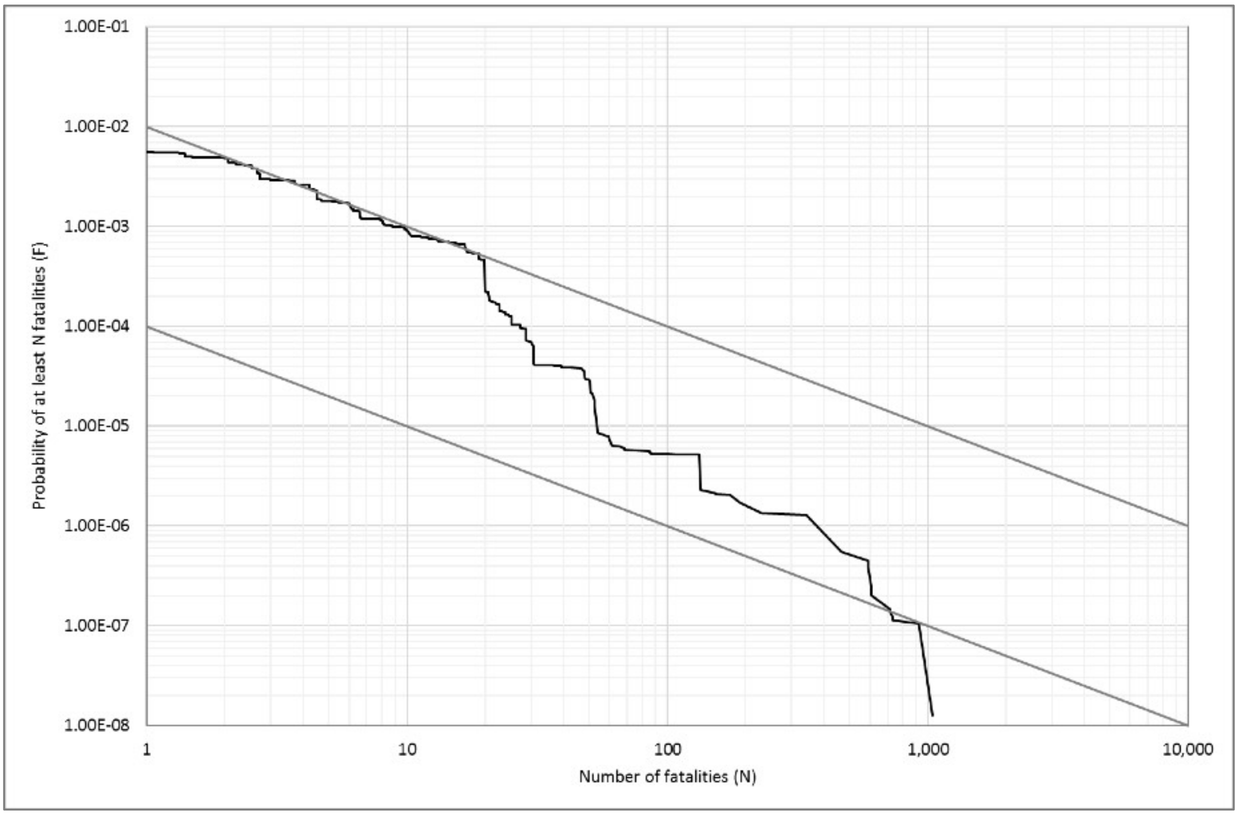

Figure 6-14.

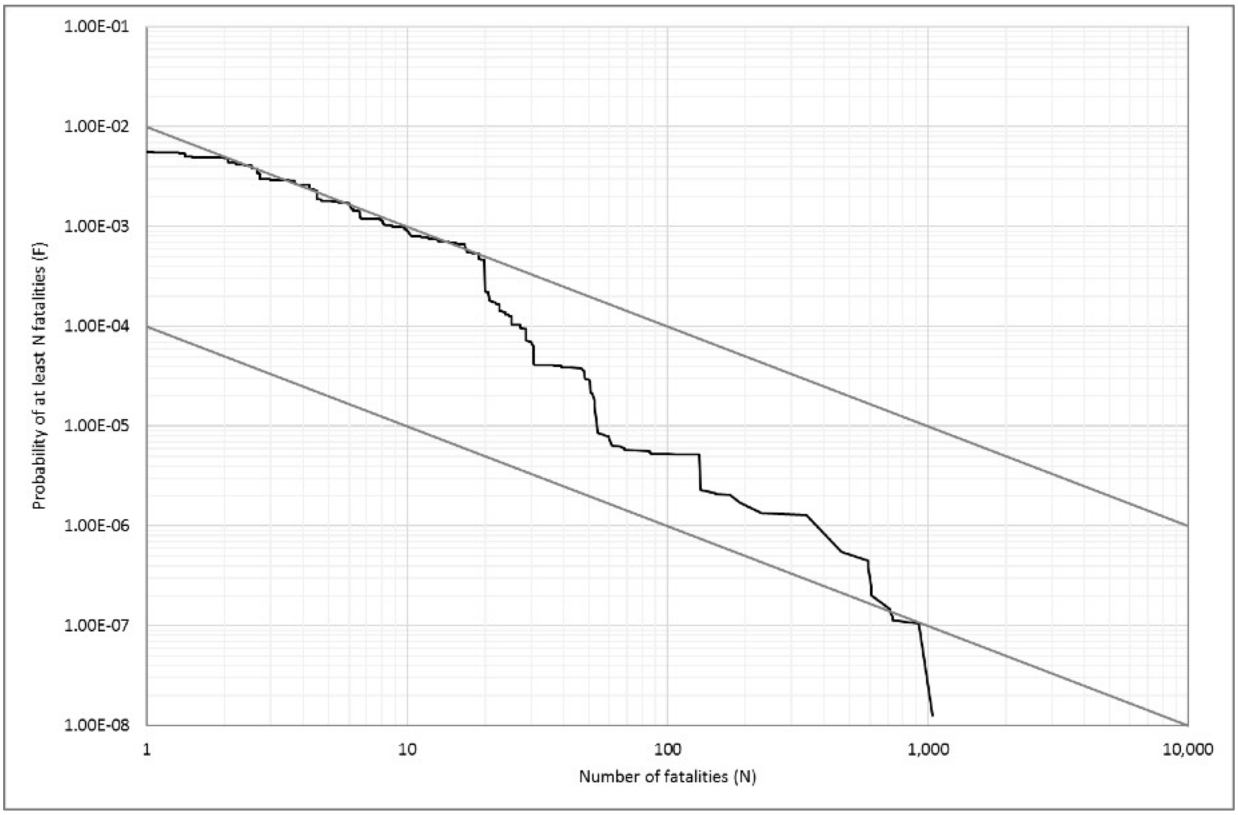

Figure 6-14 FN Curve for Current Port Layout

This shows that the FN curve lies largely within the ALARP (significant) region and the broadly acceptable region. The FN curve touches the upper criterion line briefly, between an *N* of 2 and 6 and again between an *N* of 14 and 19. However, as noted in Section 6.5.1.2, *societal risk criteria should not … be viewed as more than broad indicators of a desirable objective, with many other, non-technical factors needing to be weighed in any final decision*.

In this context, we consider that the societal risk of the current arrangement in the Port can be considered tolerable, taking into account the conservative assumptions underlying this assessment, the estimates for the number of people that may be present in the Port at any one time, and as the FN curve is based on an aggregation of risk across ten separate COMAH establishments[22].

Post-MP2 Project

The FN curve for the layout of the Port following the MP2 Project is shown in Figure 6-15. Again, this shows that the curve lies largely within the ALARP (significant) region and the broadly acceptable region. As in the case of the RI, the FN curve for the post-MP2 Project layout of the Port shows a reduction in the

[22] In its guidance *Reducing risks, protecting people*, the UK HSE proposed that *where societal concerns arise because of the risk of multiple fatalities occurring in one event from a single major industrial activity … the risk of an accident causing the death of 50 people or more in a single event should be regarded as intolerable if the frequency is estimated to be more than one in five thousand per annum*. This corresponds to the upper criterion line for the FN curves. The HSE's guidance also noted that *a single major industrial activity means an industrial activity from which risk is assessed as a whole, such as all chemical manufacturing and storage units within the control of one company in one location or within a site boundary, a cross-country pipeline, or a railway line along which dangerous goods are transported.*

societal risk, which can be attributed to the same factors (the relocation of receptors further from the sources of the major accident hazards).

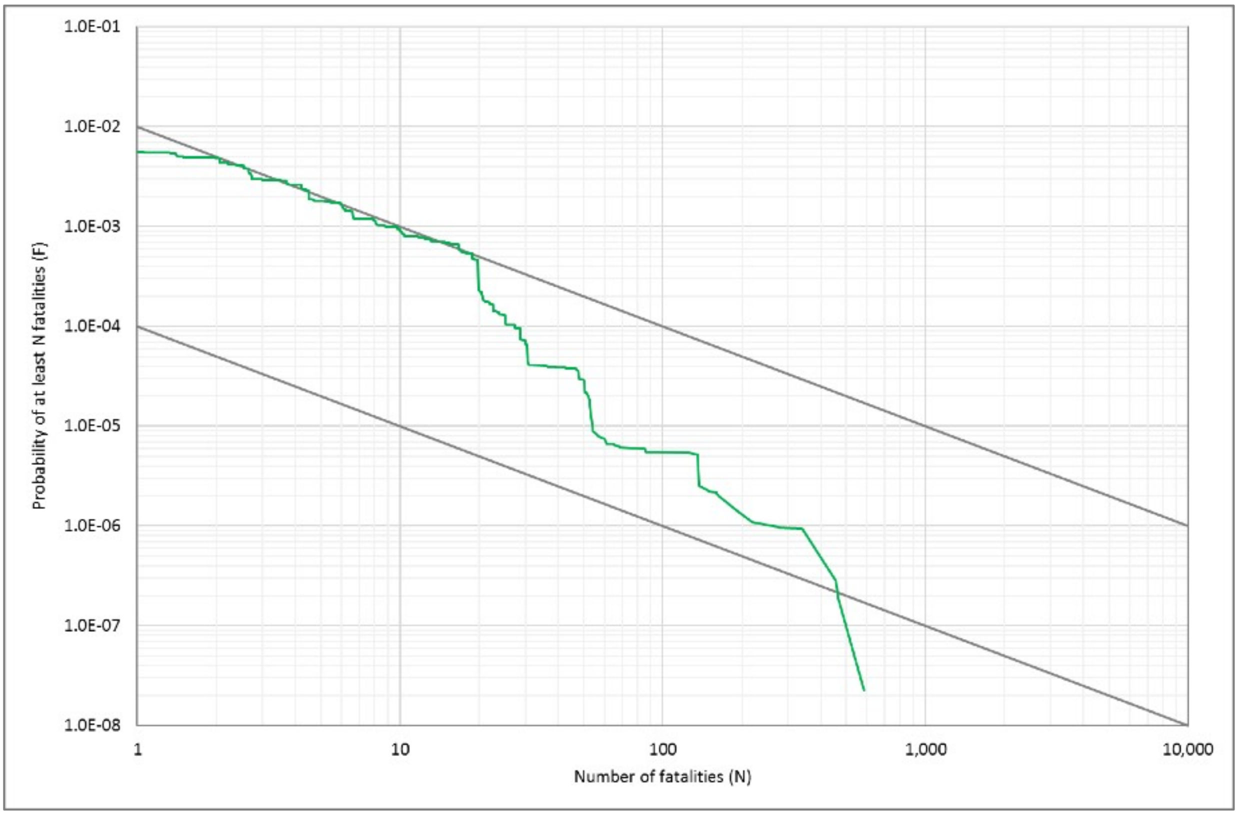

Figure 6-15: FN Curve for MP2 Project

The combination of the current (undeveloped) layout and the post-MP2 Project layout is shown in Figure 6-16 for comparison.

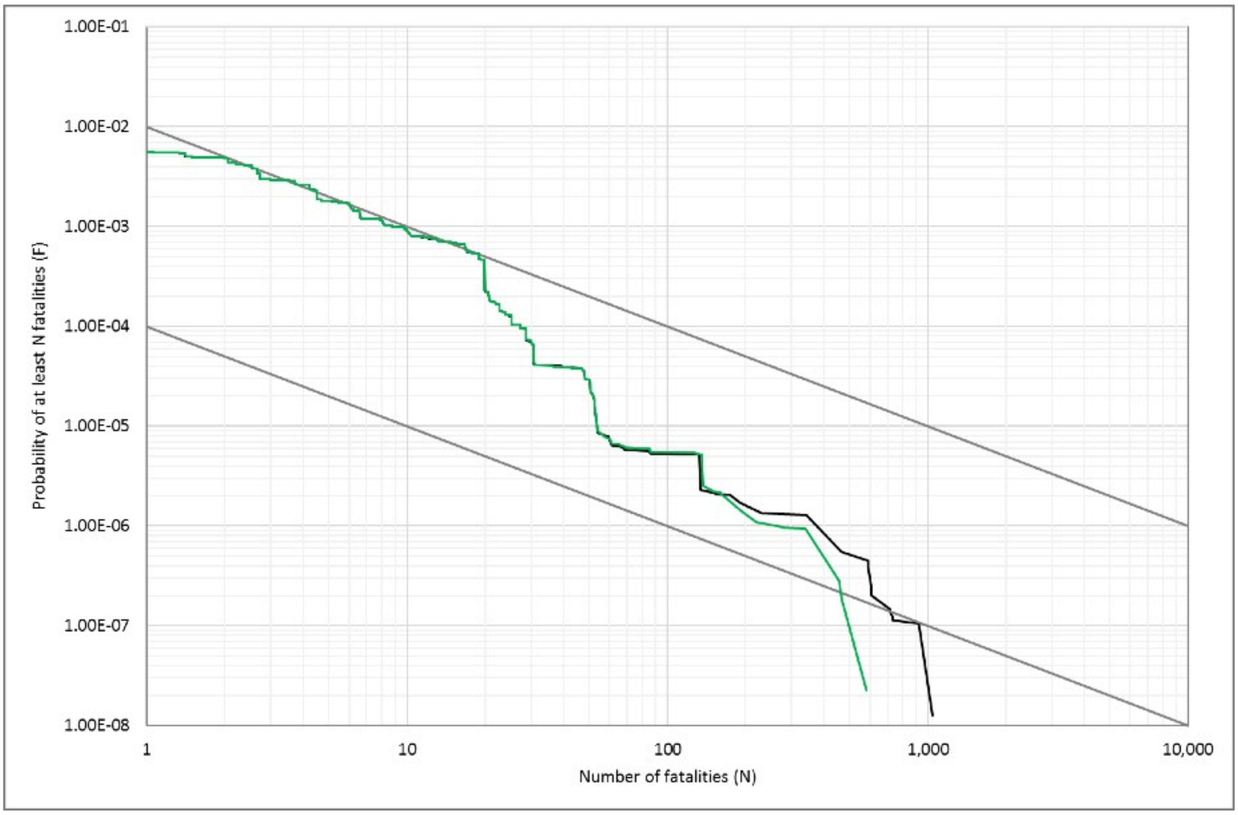

Figure 6-16 Comparison of FN Curves – Current & Post-MP2 Project Layouts

6.5.3 Development Sensitivity Levels

6.5.3.1 Introduction

The HSA provides advice to the planning authorities, in accordance with the COMAH Regulations, using a similar system to that applied by the UK HSE, which is described in the *HSE's Land Use Planning Methodology*. Different types of development are categorised under one of four sensitivity levels:

- Level 1: people at work, parking (workplaces and parking areas).
- Level 2: developments for use by the general public (housing, hotel / hostel / holiday accommodation, transport links, indoor use by the public, outdoor use by the public).
- Level 3: developments for use by vulnerable people (institutional accommodation and education, prisons).
- Level 4: very large and sensitive developments (institutional accommodation, very large outdoor use by the public).

Table 6-13 provides a summary of the sensitivity levels and examples of the types of development for each.

Table 6-13 Summary of development types for Land Use Planning Zones

Zone	Type	Description / Examples
Inner	Workplaces Parking area Estate & access roads Members of the public not normally present, or present in small numbers & for a short time	Workplaces (non-retail) for less than 100 occupants in any building <u>and</u> less than **three** occupied storeys Parking facilities (car park, truck park) with no other associated facilities (other than toilets) Single carriageway roads Developments for **indoor** use by the public where total floor space is **less than 250 m²** (e.g. restaurants and cafés, shops, petrol filling stations, coach / bus stations, ferry terminals)
Middle	Large workplaces Transport links Indoor & outdoor areas for use by the general public	Workplaces providing for more than **100** occupants in any building, <u>or</u> **three** or more occupied storeys in height Major transport links (e.g. motorway, dual carriageway) Developments for **indoor** use by the public where total floor space is **between 250 and 5,000 m²** (e.g. restaurants and cafés, shops, petrol filling stations, coach / bus stations, ferry terminals) Developments for **outdoor** use by the public with less than **100** people at any one time

Zone	Type	Description / Examples
Outer	Developments for use by vulnerable people Large developments for use by the general public	Developments for **indoor** use by the public where total floor space is **greater than 5,000 m^2** (e.g. restaurants and cafés, shops, petrol filling stations, coach / bus stations, ferry terminals) Developments for **outdoor** use by the public with **100 to 1,000** people at any one time
Outside all zones	*Very large and sensitive developments* *Very large developments for use by the general public*	*Developments for **outdoor** use by the public **more than 1,000** people at any one time* *Large outdoor public use e.g. theme parks, open air markets, sports stadia, festivals*

The HSA provides its advice to planning authorities in the form 'advises against' or 'does not advise against' depending on which zone (from Table 6-9) the development lies within, as shown in Table 6-14(a tick indicating 'do not advise against' and a cross indicating 'advise against').

Table 6-14 HSA Matrix for Land Use Planning Advice

Sensitivity Level	Individual Risk Zone (refer to Table 3)		
	Inner Zone	Middle Zone	Outer Zone
Level 1	✓	✓	✓
Level 2	×	✓	✓
Level 3	×	×	✓
Level 4	×	×	×

The development sensitivity levels applicable or analogous to the types of development associated with the MP2 Project are summarised in Table 6-15 (from the HSA's and UK HSE's guidance). The sensitivity levels relevant to the MP2 Project are described in more detail in Sections 6.5.3.2, 6.5.3.3, 6.5.3.4 and 6.5.3.5, based on the HSA's and the HSE's guidance and, in the absence of a direct comparison between the activities in the MP2 Project area and examples of a development type from the HSA's guidance, the principles (justification) outlined in the guidance.

Table 6-15 Development Sensitivity Levels applicable or analogous to Masterplan 2 Project

Development Type	Examples	Development Detail & Size	Justification
DT1.1 – workplaces	Offices, factories, warehouses, haulage depots, farm buildings, non-retail markets, builder's yards.	Workplaces (predominantly nonretail), providing for less than 100 occupants in each building **and** less than 3 occupied storeys – **Level 1**	Places where the occupants will be fit and healthy, and could be organised easily for emergency action. Members of the public will not be present or will be present in very small numbers and for a short time.
	Exclusions		
	-	**DT1.1 ×1** Workplaces (predominantly non-retail) providing for 100 or more occupants in any building or 3 or more occupied storeys in height – **Level 2** (except where the development is at the major hazard site itself, where it remains Level 1).	Substantial increase in numbers at risk with no direct benefit from exposure to the risk.
	Sheltered workshops, Remploy.	**DT1.1 ×2** Workplaces (predominantly non-retail) specifically for people with disabilities – **Level 3**	Those at risk may be especially vulnerable to injury from hazardous events and / or they may not be able to be organised easily for emergency action
DT1.2 – parking areas	Car parks, truck parks, lock-up garages	Parking areas with no other associated facilities (other than toilets) – **Level 1**	-
	Exclusions		
	Car parks with picnic areas, or at a retail or leisure development, or serving a park and ride exchange.	**DT1.2 ×1** Where parking areas are associated with other facilities and developments the sensitivity level and the decision will be based on the facility or development.	-

DT2.1 – housing	Houses, flats, retirement flats/ bungalows, residential caravans, mobile homes.	Developments up to and including 30 dwelling units **and** at a density of no more than 40 per hectare – **Level 2**	Development where people live or are temporarily resident. It may be difficult to organise people in the event of an emergency.
	Exclusions		
	Infill, backland development	**DT2.1 ×1** Developments of 1 or 2 dwelling units – **Level 1**	Minimal increase in numbers at risk.
DT2.2 – hotel / hostel / holiday accommodation	Hotels, motels, guest houses, hostels, youth hostels, holiday camps, holiday homes, halls of residence, dormitories, accommodation centres, holiday caravan sites, camping sites.	Accommodation up to 100 beds or 33 caravan / tent pitches – **Level 2**	Development where people are temporarily resident. It may be difficult to organise people in the event of an emergency.
	Exclusions		
	Smaller - guest houses, hostels, youth hostels, holiday homes, halls of residence, dormitories, holiday caravan sites, camping sites.	**DT2.2 ×1** Accommodation of less than 10 beds or 3 caravan / tent pitches – **Level 1**	Minimal increase in numbers at risk.
DT2.3 – transport links	Motorway, dual carriageway.	Major transport links in their own right; i.e. not as an integral part of other developments – **Level 2**	Prime purpose is as a transport link. Potentially large numbers exposed to risk, but exposure of an individual is only for a short period.
	Exclusions		
	Estate roads, access roads.	**DT2.3 ×1** Single carriageway roads – **Level 1**	Minimal numbers present and mostly a small period of time exposed to risk Associated with other development
DT2.4 – indoor use by public	**Food & drink**: drive-through fast food. **Retail**: petrol filling station (total floor space based on shop area not forecourt),	Developments for use by the general public where total floor space is from 250 m^2 up to 5,000 m^2 – **Level 2**	Developments where members of the public will be present (but not resident) Emergency action may be difficult to co-ordinate.

	Assembly & leisure: coach / bus / railway stations, ferry terminals, airports.		
	Exclusions		
	-	**DT2.4 ×1** Development with less than 250 m^2 total floor space (of all floors) – **Level 1**	Minimal increase in numbers at risk
DT2.5 – outdoor use by public	**Assembly & leisure**: coach / bus / railway stations, park & ride interchange, ferry terminals.	Principally an outdoor development for use by the general public i.e. developments where people will predominantly be outdoors and not more than 100 people will gather at the facility at any one time – **Level 2**	Developments where members of the public will be present (but not resident) either indoors or outdoors. Emergency action may be difficult to co-ordinate.
	Exclusions		
	Outdoor markets, car boot sales, funfairs. Picnic area, park & ride interchange, viewing stands, marquees.	**DT2.5 ×1** Predominantly open-air developments likely to attract the general public in numbers greater than 100 people but up to 1,000 at any one time – **Level 3**	Substantial increase in numbers at risk and more vulnerable due to being outside

6.5.3.2 Check-in Booths & Stacking

Car Passengers

Car passengers are members of the public and may include vulnerable people (the young, elderly and / or infirm), and they may not be easy to organise in the event of an emergency. Individual car passengers may only be present at the check-in booths for a relatively short time during the check-in process (typically less than 1 minute). However, a queue may start to form 15 minutes before the check-in booths open and therefore a queue of traffic of up to 580 m may form before the booths open. Based on the indicated 6 no. lanes for light vehicle check-in, the queue may extend approximately 100 m west from the check-in booths.

In the event of three ships departing at the same time, and assuming a conservative 45 second check-in time, the longest queue of passenger vehicles may be up to 680 m, extending approximately 115 m west from the check-in booths. Based on an average car length of 6 m (including the gap to other vehicles) and up to 4 passengers per car, there could be in the order of 450 people in the queue leading to the check-in booth. Based on the HSA's COMAH land use planning guidance, we consider that the check-in booths and the associated vehicle queue falls within Sensitivity Level 3:

- The check-in booths and queues constitute outdoor use by the public.
- There is likely to be more than 100 people, but less than 1,000 people present in the queue.
- The queue may include vulnerable members of the public.
- Members of the public may be more difficult to organise in the event of an emergency.

The light vehicle check-in booths are within the outer zone, which is consistent with the HSA's guidance. The majority of the length of the associated queue lies within the outer zone, with the potential for a small proportion to lie within the middle zone. Under the land use planning guidance, a small proportion of the queue (up to approximately 10% of the queue length) may extend into the middle zone.

Coaches

Coach traffic will check-in at the same booths as passenger cars. As coaches also contain members of the public and at a higher passenger density, we consider that the check-in booths and associated queues fall within Sensitivity Level 3, provided that the total number of people that may be present in the queue is limited to 1,000.

Professional Drivers

Shunter Drivers

In our opinion, shunter drivers may be classified as workers in the context of the COMAH land use planning guidance. The examples of workplaces provided in the HSA's (and HSE's) guidance include offices, factories, warehouses and haulage depots and are therefore not confined to COMAH workplaces. The areas in which trailers are parked and manoeuvred are analogous to warehouses and haulage depots (workplaces) or to truck parks (parking areas), both of which fall within Sensitivity Level 1 provided that there are no more than 100 occupants (workers) present. Therefore, areas in which shunter drivers operate may be located within the inner zone.

Dangerous Goods Vehicle Drivers

Drivers of heavy goods vehicle (HGV) and light goods vehicle (LGV) that transport dangerous goods are subject to the *European Agreement Concerning the International Carriage of Dangerous Goods by Road* (ADR). As set out in the HSA's guidance on ADR:

> *The ADR and current regulations on the carriage of dangerous goods by road require drivers of vehicles used for the carriage of dangerous goods by road to be trained to enable them to understand and be aware of hazards arising in the carriage of dangerous goods. The training must give drivers basic information indispensable for minimising the likelihood of an incident taking place and, in such an event, to enable them to take measures that may prove necessary for their own safety and that of the public and the environment, to limit the effects of such an incident.*

There is no explicit guidance on whether trained drivers should be classified as members of the public or as workers[23], or whether the areas in which such drivers operate should be classified as workplaces under the COMAH land use planning guidance. It is therefore necessary to consider the principles (justification) set out by the HSA for the different sensitivity levels.

In general, Sensitivity Level 1 developments (which can be accommodated within the inner zone) are places where occupants will be fit & healthy and could be organised easily for emergency action. Workplaces fall within Sensitivity Level 1, as well as places where (very) small numbers of members of the public may be present for a short time.

In this context, we consider that it is reasonable to classify drivers of dangerous goods vehicles as workers and the areas in which they operate as workplaces, and therefore the check-in booths and associated queues for this class of driver fall within Sensitivity Level 1, subject to a maximum of 100 drivers (occupants).

- Drivers of dangerous goods vehicles are exposed to hazards similar to those present within the Port, and at COMAH establishments in general, and therefore they may be expected to have a greater awareness of the hazards within the Port and a greater capacity to respond in an emergency.
- Drivers of dangerous goods vehicles are workers, and by virtue of using the Port, the Port forms part of their workplace.
- Drivers of dangerous goods vehicles are required to undergo specialised training on ADR, in addition to their training as professional drivers.
- Truck parks are classified as Sensitivity Level 1.

[23] HGV, LGV and other professional drivers may be classified as workers based on their occupation / employment status.

During peak times, there could be a queue of up to 1,680 m of goods vehicles at the check-in booths. Based on an average length of 16 m (including the space between vehicles) and a single driver per vehicle, there could be in the order of 100 drivers (occupants) present in the queue. This type of development could be accommodated within the inner zone.

Other Drivers

Drivers of goods vehicles that do not convey dangerous goods are not required to undergo specialised ADR training and therefore may not be as familiar with hazardous substances and the associated risks. However, while this class of drivers may not have undergone ADR training, professional drivers operating within the EU are subject to the EU Directive *on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers* (2003/59/EC) and the corresponding national legislation. The Directive applies to drivers under licence categories C and D (LGV, HGV and passenger vehicles) and requires that drivers undergo specialised training:

- **to ensure passenger comfort and safety**: road sharing, using specific infrastructures (public areas, dedicated lanes), managing conflicts between safe driving and other roles as a driver, interacting with passengers, peculiarities of certain groups of passengers (disabled persons, children);
- **to know the regulations governing the carriage of goods**: transport operating licences, international transport permits, crossing borders;
- **to know the regulations governing the carriage of passengers**: carriage of specific groups of passengers, safety equipment on board buses;
- **to make drivers aware of the risks of the road and of accidents at work**: types of accidents at work in the transport sector, involvement of lorries / coaches, human, material and financial consequences; and
- **to assess emergency situations**: behaviour in an emergency situation, assessment of the situation, avoiding complications of an accident, summoning assistance, assisting casualties and giving first aid, reaction in the event of fire, evacuation of occupants of a lorry / bus passengers, ensuring the safety of all passengers.

While this training may not be specifically aimed at the hazards associated with COMAH establishments, it requires that professional drivers have a greater level of training than members of the public.

As in the case of drivers of dangerous goods vehicles, we consider that it is reasonable to consider that professional drivers of goods vehicles are workers and that the areas in which they operate are workplaces. Therefore, we consider that it is reasonable to classify the check-in booths for all professional drivers and the associated queues as Sensitivity Level 1, subject to a maximum of 100 drivers (occupants):

- All professional drivers are required to undergo specialised training, including training for emergency situations.

- Professional drivers are workers, and by virtue of using the Port, the Port forms part of their work place.
- Truck parks are classified as Sensitivity Level 1.

During peak times, there could be a queue of up to 1,680 m of goods vehicles at the check-in booths. Based on an average length of 16 m (including the space between vehicles) and a single driver per vehicle, there could be in the order of 100 drivers (occupants) present in the queue. This type of development could be accommodated within the inner zone.

6.5.3.3 State Services

Offices

Offices and indoor workplaces for the state services (customs, immigration, policing, government departments) for up to 100 people and for a building no more than two storeys fall within Sensitivity Level 1 and may be located within the inner zone. Larger workplaces (for more than 100 people, or more than 2 storeys) fall within Sensitivity Level 2 and could be accommodated in the middle zone.

Inspection Areas

There is no explicit guidance on the relevant sensitivity level for areas in which state services workers carry out inspections and checks on passengers and vehicles, and therefore it is necessary to consider the HSA's principles (justifications) for the different sensitivity levels.

In our opinion, it is reasonable to consider short duration inspections / checks, during which passengers remain within their vehicle, or exit the vehicle to open doors / car boots to allow a brief visual inspection, as meeting the general description for a Sensitivity Level 1 development, with members of public present in very small numbers for a (very) short time (DT1.1).

Areas in which more detailed inspections / checks are carried out, during which the occupants may be required to remain outside the vehicle for a longer period (30 to 60 minutes), may also meet the general requirements for Sensitivity Level 1 developments, based on the following:

- Only small numbers of people will be present at any one time (see justification for DT1.1 in Table 6-15).
- While the inspection may be longer than the initial 'screening' check / visual inspection, on average the inspections will be of a relatively short duration (see justification for DT1.1, DT2.3 and DT2.4 ×1 in Table 6-15).
- Members of the public at the inspection area will be accompanied at all times by members of State Services staff and therefore any emergency action that may be required could be organised relatively easily (see justification for DT1.1, DT2.3 and DT2.4 ×1 in Table 6-15).
- Several developments for members of the public are explicitly classified as Sensitivity Level 1 areas, including:
  - Car parks (with no other facilities) (DT1.2 ×1 in Table 6-15),

- Developments of 1 or 2 dwellings (which could contain up to 10 people) (DT2.1 ×1 in Table 6-15),
- Accommodation of less than 10 beds or 3 caravan / tent pitches (DT2.2 ×1 in Table 6-15), and
- Indoor areas up to 250 m^2 for use by the public (DT2.4 ×1 in Table 6-15)[24].

While none of these examples are directly analogous to an inspection area, they demonstrate that small numbers of members of the public can be accommodated within the inner zone.

6.5.3.4 Other Areas

Staff Car Park

Staff car parks fall within Sensitivity Level 1 as they are parking areas associated with a workplace (DT1.1)

Cabins / Offices

Other cabins / offices and similar indoor workplaces for up to 100 people and for a building no more than 2 storeys fall within Sensitivity Level 1.

6.5.3.5 Summary

In our opinion, the check-in booths, queuing areas and state services area may be classified as shown in Table 6-16. However, the sensitivity levels for the different parts of the development will ultimately be subject to agreement with the HSA.

Table 6-16 Summary of Development Sensitivity Levels

Area	Sensitivity Level	Land Use Planning Zone	Notes
Passenger car check-in booths & queues	3	Outer	Approximately to 10% of the queue may straddle the middle zone (Sensitivity Level 2)
Coach check-in booths & queues	3	Outer	Approximately 10% of the queue may straddle the middle zone (Sensitivity Level 2)
Shunter drivers	1	Inner	Subject to a maximum of 100 occupants within the inner zone
HGV check-in booths & queues	1	Inner	Subject to a maximum of 100 occupants within the inner zone
State services – offices / indoor workplaces	1	Inner	Subject to a maximum of 100 occupants and no more than 2 storeys

[24] There is an apparent discrepancy between the list of development sensitivity levels under the exclusions for DT2.4 *Indoor Use By Public* in the HSA's guidance and the corresponding list of development exclusions in the *HSE's Land Use Planning Methodology*. The exclusions in the HSA's guidance for DT2.4 correspond to the exclusions are for DT2.5 (*Outdoor Use By Public*) in the HSE's guidance.

Area	Sensitivity Level	Land Use Planning Zone	Notes
State services – short duration inspection / visual check	1	Inner	Limited to a short duration inspection in which the occupants remain in the vehicle or exit the vehicle to facilitate a brief visual inspection by State Services.
State services – detailed vehicle inspection	1 (2)	Inner (Middle)	Subject to agreement with the HSA; otherwise likely to fall within Sensitivity Level 2 (middle zone)

6.6 Non-COMAH Events

6.6.1 Introduction

The COMAH Regulations only apply to establishments that store, handle or process dangerous substances above certain thresholds; the Regulations do not apply to either:

- the transport of dangerous substances by road, rail, internal waterways, sea or air outside establishments, including loading and unloading and transport to and from another means of transport at docks, wharves or marshalling yards; or
- the transport of dangerous substances in pipelines, including pumping stations, outside establishments.

As such, the HSA’s guidance on COMAH land use planning does not apply to the transport of dangerous goods by road, or to pipelines conveying dangerous substances within the Port estate but outside establishments. The risks associated with these activities are considered in the following sub-sections.

6.6.2 Transport of Dangerous Substances by Road

The substances that are stored and handled at the COMAH establishments are also transported to and / or from the establishments by road; these include:

- Petroleum products and LPG are loaded into road tankers at the respective sites for distribution to customers, with the road tankers making use of certain roads within the Port to get from the COMAH establishment to the main road network (outside the Port).
- In the case of Indaver, waste materials are transported to the site in light and heavy goods vehicles, including road tankers for bulk waste solvents. The materials are sorted and segregated at the site and are subsequently dispatched from the site in trucks and road tankers for export or transfer to another waste facility.

Petroleum products are loaded at the following locations:

- on the southern part of the Valero establishment, with vehicles exiting the site onto Alexandra Road, and either No. 2 Branch Road North or Breakwater Road North onto Tolka Quay Road ultimately exiting the Port along Promenade Road, or continuing along Alexandra Road and exiting the Port at East Wall Road;
- at TOP Yard 1, with vehicles exiting the site via No. 2 Branch Road North Extension, onto Tolka Quay Road, ultimately exiting the Port along Promenade Road;
- at the truck loading yard opposite TOP Yard 1 on No. 2 Branch Road North Extension serving the Fareplay establishments, with vehicles exiting the site via No. 2 Branch Road North Extension, onto Tolka Quay Road, ultimately exiting the Port along Promenade Road;
- at the Iarnród Éirean depot on Alexandra Road (class III material only), with vehicles exiting the site onto Alexandra Road, onto No. 2 Branch Road North, and onto Tolka Quay Road, ultimately exiting the Port along Promenade Road, or continuing along Alexandra Road and exiting the Port at East Wall Road; and
- at Topaz Yard 1 on Alexandra Road, with vehicles exiting the site onto Alexandra Road and exiting the Port at East Wall Road.

LPG is loaded onto road tankers at the Calor establishment (the closest COMAH establishment to the MP2 Project), with tankers exiting the site onto Tolka Quay Road and ultimately exiting the Port along Promenade Road. Waste transported to the Indaver establishment generally enters the Port via Promenade Road and along Tolka Quay Road. Sorted / segregated / bulk waste is dispatched from the site either in container for export via container ship, or in road tankers (for the bulk solvent) or trucks (for packaged materials) via Ro-Ro cargo vessel (ferry). These shipments exit the site onto Tolka Quay Road and are transported to the relevant location within the Port.

All vehicles conveying dangerous substances by road are subject to the *European Agreement Concerning the International Carriage of Dangerous Goods by Road* (ADR), while dangerous goods conveyed by ship (either in containers or in trucks / tankers on ferries) are subject to *The International Maritime Dangerous Goods (IMDG) Code*. The ADR and IMDG both set out the requirements for packing, loading, filling, transporting and unloading dangerous goods, and the requirements for the performance of the containers, the segregation / separation of incompatible materials, the separation of dangerous goods from other goods and, in the case of the IMDG, separation from passenger spaces, and the actions to be taken in the event of an emergency. In addition, dangerous substances within the Port estate are governed by the *Dublin Port Bye-Laws - Dangerous Goods (Cargoes)* 2014 (refer to Section 6.7.7).

Specialised vehicles that convey dangerous substances, such as road tankers (for petroleum products and LPG), must be certified for the transport of dangerous goods on an annual basis. Therefore, in addition to holding a Commercial Vehicle Road Test certificate (either as a heavy or light commercial vehicle), these vehicles must also hold an ADR vehicle certificate. As noted in Section 6.5.3.2, drivers of vehicles conveying dangerous goods must hold a valid ADR Training Certificate, which requires completion of an approved basic and / or tanker specialisation driver training course and successful completion of an exam, which, in Ireland, is managed by the Chartered Institute of Logistics.

If a vehicle transporting a dangerous substance were involved in an incident giving rise to a major accident, the consequences would be similar in nature to those described for the COMAH establishments (e.g. an explosion, fire or release of potentially toxic material), albeit that the quantities involved in the incident would generally be smaller. The traffic routes that such vehicles use generally coincide with the areas of the Port that may be impacted by events at the individual COMAH establishments, including in particular unbunded pool fires. The traffic routes for vehicles conveying dangerous substances also coincide, in part, with the routes used by other traffic within the Port, including traffic to and from the ferry terminals at the east end of the estate in the area of the MP2 Project. As the same traffic will continue to access the east end of the Port following the MP2 Project and the unification of the ferry terminals, there is no change in the risk to which such vehicles and occupants are exposed from the transport of dangerous goods by road.

6.6.3 Common Oil Pipeline

The Common Oil Pipeline (COP) is used for transferring petroleum products from the oil berths to the various oil storage sites (including the eight COMAH establishments that store petroleum products), and for transferring LPG to the Calor establishment. The COP comprises separate pipelines for different products, including LPG, gasoline, kerosene, gas oil and bitumen (to three facilities that store bitumen and that are not subject to the COMAH Regulations). The pipelines generally run above-ground, with short sections running under certain road junctions and in culverts. The COP extends from Jetty Road to the north of the jetties, from where it takes one of two routes:

- To the west along Jetty Road, along the southern boundaries of the Valero, Irish Tar & Bitumen, and Iarnród Éireann sites onto No. 4 Branch Road South, and then north along No. 4 Branch Road South and No. 2 Branch Road North. At the junction with Tolka Quay Road, this part of the COP splits into three:
  - west along the south side of Tolka Quay Road,
  - north along No. 2 Branch Road North Extension,
  - east along the south side of Tolka Quay Road, and
- to the east along Jetty Road, before turning north along the western side of Breakwater Road South. At the junction with Tolka Quay Road, this part of the COP splits into two:
  - west along the south side of Tolka Quay Road, and
  - east along the south side of Tolka Quay Road (serving the Calor establishment).

The individual pipelines are between 6 inches and 10 inches (150 mm to 250 mm) in diameter. They are conveyed on dedicated pipeline supports and are separated (and protected) from the roadways by concrete or metal barriers. Petroleum products are transferred through the pipelines at flow rates of between 140 and 460 tonnes per hour. In the event of a loss of containment from a pipeline, due to an external impact (e.g. significant traffic incident or civil / construction works in the vicinity of a pipeline) or failure of a pipeline, up to

140 tonnes could be released, based on a conservative 20-minute response time to shut down the pumps. Depending on the location of such a failure, the product could spill onto the road and, if ignited (refer to Section 6.5.1.3), would result in an unbunded pool fire similar to those described for the individual COMAH establishments.

As in the case of the transport of dangerous goods by road, the route for the COP coincides, in part, with the routes used by traffic in the Port, including traffic to and from the terminals at the east end of the estate in the area of the MP2 Project. As the same traffic will continue to access the east end of the Port following the MP2 Project and the unification of the ferry terminals, there is no change in the risk to which such vehicles and occupants are exposed from the COP.

6.7 Emergency Response Management

6.7.1 Introduction

Dublin Port's approach to Emergency Response Management is described in the following sub-sections, in the context of the potential for major accident hazards to arise at the COMAH establishments and, more generally, for other incidents and accidents that may arise across the Port estate.

6.7.2 Dublin Port Traffic Management

There are three access / egress points within the Port:

- The main entrance to and exit from the Port is on Promenade Road, which is manned 24 hours per day, 7 days per week, 365 days a year, by An Garda Síochána.
- The entrance to / exit from the Port on Tolka Quay Road is normally closed to traffic, but it can be opened in the event of an emergency in consultation with DCC and An Garda Síochána.
- The entrance to / exit from the Port on Alexandra Road is normally open and is manned 24 hours per day, 7 days per week, 365 days a year, by An Garda Síochána. This entrance / exit provides access to DPC's administration / office building and to parts of the commercial and industrial areas of the Port; in normal operation, it is not used for access to / egress from ferry Terminals 1, 2 or 5.

These three entrances / exits provide access to / from the three main roads running east-west: Promenade Road, Tolka Quay Road and Alexandra Road. The normal traffic routes through the Port for the majority of traffic, and in particular for the traffic accessing Terminals 1, 2 and 5 is via the main entrance on Promenade Road to the roundabout at the junction with Bond Drive Extension.

In the event of an incident, traffic can either be held by the Harbour Police and Dublin Port Security at a safe location, depending on the location and nature of the incident / emergency, or alternatively it can be diverted onto one of the other east-west (or adjoining roads) to facilitate egress from the Port. The main diversion routes that have been established by the Port for emergency access are included in Appendix 6-4. DPC implements these diversion routes on a regular basis, not due to incidents in the Port, but rather due to closures in the

Dublin tunnel which requires traffic to be diverted in conjunction with DCC, An Garda Síochána and Transport Infrastructure Ireland.

If an incident at one of the COMAH establishments resulted in a bund or unbunded fire at or immediately adjacent to one of the primary access roads (e.g. on Tolka Quay Road), the Port would activate its emergency procedures and divert any traffic from the eastern end of the Port (e.g. disembarking traffic from the ferry terminals) via Dublin Ferryport Terminal (DFT) (diversion route 1 on the drawings in Appendix 6-4). In addition, the Port has significant capacity to store cargo (tourist cars & HGV) at a combination of Terminals 1, 2, 5, depending on the nature and location of the particular event requiring the emergency action. The holding areas at Terminals 1 and 5 are located in the outer zone or outside the outer zone.

Overall, the Port has two normally open routes in / out (via Promenade Road and Alexandra Road) and a back-up route (via Tolka Quay Road). Given the layout of the Port and the location of the COMAH establishments, a major accident at one establishment is unlikely to affect access via all three routes, and in all but the largest events, an event is only likely to affect one of the three routes. Therefore, the Port will always have an alternative route to provide access to / egress from the estate.

6.7.3 Dublin Port Security

DPC operates its own Harbour Police & Port Security, which is present 24 hours per day, 7 days per week, 365 days a year. Two patrol vehicles operate at all times in conjunction with An Garda Síochána, and the Port has a close working relationship with DCC, the operator of the Dublin Port Tunnel, and TII. In addition, DPC has a comprehensive CCTV system across the estate, with over 130 camera locations monitoring the complete road network and port infrastructure, with the system monitored by Harbour Police & Port Security 24 hours per day, 7 days per week, 365 days a year. Therefore, in the event of an incident on the road network, or an incident at a COMAH (or other facility) within the Port requiring the diversion of traffic, the Port can respond immediately and co-ordinate directly with the relevant emergency services.

6.7.4 Dublin Port Emergency Management Plan

6.7.4.1 Summary

As set out in *A Framework For Major Emergency Management* (produced by the National Steering Committee for Major Emergency Management), the Harbours Act places responsibility on the Harbour Master for the safety of shipping and all activities within the defined port limits. The legislation also requires that emergency plans be prepared in respect of the major ports. These emergency plans are designed generally to deal with incidents, in the first place using the port's own resources. Each port is also required to prepare an oil pollution plan to deal with oil pollution incidents, and responsibility for implementing the plan rests with the harbour master. Where COMAH establishments are located within a port (or harbour), the port authority is designated as a local competent authority and as such is included in the relevant external emergency planning process.

In this context, DPC has developed its Emergency Management Plan (Appendix 6-5), the aim of which is to set out the structures and arrangements that will be used in response to an emergency to mitigate:

- loss of life or injury to employees, contractors, visitors and local residents,

- damage to the environment, and
- damage to the facilities, plant and equipment within the port, its commercial partners, tenant companies and neighbours.

The plan also aims to ensure that DPC emergency management structures and arrangements are compatible with the requirements of the Framework for Major Emergency Management.

The actions to be taken in an emergency are decided by the Emergency Management Team (EMT) and the plan itself may be activated by the Chief Executive Office, the Emergency Management Marine Coordinator (EMMC), or the Emergency Management Land Coordinator (EMLC), depending on the circumstances and severity of the incident.

The plan is designed to cater for both marine and land-based emergencies; land emergency scenarios may include:

- major fire within the general port area,
- major oil spill,
- major spill of hazardous material,
- a vehicle accident involving hazardous material,
- chemical incidents (e.g. toxic cloud), or
- major incident in an oil, gas or hazardous material storage facility.

The *Dublin Port Emergency Management Plan* also contains several scenario-specific sub plans for the individual types of emergency scenario, which focus on the immediate actions to be taken by internal sections of the Port Authority.

6.7.4.2 Dublin Port Alarm

The DPC fire alarm panel system is located in the Harbour Police / Port Security Control Room, situated on the ground floor of the Port Operations Centre. The fire alarm system monitors approximately 21 sites, and break glass units are located throughout the port estate.

The fire alarm system can be activated manually or automatically from various points around the port directly linked to the system. When activated, the Harbour Police / Port Security are immediately alerted and investigate the alarm before deciding on what action is required. The port wide sirens are located at the ESB North Wall Generating Station, the oil jetties, and DP Warehousing. With the exception of alarm tests, all pumping stops immediately on sounding of the Port-wide siren. Fire Wardens on the oil jetties communicate with all COP users by VHF radio.

For confirmed alarm activations, the affected site and Harbour Police / Port Security request the attendance of the emergency services, advising them of the nature of the emergency, name and location of the site affected using the ETHANE pneumonic:

- **E**xact location of the emergency.
- **T**ype of emergency (e.g. fire; hazardous material spill; road traffic accident).
- **H**azards (present and potential).
- **A**ccess route to the emergency.
- **N**umber and type of casualties (if known).
- **E**mergency Services (those present and those required).

Once confirmed, the Harbour Police / Port Security immediately open the emergency gates located at the western end junction of Tolka Quay Road and East Wall Road, and this immediate area operates as the emergency services rendezvous point. Dublin Fire Brigade will be dispatched to the Port to deal with the incident, whilst the Harbour Police / Port Security will implement a traffic control plan, with the support of An Garda Síochána, as required.

The Port-wide alarm system is a continuous wailing alarm sound. On hearing this alarm, Port users should:

- Be aware that an incident is ongoing.
- Account for staff, visitors and contractors.
- Continue to operate as normal unless instructed otherwise, or individual company standard operating procedures indicate otherwise.
- Wait for further instructions from the Harbour Police / Port Security or the Principal Emergency Services[25].

Port users should await further information from the Harbour Police / Port Security, whilst members of the public should tune in to a national radio station for updates.

6.7.4.3 Port Evacuation

During an emergency it may be necessary to evacuate the Port, or parts of the Port. The Port is divided into six separate areas for evacuation planning purposes, as shown in Figure 6-17. The Harbour Police / Port Security control traffic flow throughout the Port in the event of an evacuation of one or more areas (as described in Section 6.7.2).

[25] An Garda Síochána, the Ambulance Service and the Fire Service. A fourth principal emergency service, the Irish Coast Guard, is responsible for the initiation, control and co-ordination of maritime emergencies in the Irish territorial waters, harbours and coastline.

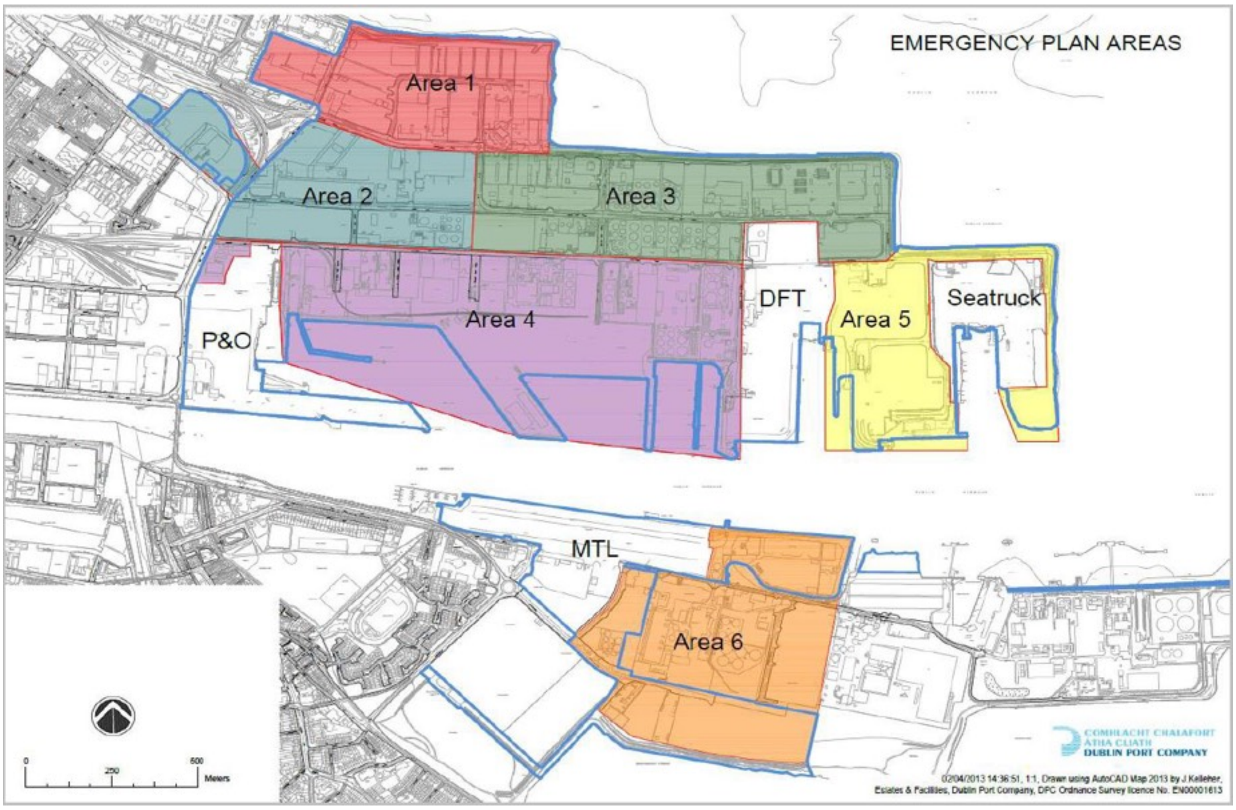

Figure 6-17 Dublin Port Company Evacuation Areas

6.7.5 Dublin City Council Major Emergency Plan

Dublin City Council, the relevant Garda Division and Health Service Executive District are the principal response agencies (PRA) charged with managing the response to emergency situations that arise within Dublin City Council's administrative boundary. The Dublin City Council Major Emergency Plan is supported by, and is compatible with, the major emergency plans of An Garda Síochána and the Health Service Executive. In certain circumstances, the local response may be escalated to regional level, thus activating the plan for regional level co-ordination. If this is activated, the management of the incident is coordinated from a regional perspective.

Several specific local plans, such as the response plan to flood emergencies, remain in place as standalone plans, which can be implemented under the general arrangements and structures set out in the plan. Certain types of emergency have a particular focus, thus enabling a hazard or site-specific plan to be activated. Sub-plans deal with a range of incidents, such as severe weather emergencies, large crowd events and hazardous substances storage sites (such as COMAH establishments).

In the Dublin City Council administrative area there are eight upper tier establishments notified to the HSA, for which interagency specific off-site plans have been prepared. In addition, the Port (which lies within the Dublin City Council administrative boundary) has prepared emergency plans and maintains emergency services commensurate with the hazards within the port boundary. Dublin Port authorities generally request the attendance of the principal emergency services at alerts, incidents and exercises at the facility. Where appropriate, a major emergency may be declared by the principal response agencies when responding to an incident in Dublin Port.

Dublin Fire Brigade provides the primary response to emergencies in the city and to the Port. The Council supports this response by providing amongst others, the following functions:

- coordinating the delivery of services from all council departments,
- making buildings such as leisure and community centres available to people displaced by the emergency,
- providing a volunteer civil defence organisation,
- providing advice and assistance with clean up after major flooding or pollution,
- assessing structural damage to buildings, and
- co-ordinating and leading multi-agency meetings to plan community recovery.

Overall, and in accordance with the requirements of *A Framework for Major Emergency Management*, the *Dublin City Council Major Emergency Plan* has been prepared to facilitate the response to, and recovery from major emergencies as well as ensuring the Council's arrangements are coordinated with those of the other designated principal response agencies, the Health Service Executive and An Garda Síochána.

6.7.6 Emergency Response Exercises

The Port conducts regular emergency response exercises across its estate (2 no. half-day exercises a year), covering incidents at the COMAH establishments in co-ordination with the operators of the establishments and with the emergency services, incidents at other facilities in the Port, road traffic incidents including incidents outside the Port estate that can have a knock-on effect on traffic within the Port, and incidents at the ferry terminals or berths. These exercises test the Port's procedures, response actions and the resources that may be deployed (personnel and emergency response equipment), thereby ensuring that the Port is well prepared to respond to an incident or emergency.

6.7.7 Dublin Port Dangerous Cargoes Bye-laws

In addition to the obligations on operators of COMAH establishments under the COMAH Regulations, and on the obligations of vessels and goods vehicles transporting dangerous goods under the *European Agreement concerning the International Carriage of Dangerous Goods by Road* (ADR) and the *International Maritime Dangerous Goods* (IMDG) Code, dangerous goods within the Port estate are governed by the *Dublin Port Bye-Laws - Dangerous Goods (Cargoes)* 2014. Table 6-17 lists the classes and divisions of dangerous goods that are subject to the byelaws.

Table 6-17 Classification of Dangerous Goods

Class	Division	Dangerous Goods
2	-	Gases
-	2.1	Flammable Gases (e.g. LPG, acetylene, natural gas)
-	2.2	Compressed non-flammable gases (e.g. nitrogen, argon)
-	2.3	Toxic gases (e.g. chlorine, sulphur dioxide, ammonia)
3	-	Flammable liquids (e.g. petrol, kerosene, solvents)
4.1	-	Flammable solids, self-reactive substances and solid desensitized explosives
4.2	-	Substances liable to spontaneous combustion
4.3	-	Substances which on contact with water emit flammable gasses.
5.1	-	Oxidising substances (e.g. ammonium nitrate, solid pool chlorine)
5.2	-	Organic peroxides (e.g. methyl ethyl ketone peroxide – MEKP)
6.1	-	Toxic Substances (e.g. sodium cyanide, pesticides)
6.2	-	Infectious substances (e.g. medical waste)
7	-	Radioactive material (e.g. monazite, uranium)
8	-	Corrosive substances (e.g. sulphuric acid, caustic soda, hydrofluoric acid)
9	-	Miscellaneous dangerous substances and articles

The byelaws regulate the movement and storage of dangerous goods within the Port, including:

- arrival by sea in packaged form, in liquid bulk or in solid bulk,
- departure by sea,
- arrival by road or rail, and
- storage / staging in the Port estate.

In the context of storing / staging dangerous goods within the Port, including at the COMAH establishments, the byelaws require that:

7.4.1 All Port Terminals and tenants must have a Company approved Dangerous Goods Storage and Emergency Response Plan. The Plans must be reviewed annually and are subject to inspection by the Company.

7.4.2 All Port Terminals and tenants must have in place a Dangerous Goods Inventory in an approved format on site and available for inspection by the Company at all times and inventories must be emailed to dg@dublinport.ie each day the terminal or tenant premises operate.

7.4.3 All Port Terminals and tenants must hold and have readily available Safety Data Sheets for all Dangerous Cargoes stored on their site.

7.4.4 All Port Terminals and tenants must carry out an annual exercise of their emergency response plan and document for audit purposes.

7.4.5 All Port Terminals storing, staging or loading / unloading Dangerous Goods must have a qualified Dangerous Goods Safety Advisor (DGSA) employee certified by a HSA approved training organisation.

7.4.6 The Company recommends all facilities storing or staging Dangerous Goods should have a Chemical Risk Assessment completed and staff involved complete a Dangerous Goods Awareness Course.

7.4.7 The Harbour Master, his nominee or authorised officer or representative of the Company, may under exceptional circumstances allow by written authorisation that dangerous goods may be temporarily stored at the Port. Note exceptional circumstances exclude matters of commercial gain or expediency.

7.4.8 All Port Terminals and tenants requesting derogation of storage time and quantity must do so in writing to the Company stating Dangerous Goods class (UN specific) and must be accompanied by risk assessment and relevant Safety Data Sheet.

6.8 Conclusions

Based on this conservative assessment, it is considered that the proposal for the MP2 Project within Dublin Port would satisfy the HSA's criteria under its land use planning guidelines. The aspects of the proposed MP2 Project within the inner zone may be classified as Sensitivity Level 1, and are therefore consistent with the HSA's criteria for individual risk.

Approximately 30% of the overall area of the MP2 Project (the land-side and marine-side development) lies within the COMAH land use planning zones (summarised in Table 6-18 and shown in Appendix 6-3), with the majority of the development lying outside the zones. Of the land-side development (comprising approximately 45% of the overall area of the development), approximately 67% lies within the COMAH land use planning zones.

Table 6-18 Summary of MP2 Project Areas & COMAH LUP Zones

MP2 Project area	Total development		Land-side development (approximate)	
	Area (ha)	% of total area	Area (ha)	% of total area
Within 1 × 10^{-5} zone	13.5	8.6%	13.5	19.2%
Within 1 × 10^{-6} zone	14.2	9.0%	14.2	20.2%
Within 1 × 10^{-7} zone	19.2	12.3%	19.2	27.5%
Outside COMAH LUP zones	109.6	70.0%	23.1	33.0%
Total	156.4	100.0%	70.0	100.0%

In the case of the societal risk criteria, the risk profiles for both the current Port layout and following the MP2 Project lie largely within the broadly acceptable and ALARP regions, with the FN curve for the MP2 Project showing a decrease in the risk profile. As noted in Section 6.5.1.2, societal risk criteria should not be viewed as more than broad indicators of a desirable objective, with many other, non-technical factors needing to be weighed in any final decision. In this context, and taking into account that the COMAH establishments are required to manage their establishments such that the risks are as low as reasonably practicable, it is concluded that the societal risk satisfies the HSA's land use planning criteria.

It is also concluded that the natural events that could impact on sites within the Port, including on the MP2 Project, are no more significant that the potential impacts from the COMAH establishments and would not have a significantly different impact on the MP2 Project compared to the current layout of the terminals and surrounding area. Similarly, the potential impacts on the MP2 Project from an accident involving the transport of a dangerous substance either by road or by pipeline are not significantly different than those on the current Port layout. Furthermore, the MP2 Project itself does not present any risks to other areas of the Port that are different to, or greater than, the current risks within the Port.

In addition, the Port 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.

Accordingly, on the basis of the information set out in this chapter, it is concluded that, from a COMAH perspective, the potential direct and indirect major accident and disaster risks arising from the proposed MP2 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 MP2 Project are not significantly different from the current risks.

7 BIODIVERSITY, FLORA AND FAUNA

7.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses in an appropriate manner, the direct and indirect significant effects of the MP2 Project on biodiversity.

As noted in the EC (2013) *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*, biological diversity or 'biodiversity' is one of the key terms in conservation, encompassing the richness of life and the diverse patterns it forms. The 1992 UN Convention on Biological Diversity defines biological diversity as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems'.

Ecological Impact Assessment (EcIA) is a process of identifying, quantifying and evaluating the potential and likely significant effects of a proposed project on ecological features, where ecological features are the species, habitats and biodiversity components of ecosystems that have the potential to be affected by the MP2 Project.

As all biodiversity comprises an enormous amount of species and habitats, ecological assessment is typically divided into specialist subject areas. The biodiversity chapter of this EIAR contains a description of the terrestrial, marine and avian biodiversity features and designated sites within a zone of influence (ZoI) of the MP2 Project, followed by an assessment of the potential and likely significant effects of the MP2 Project on terrestrial, marine and avian biodiversity features and designated sites.

This chapter contains information on different specialist subject areas of ecology, and has been written by a number of authors as specified in Table 1.1 '*List of Contributors to EIAR Chapters'* of Chapter 1 of the EIAR. Avian biodiversity features are present in both the marine and terrestrial environments, and a decision was taken to present the assessment on avian biodiversity separately rather than split avian biodiversity into two sub-assessments.

The remainder of this chapter has been broken down into the following sub-sections:

- 7.2: Terrestrial Biodiversity
- 7.3: Benthic Biodiversity and Fisheries
- 7.4: Marine Mammals
- 7.5: Avian Biodiversity
- 7.6: Designated Sites (other than European sites)

Each specialist sub-section discusses terrestrial, marine and avian biodiversity features and designated sites in turn under each of the sub-headings of:

- Methodology
- Receiving Environment

- Impact Assessment
- Remedial and Mitigation Measures
- Residual Impacts
- Monitoring

'Methodology' describes the survey and assessment methodology used by each specialist in compiling their component part of the chapter.

'*Receiving Environment*' describes the receiving environment and comprises a description of the relevant biodiversity features within the zone of influence of the MP2 Project.

'*Impact Assessment*' outlines the potential for impacts upon relevant biodiversity features as a result of the construction and operation of the MP2 Project at each phase and cumulatively, and determines whether or not those potential impacts which have been identified are likely. This section then predicts the magnitude of potential effects on relevant biodiversity features and determines whether or not they are significant in the absence of mitigation.

'*Remedial and Mitigation Measures*' describes measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on relevant biodiversity features within the zone of influence of the MP2 Project.

'*Residual Impacts*' predicts the residual impact upon relevant biodiversity features within the zone of influence of the MP2 Project, after having taken avoidance, remedial or counterbalancing mitigation measures into account.

'*Monitoring*' concludes the sub-divided assessments by describing, where relevant and applicable, any proposals for monitoring. Monitoring provides a mechanism to detect unexpected mitigation failures, and verify that the MP2 Project is being constructed and/or operated as intended. Monitoring can result in actions, activities or operations being adapted or adjusted to ensure continued compliance with conditions of consent.

Section 7.7 then presents an overall conclusion to the Biodiversity chapter.

In addition a Natura Impact Statement (NIS) has been prepared on behalf of Dublin Port Company (DPC) in respect of the applications for development consent in relation to the MP2 Project. The NIS has been submitted so as to enable the competent authorities to carry out the assessments required under the Habitats Directive and Irish law. This chapter should be read alongside appendices and technical reports not included in the EIAR main text. Appendices and technical reports are presented in the EIAR as follows:

<u>EIAR Volume 3</u>

- Appendix 7.1 Terrestrial Biodiversity Data Tables
- Appendix 7.2 Bat Survey Reports

<u>Under separate cover</u>

- Article 6(3) of the Habitats Directive – Stage 1 and 2 appraisals in separate Natura Impact Statement

7.2 Terrestrial Biodiversity

7.2.1 Methodology

7.2.1.1 Desktop Review

The National Biodiversity Data Centre (NDBC) is a national organisation that collates, manages, analyses and disseminates data on Ireland's biodiversity. It is funded by the Heritage Council and the Department of Culture, Heritage and the Gaeltacht. The NBDC provides access to all validated biodiversity data through Biodiversity Maps, the on-line biodiversity data portal.

Biodiversity records and full species accounts can be viewed and scrutinised through an interactive Biodiversity Maps portal. This is a tool that can be used to help make a preliminary assessment of biodiversity issues when considering site-specific developments. The chosen search area using the NBDC search tool was customised in order to capture all terrestrial biodiversity records within 1km^2 surrounding the MP2 Project. Online searches were undertaken in July 2018 and again in May 2019. The purpose of this task was to capture any records of protected species or species of natural heritage importance in proximity to the MP2 site boundary. The zone of influence of the MP2 Project on terrestrial biodiversity features does not extend further than this, as pressures of the urban cityscape will dominate effects on terrestrial biodiversity features beyond the limits of the Port estate.

A National Parks and Wildlife Service (NPWS) data set of Annex I habitats and Flora Protection Order (2015) plant species was reviewed to check for any records at the site of the MP2 Project.

The EIA team also met with the NPWS Divisional Ecologist in August 2018, and Dublin City Council Parks and Biodiversity teams in September 2018 to present the scheme and discuss inter alia the scope of the biodiversity assessment. Consultation with Dublin City Council Parks department has continued into 2019. These consultations are described in more detail in Chapter 5 of the EIAR.

7.2.1.2 Flora and Habitat Survey

A habitat survey was first conducted on 3rd May 2018 and again on 22nd and 23rd May 2019. The survey was undertaken in accordance with the Heritage Council's *Best Practice Guidance for Habitat Survey and Mapping* (Smyth *et al.*, 2011). These surveys were undertaken in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping. All habitats were mapped and categorised in accordance with the Heritage Council's *Guide to Habitats in Ireland* (Fossitt, 2000). A search was undertaken for protected and invasive flora species. Georeferenced aerial photographs were used as an aid to mapping habitats.

7.2.1.3 Protected Species

The habitat survey was also extended to include further information on the potential of the habitats present to support species by law or of natural heritage importance. This aspect of the survey was conducted with regard to best practice guidelines, in particular the National Roads Authority guidance on *Ecological surveying techniques for protected flora and fauna during the planning of National Road Schemes* (NRA, 2008).

All visible signs of mammals were recorded, and the site visually assessed, in particular for potential breeding or resting areas for protected mammal species. Notes were taken on tracks and signs of protected species during the surveys where or if this arose. The suitability of habitats for protected species was also assessed using expert judgement in combination with the survey results and desktop assessment. In addition, a specific bat survey was conducted.

Bats

Section 3.2.8 and Figure 3.14 of Chapter 3 of the EIAR describes and illustrates the buildings/structures to be demolished as part of the MP2 Project. This information informed the bat survey, and a pre-survey reconnaissance site visit was made by the bat surveyor to the site of the MP2 Project in May 2018 to design a survey plan. Buildings scheduled for demolition (as illustrated in EIAR Figure 3.14) were subjected to further daytime inspection; and dusk and dawn activity surveys over three days in July 2018 (16th – 18th July) in the active summer season of 2018. Daytime inspection was again conducted on 23rd May 2019, and nocturnal walking transect survey was undertaken on 30th May 2019, supplemented by a driven transect survey undertaken on 1st June 2019. The routes of the transects are illustrated in the Bat Survey Report at Appendix 7.2.

The Surveys extended from the Circle K (Promenade Road – Bond Drive) roundabout in the west to the Alexandra Road Extension at the Seatruck terminal at the eastern (seaward) port limit, and included all land within the MP2 Project red line area. The following structures were considered for their bat roosting potential as part of survey:

- Seatruck (Terminal building and steeltech sheds)
- Irish Ferries (Terminal buildings)
- Harbour Control Offices / Port Harbour Buildings
- Calor compound, warehouses and along the sea wall
- Stena Line (Terminal buildings)

A daytime survey was undertaken to identify potential roosting sites and foraging habitats. Evidence of bats is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks.

Night-time surveys were completed during the hours of 21:45hrs to 01:15hrs. Dawn surveys were completed from 03:50hrs to 05:10hrs.

7.2.1.4 Ecological Valuation and Assessment

Likely significant effects are predicted on the basis of the Project Description described in EIAR Chapter 3. The information gathered from consultation, scoping and stakeholder feedback; the desk study and suite of targeted ecological field surveys has been used to prepare an EcIA of the MP2 Project upon the identified terrestrial biodiversity features. The EcIA was undertaken in accordance with the following guidelines which were used to derive valuation and assessment criteria as set out in

Table 7-1 and Table 7-2.

Section 1.3.4 of the European Commission's *Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)* (EC, 2017) provides advice and guidance on integrating biodiversity considerations into EIA generally and marine biodiversity into EIA specifically. It further refers to EC guidance on integrating climate change and biodiversity into EIA and CIEEM guidance for conducting ecological impact assessment (see below).

Section 4 of the European Commission's *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (EC, 2013) provides advice and guidance on integrating climate change and biodiversity into EIA.

Section 3.7.3 of the draft Environmental Protection Agency's *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2017) note under Figure 3.5 therein that "*where more specific definitions exist within a specialised factor or topic e.g. biodiversity, these should be used in preference to these generalised definitions*".

The valuation and impact assessment for terrestrial biodiversity has been undertaken following the methodology set out in the Chartered Institute of Ecology and Environmental Management's *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal* and Marine (CIEEM, 2018); and with reference to Transport Infrastructure Ireland's *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009); EPA (2017); and BS 42020:2013 Biodiversity: Code of practice for planning and development (BSI, 2013).

CIEEM (2018) guidelines complement EPA (2017) guidelines when describing the nature of effects on biodiversity features:

Positive or negative:	Positive and negative impacts/effects are determined according to whether the change is in accordance with nature conservation objectives and policy e.g. improves the quality of the environment or reduces the quality of the environment (*Quality of Effects*, EPA 2017);
Extent:	The spatial or geographical area over which the impact/effect may occur (*Extent and Context of Effects*, EPA 2017);
Magnitude:	'Magnitude' refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms (*Duration and Frequency of Effects*, EPA, 2017);
Duration:	'Duration' is defined in relation to ecological characteristics as well as human timeframes. Five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. Effects may be described as short, medium or long-term and permanent or temporary. Short, medium, long-term and temporary will need to be defined in months/years (*Duration and Frequency of Effects*, EPA, 2017);
Frequency and timing:	The number of times an activity occurs will influence the resulting effect. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons (*Duration and Frequency of Effects*, EPA, 2017), and

Reversibility:	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects (*Duration and Frequency of Effects*, EPA, 2017).

EcIA is based upon a source-pathway-receptor model, where the source is defined as the individual elements of the MP2 Project that have the potential to affect identified ecological features. The pathway is defined as the means or route by which a source can affect the ecological features. An ecological receptor is the feature of interest, being a species, habitat or ecologically functioning unit of natural heritage importance. Each element can exist independently however an effect is created where there is a linkage between the source, pathway and feature.

EC (2017) advises that assessment of significance should be based on clear and unambiguous criteria. A significant effect is defined in CIEEM (2018) as –:

> *"an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' [...] or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local";*

and

> *"an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise a project: it can influence whether permission is given or refused and, if given, whether the effect is important enough to warrant conditions, restrictions or further requirements such as monitoring".*

British Standard 42020:2013 states that if an effect is sufficiently important to be given weight in the planning balance or to warrant the imposition of a planning condition, e.g. to provide or guarantee necessary mitigation measures, it is likely to be "significant" in that context at the level under consideration. The converse is also true: insignificant effects would not warrant a refusal of permission or the imposition of conditions.

Table 7-1 sets out a geographic frame of reference and criteria for valuing ecological features.

Table 7-2 sets out criteria for predicting magnitudes of effect. These tables have been prepared with due regard to EC, CIEEM, EPA and NRA guidelines described above.

Significant impacts are those with moderate or major effects which require avoidance, reduction or counterbalancing measures to mitigate or offset their adverse effects. In this context, it should be noted that likely significant effects on designated European sites are considered separately in the Natura Impact Statement submitted with the application for permission. Beneficial effects do not require mitigation measures as their effects are positive.

Table 7-1 Valuation Criteria for Biodiversity Features

Value	Criteria
International	• 'European Sites' including Special Areas of Conservation (SAC), candidate Special Areas of Conservation (cSAC) & Special Protection Areas (SPA) • Resident or regularly occurring populations (assessed to be important at the international level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Ramsar Sites • World Heritage Sites • Sites hosting significant populations of species under the Bonn Convention • Sites hosting significant populations of species under the Berne Convention
National	• Wildlife Refuge for species protected under the Wildlife Acts • Resident or regularly occurring populations (assessed to be important at the national level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Natural Heritage Areas (NHA) or proposed (p)NHA • National Nature Reserves (NNR) • Marine Nature Reserve (MNR)
County	• Sites listed as part of the Ecological Network in the County Development Plan (CDP) • Areas subject to a Tree Preservation Order in a CDP • Resident or regularly occurring populations (assessed to be important at the County level) of the following • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Species protected under the Wildlife (Northern Ireland) Order 1985 (as amended); and/or • Species listed on the relevant Red Data list • Sites containing areas of the habitat types listed in Annex I of the Habitats Directive that do not satisfy the criteria for valuation as of International or National importance • Regionally important populations of species or viable areas of semi-natural habitats or natural heritage features identified in a Biodiversity Action Plan (BAP) or County Development Plan (CDP) prepared for an administrative area • Sites containing natural habitat types with high biodiversity in a regional context and a high degree of naturalness, or populations of species that are uncommon within the County
Local (Higher)	• Locally important populations of priority species or habitats or features of natural heritage importance identified in a BAP, if this has been prepared • Key features of local value, e.g.: – sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality – Sites or features containing common or lower value habitats that maintain links and function as ecological corridors between key features of local value
Local (Lower) / Site	• Sites containing small areas of semi-natural habitats that are of limited local importance • sites containing areas of highly modified habitats

Value	Criteria
	• sites containing local populations of species that are common and not of conservation value • Sites that are used by protected species or species of conservation value as part of their territories but which do not contain the breeding or resting places of these species • Sites that do not maintain links or do not function as ecological corridors between key features of local value

Table 7-2 Magnitudes of Effect upon Biodiversity Features

Magnitude of Effect	Criteria
Major adverse	• Adverse Effect upon Integrity of a European site • Loss of or permanent damage to any part of a site of international or national importance • Loss of a key component or key feature of a site of regional importance • Decline in favourable conservation status (FCS) or condition (FCC) of a legally protected species at County value • Causing of an offence under European Directives or domestic transposing legislation
Moderate adverse	• Temporary impacts to key features of a site of international or national importance, but no permanent damage or loss of FCS/FCC • Permanent impacts to any part of a site of County value • Permanent loss of a key feature of local importance (higher value) where a feature is important for and supports other features of value • Causing of an offence under domestic legislation
Minor adverse	• Temporary impacts to any part of a site of County value • Temporary loss of a feature of local importance (lower or higher value) where a feature is not important for and supports other features of value
Negligible	• No impacts above a *de minimis* threshold on identified biodiversity features • Beneficial and adverse impacts balance such that resulting impact has no overall affect upon feature.
Minor beneficial	• A small but clear and measurable gain in general wildlife interest, e.g. small-scale new habitats of wildlife value created where none existed before or where the new habitats exceed in area the habitats lost.
Moderate beneficial	• Larger new scale habitats (e.g. net gains > 1 ha in area) created leading to significant measurable gains helping to achieve relevant objectives of a BAP or CDP
Major beneficial	• Major gains in new habitats (net gains > 10 ha) of high significance for biodiversity helping to achieve relevant objectives of a BAP or CDP and underpinning government policy

7.2.2 Receiving Environment

7.2.2.1 Flora & Habitats

Eight Fossitt (2000) habitat types were identified within the MP2 Project site. In most instances these habitats are mapped and described together where they occur in close association with one another. Two areas are described and mapped as mosaics:

- **Habitat group 1** supporting three habitats
- **Habitat group 2** supporting four habitats

The remaining individual habitats are described following on from the grouped habitat mosaics. The largest habitat is Buildings and artificial surfaces BL3 disused areas of which support recolonising bare ground ED3. These mosaics and other habitats are described below and presented in

Figure 7-1

Habitat group 1

At the time of initial survey in 2018, Habitat group 1 comprised three Fossitt type habitats namely ornamental/non-native shrub [WS3], recolonising bare ground [ED3] and sea walls, and piers and jetties [CC1]. The sea walls, piers and jetties describes the physical bund upon which the other habitats have developed. This feature had been undercut significantly by sea erosion.

The non-native shrub component was largely self-sown butterfly bush *Buddleja davidii* with less frequent fuchsia possibly *Fuchsia magellanica*. Native bramble *Rubus fruiticosus* agg. also occurs here. The recolonising bare ground was largely a mixture of yarrow *Achillea millefolium*, ribwort plantain *Plantago lanceolata*, red valerian *Centranthus ruber*, mugwort *Artemisia vulgaris*, teasel *Dipsacus fullonum*, dandelion *Taraxacum officinale* agg. and clovers *Trifolium* spp. There were scatterings of many other common broadleaved herbs.

In the 2019 survey, the vegetation community described above remains the same with the exception of the bund along its northern extent. This bund here has been recently re-worked and has been consolidated with new spoil.

Habitat group 1 is judged to be of local (lower) / site value.

Habitat group 2

At the time of initial survey in 2018, Habitat group 2 comprised three Fossitt type habitats namely mixed broadleaved/conifer woodland [WD2], ornamental/non-native shrub [WS3,] recolonising bare ground [ED3] and sea walls, piers and jetties [CC1].

The broadleaved/conifer woodland and ornamental/non-native shrub planting appeared to have been planted at the same time. The woodland was mostly pine *Pinus* sp. and white poplar *Populus alba* with some non-native alder, possibly grey alder *Alnus incana*. Intermittent sycamore *Acer pseudoplatanus* also occurs. The ground flora was patchy but present and included the semi-shade species Herb Bennet *Geum urbanum* and Herb Robert *Geranium robertianum*.

Sycamore saplings were commonly encountered, along with common nettle *Urtica dioica* and cleavers *Galium aparine*. Other less frequent patch forming species included winter heliotrope *Petasites fragrans* and alexanders *Smyrnium olusatrum*.

On the seaward side of the bund were small patches of stony impoverished grassland supporting bryophytes and flowering herbs including yarrow, ribwort plantain, wild carrot *Daucus carota*, creeping cinquefoil *Potentilla reptans* and coltsfoot *Tussilago farfara*.

On the port side of the bund were ornamental/non-native shrub several garden shrubs including planted *Elaeagnus, Lonicera*, Azalea, Hebe, Holy, Dogwood, Cotoneaster and likely self-sown butterfly bush.

The recolonising bare ground supported a variety of herbs including dandelion, red valerian, mugwort, purple toadflax *Linaria purpurea*, narrow leaved ragwort *Senecio inaequidens* and common vetch *Vicia sativa*. The bare ground comprised large quarried stone.

In the 2019 survey, the recolonising bare ground habitat had, in small part, been lost to facilitate the consented Internal Road Project (Reg. Ref. 3084/16 and 2684/17). Some additional flowering herb species were recorded in the existing railway track section of recolonising bare ground habitat. These include goatsbeard *Tragopogon* *pratensis*, petty spurge *Euphorbia peplus*, annual mercury *Mercurialis annua*, long-headed poppy *R. dubium*, beaked hawksbeard *Crepis vesicaria*, common vetch *Vicia sativa* and rough hawkbit *Leontodon hispidus*.

Habitat group 2 is judged to be of local (higher) value.

Plate 7-1 Clontarf Side of Habitat Group 2

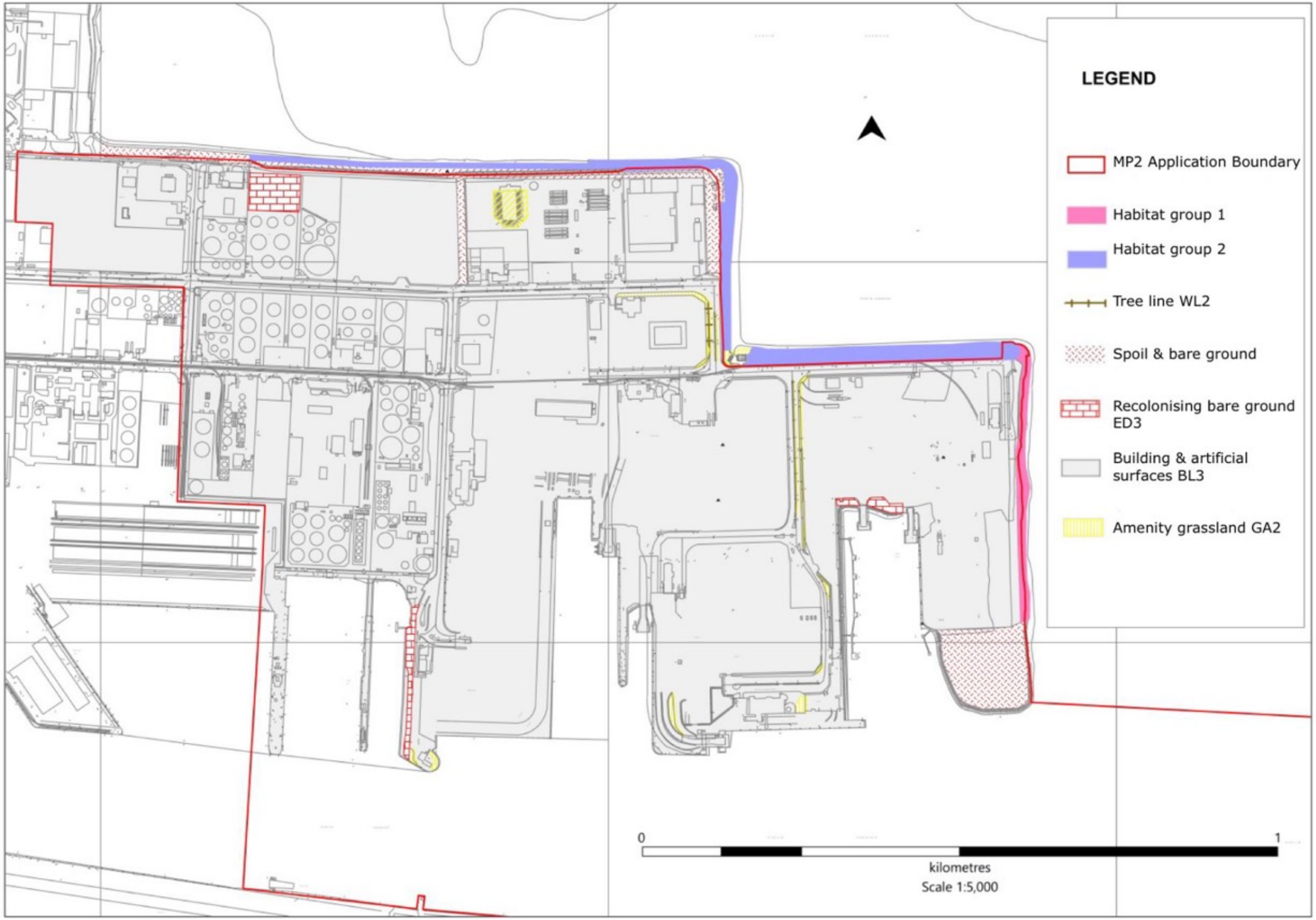

Figure 7-1 Terrestrial Habitat Map

Recolonising bare ground ED3

In 2018, this habitat was identified in two locations (in association with Sea walls, piers and jetties CC1) as larger stand-alone features, and were mapped separately. The first area, in the southwest of the site is pictured in Plate 7-2 along the Port Operations Building access road. Red valerian is the dominant species. The bare ground comprises large quarried stone. This habitat also occurs at the Seatruck terminal supporting red valerian with ribwort plantain, alexanders and other infrequent broadleaves species. These communities remained unchanged in the 2019 survey with red valerian remaining the dominant species, forming more continuous cover.

At one location in the north-west of the MP2 Project site this habitat occurs again. Circa forty vascular species were recorded in this area. Legumes were particularly prevalent notably birdsfoot trefoil *Lotus corniculatus*, kidney vetch *Anthyllis vulneraria*, black medick *Medicago lupulina*, red clover *Trifolium pratense*, white clover *T. repens* and a melilot, resembling tall melilot *Melilotus altissimus*. Also present are oxeye daisy *Leucanthemum vulgare*, weld *Reseda luteola*, scarlet pimpernel *Anagallis arvensis*, yarrow, wild carrot and plantains *Plantago* spp. (ribwort plantain and greater plantain).

Grasses are frequent comprising mostly bent likely creeping bent *Agrostis stolonifera* and lower abundances of barren broom *Anisantha sterilis* and a *Holcus* sp. resembling Yorkshire fog *H. lanatus*. Bramble and common vetch have established in the least disturbed areas. This habitat is pictured in Plate 7-3.

These communities and similar recolonising bare ground communities in habitat groups 1 and 2 above are typical of derelict / stony ground substrates in urban areas supporting a diverse flora. As such they of local importance for wildlife, particularly pollinators.

These features are considered to be of local (lower) / site value.

Plate 7-2 Recolonised bare ground ED3 approaching the Dublin Port Operations Building

Plate 7-3 Recolonised bare ground ED3

Buildings and Artificial Surfaces BL3/Spoil and bare ground ED2

In 2018 this habitat in the southeast of the site comprised a large expanse of hard standing and bare ground (pictured in Plate 7.4 below) with a large heap of rubble. The bare ground around the edge of the hardstanding was being colonised with broadleaved herbs such as teasel, plantains *Plantago* spp. In 2019, the spoil remains in situ and the site now is used to store shipping containers.

The habitat is of negligible ecological value.

Plate 7-4 Buildings and artificial surfaces BL3 / Spoil and bard ground ED2 habitat

Buildings and artificial surfaces BL3 with recolonising bare ground ED3

Buildings and artificial surfaces are the dominant habitat throughout the development site. Disused areas support smaller areas of recolonising bare ground, too small to map.

Many of the flowering plants described already occur through the port in little-used areas or areas rarely accessed by traffic where pioneering plants get a chance to take hold and colonise. Red valerian and butterfly bush again frequent these areas most but many others are patchily present or occurring as scattered individuals examples of which are common mallow *Malva sylvestris*, crane's-bills *Geranium* spp., rue-leaved saxifrage *Saxifraga tridactylites*, common ragwort *Senecio jacobaea*, Oxford ragwort *Senecio squalidus*, coltsfoot, bush vetch *Vicia sepium*, traveller's-joy and biting stonecrop *Sedum acre*.

Coastal species are common to many areas including sea plantain *Plantago maritima*, sea beet *Beta vulgaris* ssp. *maritima* and mayweeds *Tripleurospermum* spp.

Another example of this habitat occurs at an abandoned area (hardstanding – concrete and gravelled areas) (Plate 7-7). This is dominated by butterfly bush, and contains flowering herbs and grasses. Flowering herbs include ribwort plantain, dandelion, narrow leaved ragwort, beaked hawksbeard and a spurge sp. resembling petty spurge *E. peplus*.

Throughout the MP2 Project area there are a number of small, much more fragmented pieces of recolonising bare ground within much larger active compounds / facilities. Though small they are nonetheless supporting a diverse flora as do the larger, mapped areas. However, in many instances landscape management actions in the form of weed control measures are in place in active areas to keep critical infrastructure / equipment free of vegetation, and some of these treated areas were evident during survey. Examples of these vegetated areas are presented in Plates 7-5 to 7-7 below.

These features are considered to be of local (lower) / site value.

Plate 7-5 Alexandra Road Extension Seatruck Property at IG 320326, 234817

Plate 7-6 Recolonising bare ground ED3 at IG 319818, 234910

Plate 7-7 Recolonising bare ground ED3 at IG 319465 234800

Amenity Grassland GA2

This grassland habitat varies from species poor swards with low to flowering herb cover to those with high herb cover. The latter support high abundances of common flowering herbs such as creeping buttercup *Ranunculus repens*, *creeping cinquefoil*, common mouse-ear *Cerastium fontanum*, along with less frequent indictors of improved grassland such as broadleaved dock *Rumex obtusifolius*, white clover *Trifolium repens*, common ragwort with occasional spear thistle *Cirsium vulgare* and hogweed *Heracleum sphondylium*. Typical grasses are perennial ryegrass *Lolium perenne*, Yorkshire fog, red fescue *Festuca rubra* with annual meadow grass *Poa annua* and cock's-foot Dactylis glomerata.

Swards are enhanced in places with herbs more akin to semi-natural grasslands such as yarrow, oxeye daisy, ribwort plantain and red clover. However, all of these grasslands are routinely mown and therefore of limited value to pollinators.

In the 2019 habitat survey an area of this grassland habitat was identified in the Calor Gas compound in the form of a raised mound protecting stored gas beneath. The top of the mound was mown but the sides were uncut. This grassland supported only common species of such as red fescue, cocksfoot and false oat grass false oat-grass *Arrhenatherum elatius*. This habitat is more accurately aligned to the Fossitt (2000) community Dry meadows and grassy verges GS2.

These features are considered to be of local (lower) / site value.

Treelines WL2

Circa fourteen different planted silver birch *Betula pendula* occur in amenity grassland as indicated in the terrestrial habitat map. This habitat has remained unchanged between the 2018 and 2019 surveys.

This feature is of local (lower) / site value.

Invasive Plant Species

No regulated invasive plant species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, were identified on site during the surveys.

The following non-regulated 'medium impact species' identified in the NBDC biological records search (listed in Appendix 7.2.1 at Volume 3 of this EIAR) were recorded on site:

- butterfly bush Buddleja davidii
- narrow leaved ragwort *Senecio inaequidens*
- sycamore *Acer pseudoplatanus*
- traveller's-joy *Clematis vitalba*

Flora Protection Order (FPO) & Rare Plants

The NBDC records search identified seven species listed under the Flora Protection Order (2015) within the (customised polygon) 1km^2 search area. These are presented in Table 7-3.

Table 7-3 Floral Protection Order (2015) species within 1 km^2 of MP2 Project.

Species	Last recorded
Great burnet *Sanguisorba officinalis*	2016
Small cudweed *Filago minima*	2012
Lesser centaury *Centaurium pulchellum*	2010
Baltic bryum *Bryum marratii*	2007
Cernuous Thread-moss *Bryum uliginosum*	2008
Many-seasoned thread-moss *Bryum intermedium*	2007
Warne's thread-moss *Bryum warneum*	2007
Petalwort *Petalophyllum ralfsii*	2009

Two other plant species which are legally protected under the Flora Protection Order (2015) known to occur on nearby North Bull Island but not in the records search are lesser red hemp-nettle *Galeopsis angustifolia* and meadow saxifrage *Saxifraga granulata*. *Petalophyllum ralfsii*, the rare liverwort was recorded from the North Bull Island. This species is of high conservation value as it is listed on Annex II of the EU Habitats Directive.

There were no Flora Protection Order (2015) species recorded across the site of the MP2 Project during the 2018 or 2019 habitat surveys.

7.2.2.2 Terrestrial Mammals

Badger and Otter

The site is extensively developed with no semi-natural habitats. Vegetated areas either comprise early successional plant communities or landscape planting. As such the site is of limited ecological value for protected terrestrial mammals. Otters are widespread in Ireland, found in a variety of aquatic habitats, both freshwater and marine. However, they always require access to fresh water.

No badger prints, latrines, or hairs were recorded and no otter prints, spraints or prey remains were recorded on site during the surveys conducted in 2018 and 2019.

It is considered that the terrestrial component of the MP2 Project is of negligible value to local populations of otter, and of no value to badger.

Bats

All Irish bats are protected under Annex IV to the Habitats Directive ("Animal and plant species of community interest in need of strict protection requiring strict protection"), and Lesser Horseshoe Bat has additional protection under Annex II ("Animal and plant species of community interest whose conservation requires the designation of special areas of conservation"). All Irish bat species are also afforded protection under the Irish Wildlife Acts, which makes it an offence to wilfully interfere with, or destroy, the breeding or resting place of these species.

Bat Roosts

Buildings scheduled for demolition as part of the proposed redevelopment were subjected to daytime inspection and nocturnal surveys namely:

- Seatruck (Terminal building and steeltech sheds)
- Irish Ferries (Terminal buildings)
- Harbour Control Offices / Port Harbour Buildings
- Calor compound, warehouses and along the sea wall
- Stena Line (Terminal buildings)

The full bat survey report is available in Appendix 7.2 at Volume 3 of this EIAR, the results of which are summarised below.

Daytime survey recorded no bat roosts (i.e. no droppings or sightings of bats) at any of the buildings or structures scheduled for demolition.

Dusk and dawn transect surveys, supplemented by driven transect survey, were undertaken to further examine these buildings for roosting bats and determine the level of bat activity throughout the MP2 Project area.

No bat roosts were identified and no buildings or structures were categorised as having moderate or high bat roost potential. No bats were detected emerging from or returning to roosts, and no foraging or commuting bat activity was recorded in survey over two consecutive seasons in 2018 and 2019.

The site of MP2 Project is considered to be of negligible value for local bat populations.

7.2.3 Potential Impacts of the MP2 Project

As outlined above, the valuation and impact assessment for terrestrial biodiversity has been undertaken following the guidance and methodology set out in CIEEM (2018); EC (2017); EPA (2017); EC (2013); BSI (2013) and NRA (2009);

Table 7-1 sets out a geographic frame of reference and criteria for valuing ecological features. Table 7-2 sets out criteria for predicting magnitudes of effect. These tables have been prepared with due regard to EC, CIEEM, EPA and NRA guidelines.

The predicted magnitude of potential effects on biodiversity features is based on the criteria set out in Table 7-2 and determines whether or not impacts are significant in the absence of mitigation.

Significant impacts are moderate or major effects which require avoidance, reduction or counterbalancing measures to mitigate or offset their adverse effects. Beneficial effects do not require mitigation measures as their effects are welcomed.

7.2.3.1 Potential Effects at Construction Phase

Habitats

The following vegetated features will be affected by the development:

- Habitat group 1 comprises approximately 0.58 ha of ornamental/non-native shrub WS3, recolonising bare ground ED3 and sea walls, piers and jetties CC1. Only the vegetated bund will be permanently lost (circa 50% of this feature). This feature is considered to be of local (lower) / site value.
- Habitat group 2 is comprises mixed broadleaved/conifer woodland WD2, ornamental/non-native shrub WS3, recolonising bare ground ED3 and sea walls, piers and jetties CC1. This feature is being impacted in part as a result of habitat loss due to construction of a previously consented project. This MP2 Project largely avoids this feature, except in a small part furthest east (shown in Figure 7.1) resulting in a permanent loss of circa 0.08 ha. This feature is considered to be of local (higher) value.
- Up to 0.79 ha of recolonising bare ground ED (0.33 ha in association with Sea walls, piers and jetties CC1) will be permanently lost. These features are considered to be of local (lower) / site value.
- Up to circa 0.4 ha recolonising bare ground ED3 will be lost on disused (buildings and) artificial surfaces BL3. These features are considered to be of local (lower) /site value.
- Up to circa 0.4 ha amenity grassland GA2 will be lost. The grassland within the Calor Gas compound will be unaffected. These features are considered to be of local (lower) /site value.
- A treeline WL2 comprising circa fourteen planted silver birch will be lost. This feature is of local (lower) / site value.

All of these features are of local value. In accordance with Table 7-2, permanent loss of these features is predicted to result in a minor adverse magnitude of effect, as their loss does not result in any significant environmental impact. In accordance with the methodology set out in Section 7.2.1.4, these impacts do not require avoidance, reduction or counterbalancing measures to be implemented.

Protected Flora

No species listed on the Floral Protection Order (2015) were recorded within the development site. There are consequently no potential impacts, significant or otherwise on protected floral species as a result of the construction or operation of the MP2 Project.

Protected Fauna

No protected species were recorded at the site of the MP2 Project in either 2018 or 2019. There are no potential impacts, significant or otherwise on protected faunal species as a result of the construction or operation of the MP2 Project.

7.2.3.2 Potential Cumulative Effects

Chapter 18 of the EIAR describes other related projects in proximity to the proposed MP2 Project, in the surrounding Dublin Port estate and further afield. The following projects were considered for their potential to result in cumulative biodiversity effects with MP2 Project:

- Alexandra Basin Redevelopment (ABR) – ABP Reg. Ref. PL29N.PA0034
- Extension Terminal 2 Check-In Area – Reg. Ref. 2299/12
- Vehicular and Pedestrian Entrances off Breakwater Road South – Reg. Ref. 2596/15
- Dublin Port Internal Road Network – Reg. Ref. 3084/16 and 2684/17
- Demolition of Buildings and Provision of Yard – Reg. Ref. 2429/17
- Floating Dock Section Reg. Ref. 4216/17
- Vehicle Service/Maintenance Facility and Office Accommodation – Reg. Ref. 3143/18
- Asahi Demolition and Provision of Yard – Reg. Ref. 3488/18
- Demolition of Calor Offices and Provision of Yard – Reg. Ref. 3540/18
- Interim Unified Passenger Terminal – Reg. Ref. 3638/18
- Yard Upgrade – Reg. Ref 3269/18
- ESB Substation Demolition and Construction – Reg Ref 4250/18
- Terminal 4 Bridge, Alexandra Road(Reg. Ref. 4521/18)
- Dublin Ferry port Terminal Access – Reg. Ref. 3314/18
- Berth 49 Approach and Ramp. Reg. Ref 3176/19
- Former Crosbies Yard – Planning Order SI57 of 2019
- Former Storecon Yard – Planning Order SI57 of 2019
- DPC Post 2019/2021 Maintenance Dredging Campaign (Subject to Dumping at Sea Licence)
- Dublin Inland Port - Reg Ref. F18A/0139
- North Lotts & Grand Canal Dock Planning Scheme 2014- BP Ref. PL29N.ZD2011
- Exo Building – Reg. Ref. DSDZ3632/15, DSDZ3686/16, DSDZ3776/17
- Poolbeg West SDZ. BP Ref. PL29N.ZD2013
- Irish Water – Ringsend WwTP –Upgrade Project BP Ref. PL29S.301798
- Howth Yacht Club Marina Extension

No likely significant effects on terrestrial biodiversity features are predicted as a result of the construction or operation of any of the projects listed in Chapter 18 of the EIAR, and no remedial or mitigation measures are required to reduce the magnitude of the effects predicted in the relevant assessments (where documented) of those other projects.

As there are no likely significant impacts predicted on any terrestrial biodiversity feature as a result of the MP2 Project alone, and no likely significant effects on terrestrial biodiversity features predicted as a result of the construction or operation of any of the projects listed in Chapter 18 of the EIAR, there is no pathway for additional or additive effects resulting in synergistic impacts above a magnitude already predicted in this assessment.

Cumulatively, there will be no cumulative terrestrial biodiversity impacts between the MP2 Project and the other projects considered in Chapter 18 of the EIAR.

7.2.4 Mitigation and monitoring measures

As outlined in Section 7.2.3, significant impacts are described as moderate or major effects which require avoidance, reduction or counterbalancing measures to mitigate or offset their adverse effects.

There are no moderate or major effects predicted in this assessment of terrestrial biodiversity features. Thus, there are no potential significant impacts arising which require avoidance, reduction or counterbalancing measures to mitigate or offset their adverse effects. In turn, there is no requirement for monitoring.

7.2.5 Residual Effects

7.2.5.1 Flora & Habitats

There are no significant residual impacts predicted on terrestrial flora and habitat features as a result of the construction and operation of the MP2 Project.

7.2.5.2 Protected Species

There are no significant residual impacts predicted on terrestrial protected species as a result of the construction and operation of the MP2 Project.

7.3 Benthic Biodiversity and Fisheries

7.3.1 Introduction

This section assesses the potential impacts of the MP2 Project on marine benthic biodiversity and fisheries. The methodology for data collection and analyses is presented. The environment of the MP2 Project in relation to benthos and fisheries is described. The likely impacts are predicted and mitigation measures are presented.

7.3.2 Methodology

7.3.2.1 Benthic Biodiversity

A total of 20 grab samples were collected in Dublin Bay using the vessel 'Husky'. Samples were collected on 30th May 2018 using a 0.1m^2 Stainless Steel Van-Veen grab. All sampling stations were positioned using the vessels own differential GPS System. A list of stations sampled are presented in Table 7-4 and displayed on a map (Figure 7-2). Stations S01 to S14 were collected from the subtidal parts of the survey area. Stations S15 to S20 were collected at high water from the intertidal area adjacent to the eastern boundary of Dublin Port and within the SPA.

Table 7-4 Position of shallow water sub-tidal video survey stations. All locations given in Irish National Grid

Station	Co-ordinates (ITM)		Station	Co-ordinates (ITM)	
	Easting (m)	Northing (m)		Easting (m)	Northing (m)
S01	722008	734289	S11	721128	734009
S02	722136	734034	S12	719807	734249
S03	720345	734358	S13	719581	734436
S04	720662	734273	S14	719512	734387
S05	720933	734294	S15	720670	734537
S06	721129	734274	S16	721031	734501
S07	721319	734261	S17	721370	734544
S08	722481	734065	S18	720678	734393
S09	721780	734017	S19	721033	734389
S10	721443	733967	S20	721415	734378

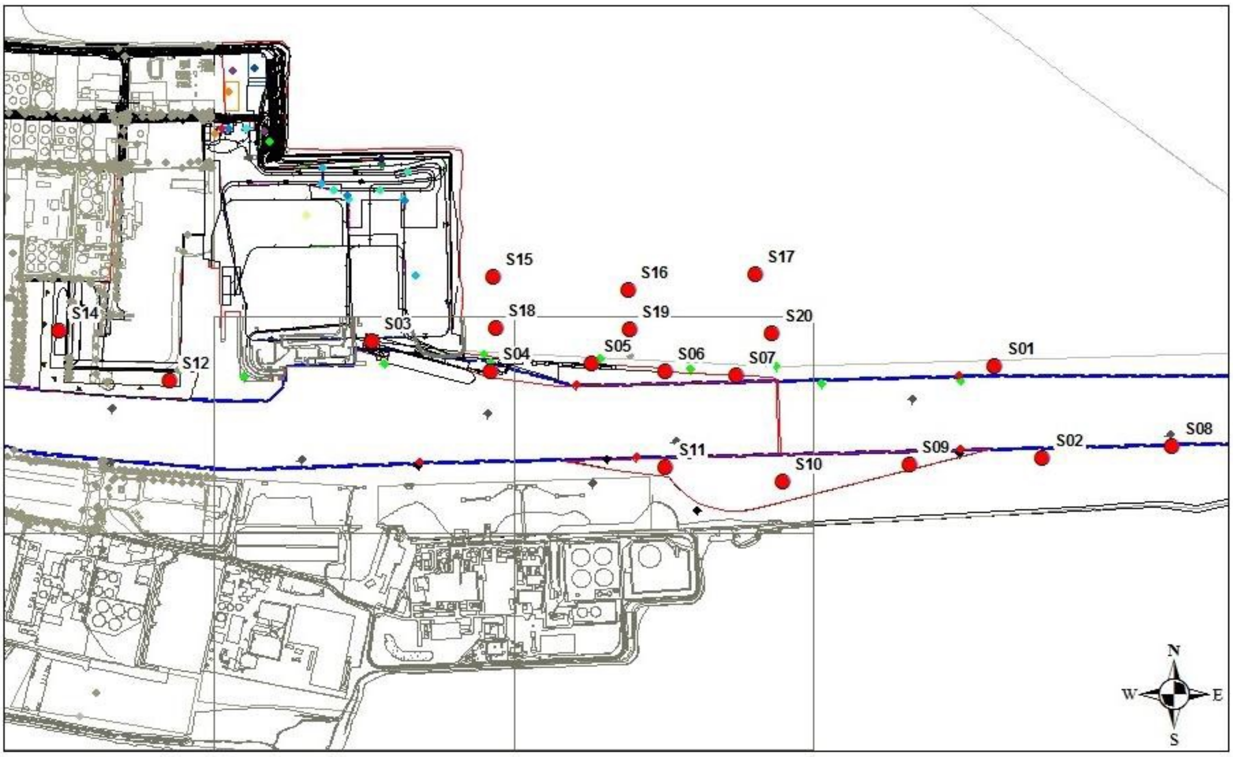

Figure 7-2 Map showing locations of grab samples taken from Dublin Port, May 2018

At each grab station:

- 1 x 0.1m^2 Van-Veen grab taken for benthic faunal analysis.
- 1 x 0.1m^2 Van-Veen grab from which a small amount of sediment was retained for Particle Size Analysis and Loss on Ignition Analysis.

Samples were sieved through a 1mm mesh sieve and preserved with 4% formalin (buffered with seawater) within 24 hours of collection. Samples were sorted by eye and fauna were sent to specialist taxonomists for identification:

- Worms – Dr. Peter Garwood
- Molluscs – Dr. Julia Nunn
- Crustaceans and other taxa – Dr. Sammy De Grave

Whole sample biomass was measured using blotted wet-weight measurements, weighed to the nearest mg (Table 7-7). A number of biotic indices were calculated from the species / abundance matrix from the grab samples. These indices included Simpson's Dominance Index (where values range from low dominance [0] to high dominance [1]), Shannon-Wiener Diversity Index (Values ranging from low diversity [0] to high diversity [4]) and Pielou's Evenness Index (values ranging from low i.e. dominated by a few species [0] to high evenness i.e. a more even spread of species [1]).

Granulometric analysis was carried out on oven-dried sediment samples from each station using the protocols described by Holme & McIntyre (1984). The sediment was passed through a series of nested brass test sieves with the aid of a mechanical shaker. The brass sieves chosen were 4mm, 2mm, 1mm, 500µm, 250µm, 125µm and 63µm. The sediments were then divided into three fractions: % Gravel (>2mm), % Sand (<2.0mm >63µm) and % Silt-Clay (<63µm). Further analysis of the sediment data was undertaken using the Gradistat package (Blott & Pye, 2001).

Organic matter was estimated using the Loss on Ignition (LOI) method. One gram of dried sediment was ashed at 450°C for 6 hours and organic carbon was calculated as % sediment weight loss. Table 7-5

Baseline data collected from the Burford Bank in 2016, in addition to further work undertaken there in 2018 was used in conjunction with historical data in assessing the receiving environment at the dredge spoil disposal site of the Burford Bank.

7.3.2.2 Fisheries

The fisheries aspects of the MP2 Project were assessed through desktop review (mainly) and focussed field survey. The area of interest covered the transitional waters of the Lower Liffey estuary. The desktop review referred to Inland Fisheries Ireland (IFI) Water Framework Directive Fish Monitoring reports for the Lower Liffey Estuary, Marine Institute data on eel migration in the Liffey, ESB fisheries data and IFI online fisheries management publications dealing with salmon. Data on recreational angling was obtained from the IFI-managed Fishing in Ireland/Angling Ireland website. Data previously gathered for the ABR Project EIS was also consulted. Fieldwork consisted of a beam trawl taken within the development area on 30th May 2018 using a 1.5m beam trawl and a 1cm mesh bag, trawling at 1.5 knots.

7.3.3 Receiving Environment

There are no SACs or cSACs within the footprint of the MP2 Project. There are 3 in close proximity to the site and one includes the area of the licensed disposal site. South Dublin Bay cSAC (Site Code 000210) extends south from the South Bull Wall and includes Annex I marine habitat (1140) i.e. *Mudflats and Sandflats not covered by seawater at low tide* (720ha) as a conservation objective. Dublin Bay cSAC (Site Code 000206) extends north from the North Bull wall incorporating most of Bull Island. Annex I Habitat 1140 (578ha) is also included as a conservation objective for this site. In the outer bay and incorporating the location of the disposal site, the Rockabill to Dalkey cSAC (Site Code 003000) is designated for Annex I intertidal and sub-tidal reefs (habitat 1170), 182 ha in extent. The site is also designated for harbour porpoise and covers a total area of approximately 273 km^2. None of these sites has Annex II fish as a conservation objective.

7.3.3.1 Development Area

Benthos

Results from the Particle Size Assessment (PSA) indicates the presence of sandy muds and muddy sands across large parts of the survey area. Mixed sediments are present along parts of the Intertidal stretches (Table 7-5, Figure 7-3).

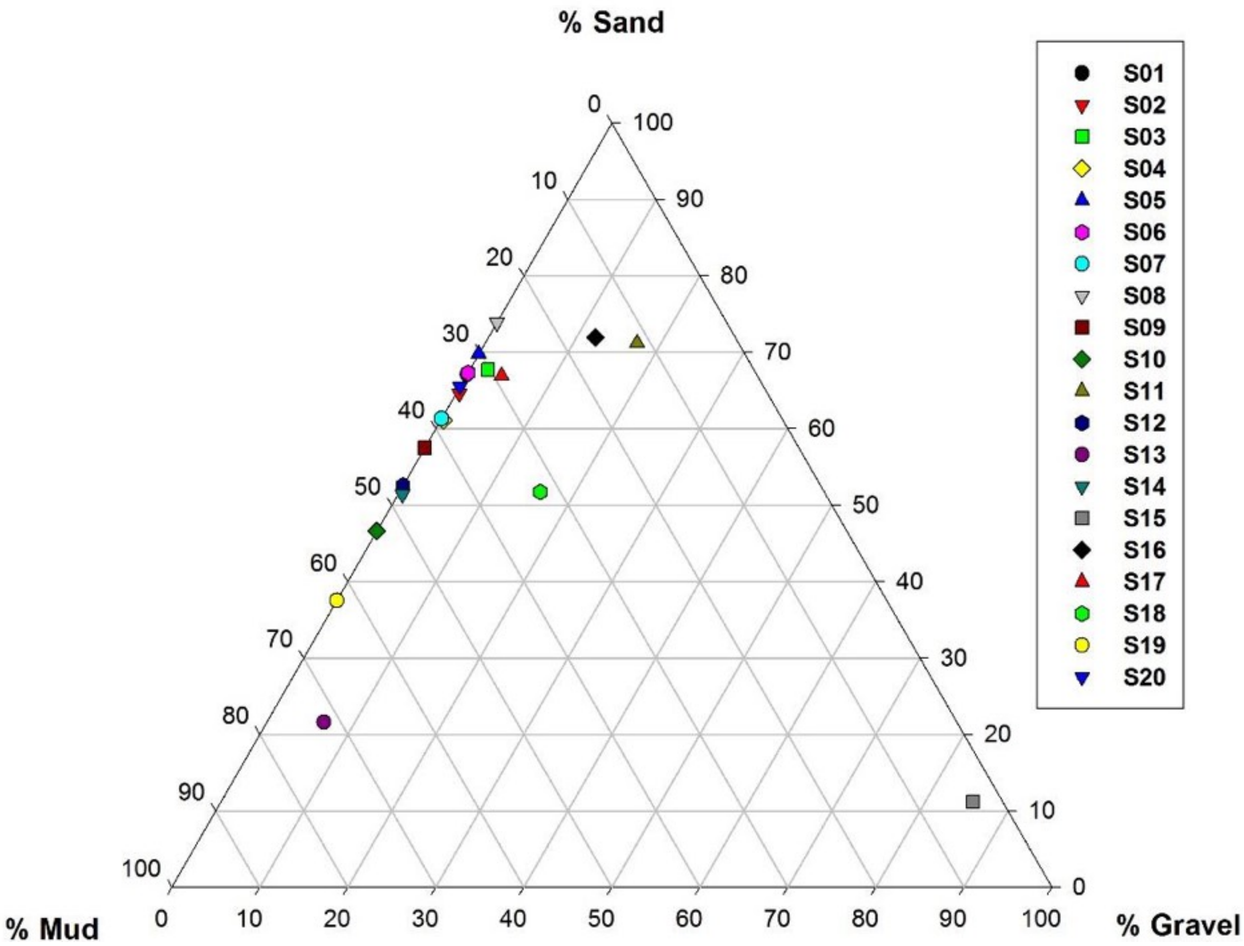

Figure 7-3 Ternary Plot of PSA Results from Dublin Port

Table 7-5 PSA and Loss on Ignition results from Samples taken within Dublin Port

	S1	S2	S3	S4	S5
% Gravel	0.0%	0.4%	2.1%	0.3%	0.0%
% Sand	67.1%	64.6%	67.7%	61.1%	69.8%
% Mud	32.9%	34.9%	30.2%	38.6%	30.2%
% LOI	2.21%	3.56%	3.26%	3.79%	3.44%
Textural Group	Muddy Sand	Muddy Sand	Slightly Gravelly Muddy	Muddy Sand	Muddy Sand
	S6	**S7**	**S8**	**S9**	**S10**
% Gravel	0.0%	0.0%	0.0%	0.0%	0.0%
% Sand	67.3%	61.3%	73.9%	57.5%	46.6%
% Mud	32.7%	38.7%	26.1%	42.5%	53.4%
% LOI	2.92%	2.83%	1.66%	6.91%	9.83%
Textural Group	Muddy Sand	Muddy Sand	Muddy Sand	Muddy Sand	Sandy Mud
	S11	**S12**	**S13**	**S14**	**S15**
% Gravel	17.3%	0.0%	6.5%	0.5%	85.5%
% Sand	71.2%	52.6%	21.6%	51.4%	11.2%
% Mud	11.5%	47.4%	71.9%	48.0%	3.3%
% LOI	1.96%	5.87%	4.25%	5.28%	1.20%
Textural Group	Gravelly Muddy Sand	Muddy Sand	Gravelly Muddy Sand	Muddy Sand	Muddy Sandy Gravel
	S16	**S17**	**S18**	**S19**	**S20**
% Gravel	12.2%	4.0%	16.0%	0.0%	0.0%
% Sand	71.9%	66.9%	51.7%	37.5%	65.5%
% Mud	15.9%	29.1%	32.3%	62.5%	34.5%
% LOI	1.68%	1.52%	3.28%	5.23%	3.95
Textural Group	Gravelly Muddy Sand	Gravelly Muddy Sand	Gravelly Muddy Sand	Sandy Mud	Muddy Sand

A Total of 55 taxa were recorded in the infaunal grab samples collected from Dublin Bay (Table 7-6).

Table 7-6 Diversity Indices derived from the infaunal grab data from Dublin Port

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
No. of Species	17	19	7	14	15	14	15	20	5	3
No. of Individuals	116	649	373	358	332	446	445	636	1092	652
Shannon-Wiener	1.81	0.755	0.28	0.555	0.813	0.44	0.609	1.74	0.407	0.158
Pielou's Evenness	0.641	0.257	0.144	0.21	0.3	0.167	0.225	0.579	0.253	0.144
Simpson's Dominance	0.317	0.724	0.901	0.806	0.688	0.854	0.783	0.223	0.801	0.935
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
No. of Species	5	8	10	13	15	13	11	9	10	11
No. of Individuals	9001	732	81	718	139	74	90	371	602	420
Shannon-Wiener	0.511	0.195	1.77	1.34	1.84	1.4	1.14	1.07	0.284	0.555
Pielou's Evenness	0.318	0.094	0.77	0.522	0.68	0.544	0.476	0.488	0.124	0.232
Simpson's Dominance	0.693	0.936	0.221	0.314	0.223	0.401	0.513	0.417	0.906	0.788

Table 7-7 Biomass data from infaunal grabs data from Dublin Bay (values in mg).

	Annelida	Mollusca	Crustacea	Other Taxa	Total Biomass
S01	5052	65	0	12	5129
S02	4338	168	5	0	4511
S03	4893	0	2	0	4895
S04	2394	89	8	0	2491
S05	2586	130	0	34	2750
S06	4731	928	0	0	5659
S07	2695	36	0	0	2731
S08	2738	410	42	0	3190
S09	21388	94	0	0	21482
S10	14159	0	0	0	14159
S11	59104	0	0	4089	63193
S12	7375	174	0	10	7559
S13	1429	458	0	0	1887
S14	4544	28131	0	0	32675
S15	368	0	1140	8745	10253
S16	209	35	1398	3917	5559
S17	111	135	7580	12942	20768
S18	762	0	0	2430	3192
S19	11109	14	0	0	11123
S20	12889	618	0	10	13517

For multivariate analysis, samples taken from the subtidal part of the survey area (Stations S1 to S14) were analysed separately from samples taken from the intertidal stretches of the survey area (Station S15 – S20).

Analysis of the subtidal data identified two distinct faunal groupings (Figure 7-4 & Figure 7-5, Table 7-8). Although fauna identified in both groups are similar, differences between both groups are as a result of greater abundances of the mollusc, *Abra nitida* and lesser numbers of *Capitella capitata* in Group 2 compared to Group 1.

Table 7-8 Results from Multivariate Analysis of the subtidal groups indicating the fauna identified in each faunal group

Group 1 (Average Similarity: 44.49)		
Abra nitida	*Capitella capitata*	*Areniocola marina*
Euchone limnicola	*Nephtys hombergii*	*Chaetozone gibber*
Aphelochaeta marioni	*Malacoceros fuliginosus*	*Pygospio elegans*
Group 2 (Average Similarily:54.95)		
Capitella capitata	*Malacoceros fuliginosus*	*Tubificoides pseudogaster*
Tubificoides benedii	*Abra alba*	*Ophryotrocha hatmanni*
Caulleriella sp. A	*Melinna palmate*	

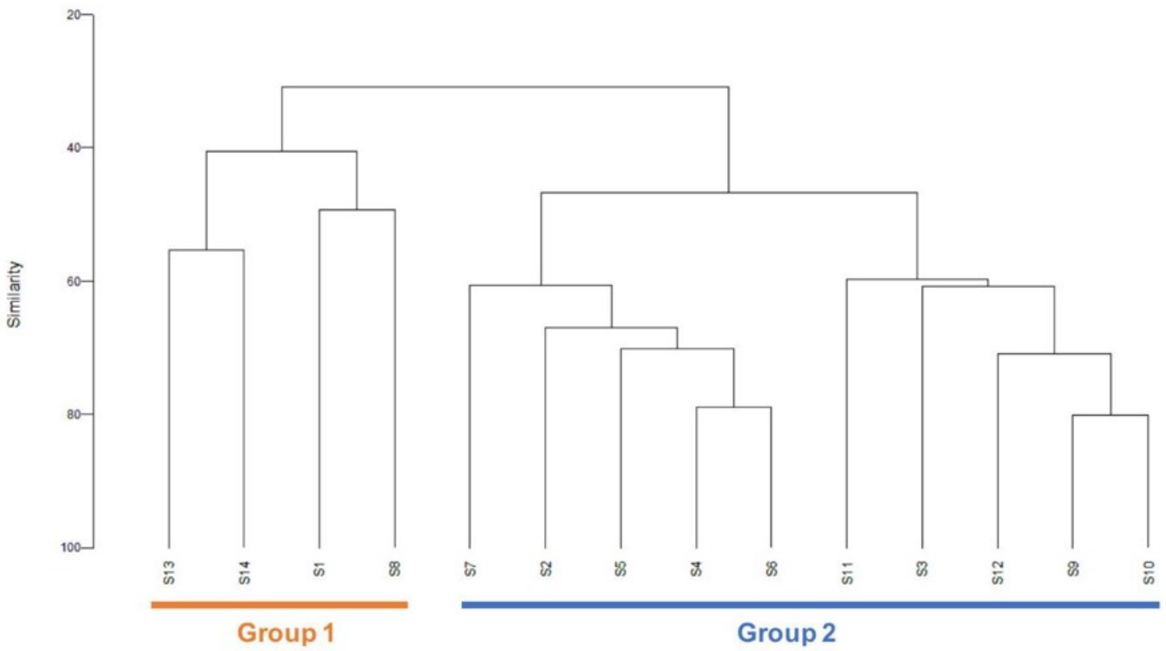

Figure 7-4 Cluster dendogram indicating the distribution of subtidal sites based on faunal distribution within the survey area in Dublin Port

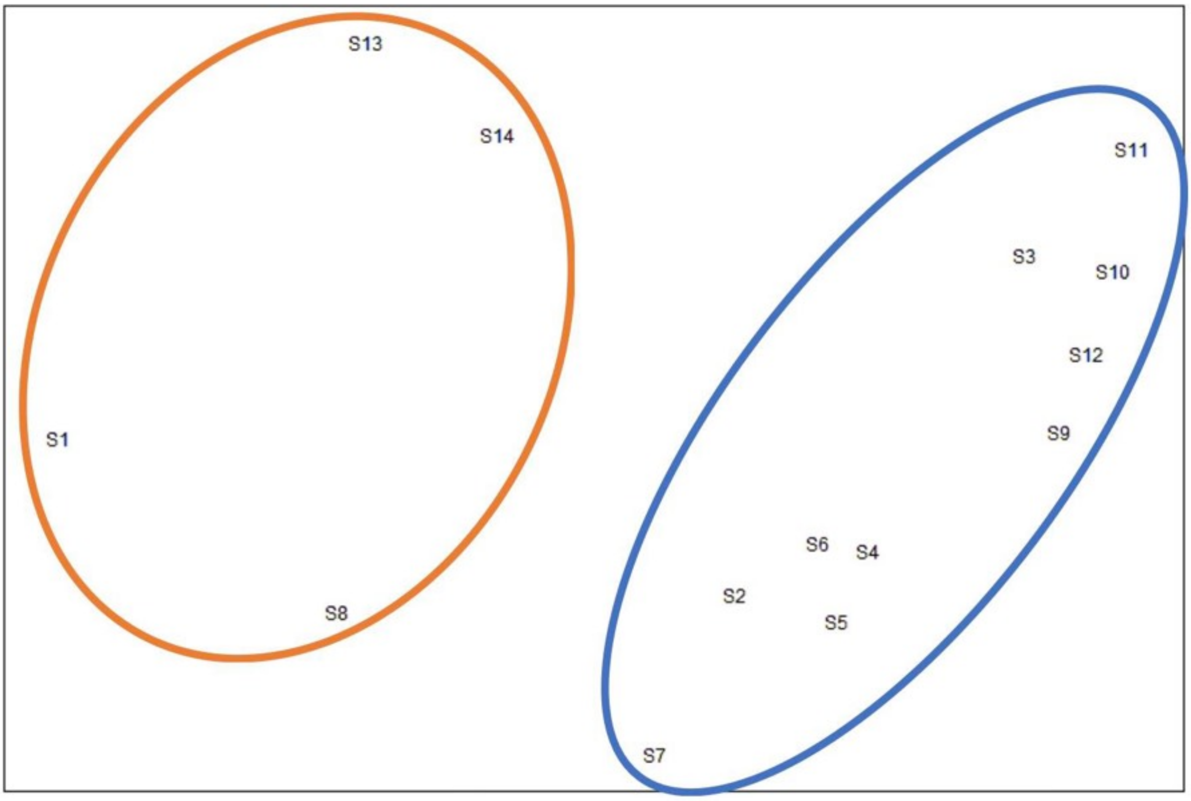

Figure 7-5 MDS plot of subtidal stations within the survey area (Stress = 0.08). Group 1 is orange, group 2 is blue

Analysis of the intertidal data also identified two distinct faunal groupings (Figure 7-6 & Figure 7-7,

Table 7-9. Group 1 consists of two stations (Stations S16 and S17), with Group 2 consisting of 4 stations (Stations, S15, S18-S20). Although there are similarities in the fauna present in both groups, the changes are associated with differences in the abundances of *Capitella capitata*, which is present in larger numbers in Group 2, and the absence of the polychaete worm *Eumida sanguinea* in Group 2, with high numbers in Group 1.

Table 7-9 Results from multivariate analysis of the intertidal groups indicating the fauna identified in each faunal group

Group 1 (Average Similarity: 54.32)		
Capitella capitata	*Tubificoides benedii*	*Ophryotrocha hartmanni*
Nereis diversicolor	*Actinaria* indet	*Malacoceros fuliginosus*
Group 2 (Average Similarity: 52.49)		
Actinaria indet	*Eumida sanguinea*	*Capitella capitata*
Abra nitida		

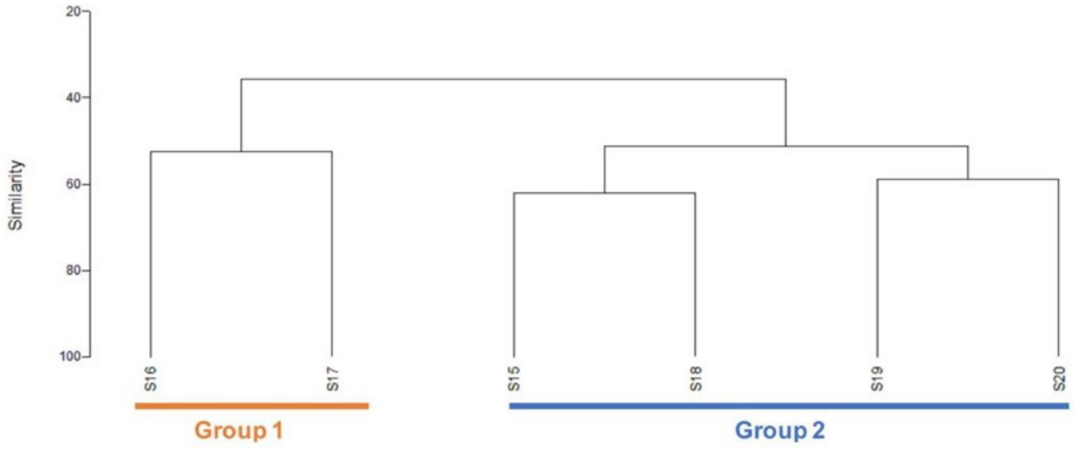

Figure 7-6 Cluster dendogram indicating the distribution of intertidal sites based on faunal distribution within the survey area in Dublin Port

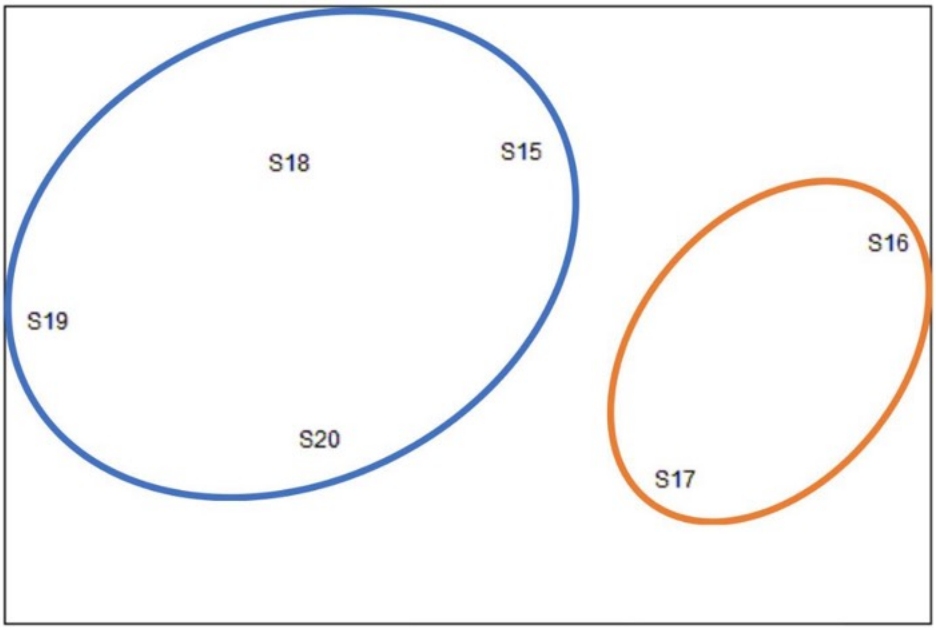

Figure 7-7 MDS plot of intertidal stations within the survey area (Stress = 0.01). Group 1 is orange, Group 2 is blue

The species identified in the survey are typical of shallow subtidal communities. Although most species identified are common in Irish coastal waters, one species of note was identified in the present survey. The tube-building polychaete *Euchone limnicola* is considered non-native and was originally described for California. It is thought to be introduced through shipping activity and is present in high numbers in the vicinity of the area to be infilled at Oil Berth 4.

Results from the benthic survey of the Dublin Port area indicate the presence of a single habitat type. The dominant species present in the area is the polychaete worm *Capitella capitata*. The faunal group identified has been classified as *Capitella capitata in enriched sublittoral muddy sediments*. This concurs with the findings of the baseline survey undertaken in 2015 as part of the ABR Project, which noted this as the dominant habitat in the Dublin Port area out to the Poolbeg lighthouse. This biotope has been described by Connor *et al* (2004) as '*typically occurs in marine inlets or estuaries where organic enrichment allows* C. capitata *to out compete other taxa'*. This biotope extends into the intertidal stretches of the survey area, with greater *C. capitata* abundances present at stations close to the shipping channel, and reducing numbers further from the shipping channel.

Fisheries

The MP2 Project is situated within the Lower Liffey Estuary, a waterbody extending from Talbot Memorial Bridge upstream to just seaward of the North Bull and Poolbeg Lighthouses at the downstream Dublin Bay end, an area of 4.8km^2. IFI surveyed this part of the estuary in both 2008 and 2010 as part of the Water Framework Directive Fish Monitoring Programme using beam trawls, beach seines and fyke nets. They recorded 10 species of fish in each year and 13 across both. In decreasing rank of abundance taking both surveys together these include: juvenile mullet (1), sprat (2) sand goby (3), flounder (4) sand smelt (5) 3-spined stickleback (6) cod (7), pollack (8), long-spined scorpion (9), eel (10), lesser sandeel (11), 15-spined stickleback (12) , 5-bearded rockling (13). These are all common marine/estuarine species around the Irish coast. Most species were taken in small numbers, generally less than 5-10 individuals, the exceptions being sprat (212) and juvenile mullet (1,078) two shoaling species both taken in beach seine nets (

Table 7-9). During the May 2018 survey, 6 beam trawls recorded small numbers of mainly bottom or near-bottom dwelling species including plaice, flounder, dragonet, pogge and butter fish (Table 7-10, Figure 7-8). The first 4 species listed are common over sandy and muddy bottoms, while butterfish are more common in rocky shores. All of the species listed can be considered more or less resident in the lower Liffey estuary including in and around the development area at least for parts of their life cycle. The longest lived of these fish are eel, which may remain for 15-20 years in freshwater. However, a sizeable portion of eels remain for extended periods in estuarine environments some being residents and some being more nomadic into nearshore coastal and freshwaters.

Apart from the species referred to above, the Lower Liffey is also a migratory corridor for salmon and river lamprey both of which are Annex II species under the EU Habitats Directive and both of which occur in the wider Liffey catchment. Fish counters are operated by IFI on the lower Liffey (that includes the Rye Water) and the upper Liffey (i.e. u/s/ Leixlip). Table 7-11 gives the counts for the most downstream counter i.e. Islandbridge since 2010 including 1 sea winter (1SW) and multi sea winter (MSW) fish. The data show figures ranging from 1000-2000 in any given year. Table 7-12 based on monthly fish counter returns on the Liffey for several years, shows that while salmon can run into the Liffey in every month of the year, on average, the main months are July to September, with years when June and October can also contribute significantly. Due to the fact that the Liffey is consistently failing to meet its conservation limits for the species, currently it isn't permitted to harvest salmon either by rod and line in any part of the river. Salmon smolts descend the river between March and May but are not counted.

Table 7-10 WFD fish survey results for the Lower Liffey (IFI 2008, 2010)

Liffey Lower Estuary	2008	Liffey Lower Estuary	2010
Sprat	212	Mullet	1078
Sand Goby	43	Sand goby	24
3-spined stickleback	10	Flounder	9
Sand Smelt	10	Long-spined	4
Cod	6	Lesser sandeel	3
Mullet	5	Pollack	3
Pollack	5	15-spined stickleback	3
Eel	4	5-bearded rockling	3
Flounder	3	Cod	3
Long-spined Sea Scorpion	2	Sand smelt	2

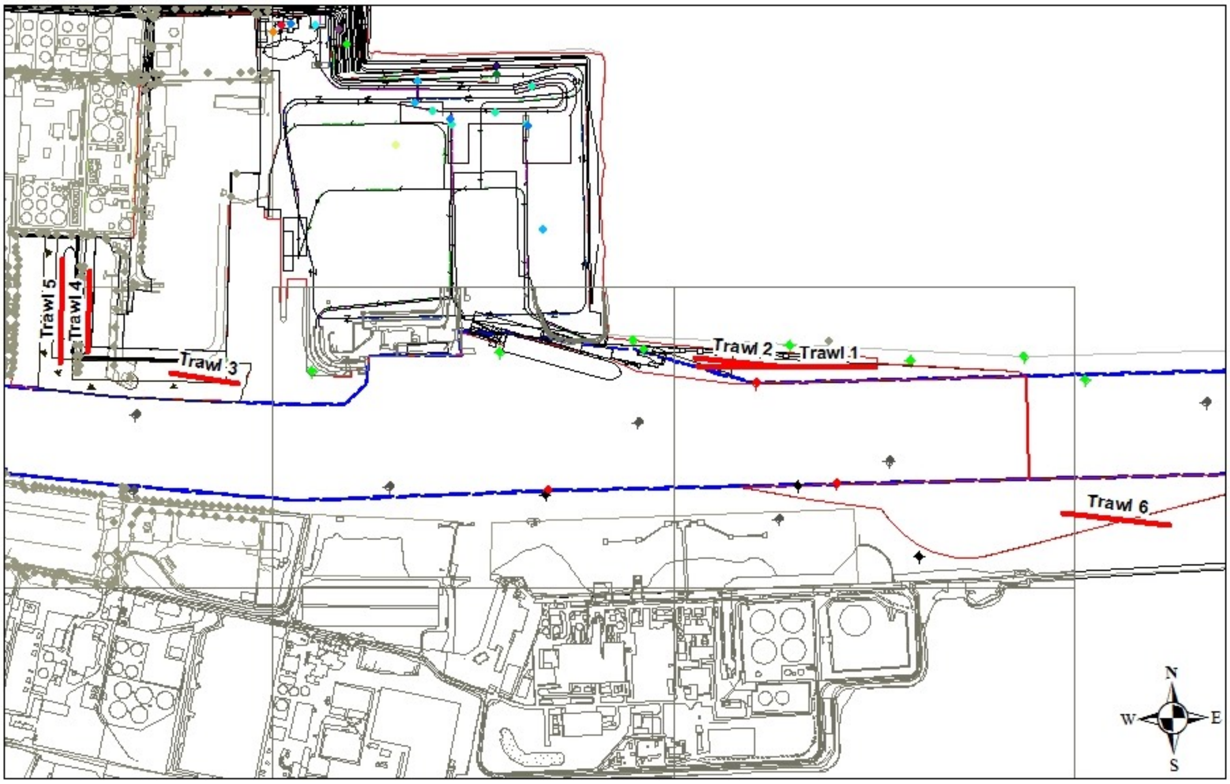

Figure 7-8 Plan of study area showing positions of beam trawls (30-5-2018)

Table 7-11 Contents of beam trawls (30-5-2016)

		Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
Plaice	*Pleuronectes platessa*		9	+	1	3	+
Flounder	*Plathichtys flesus*		1				
Pogge	*Agonus cataphractus*			1		4	
Butter fish	*Pholis gunellus*			1			
Dragonet	*Callionymus lyra*			1		1	
Green crab	*Carcinus maenas*	1kg		1.5kg	++	0.5kg	++
Brown shrimp	*Crangon crangon*					++	
Sea squirts	Acidians indet	++		++		12kg	
Sea Anemones	Anthozoa indet			++	+	+++	
Sea slugs	Nudibranchs indet			2			
Sea Mat	*Alyconidium diaphanum*			+			
Whelk	*Buccinum undatum*		3				
Bivalves	*Macoma/Abra*					+++	
Marine worms	Ploychaetes						++++
Feather Stars	*Antedon* sp.					+	
Kelp	*Saccharina latissima*			+++			

Weights in (kg) otherwise individual numbers or (+) to indicate presence/absence depending on frequency

In mid-October 2010 IFI captured 3 river lamprey in the Upper Liffey Estuary in fyke nets and a single specimen was taken by ASU in February 2017 just below Islandbridge weir in follow-up monitoring for the ABR Project. In 2017 the bristle types on the face of the Marine Institute elver trap at Islandbridge were changed to a stiffer material which had the side effect of capturing migrating river lamprey (*Lampetra fluviatilis*) for the first time. As a result 1 lamprey was caught in March 2017 and 1 in April 2017. In 2018, 7 lamprey were caught in March and a further 27 in April with a gap until September when 2 more were recorded. This points to a strong spring migration and smaller autumn run for the species in the Liffey. It's important to note that only a fraction of the lampreys (and eels) passing upstream of the weir would be caught in the trap. Recent detailed surveys in 56 main stem and tributary sites throughout the Liffey confirmed the widespread occurrence of juvenile lamprey in the catchment. These could be either brook or river lamprey (*Lampetra planeri* or *L. fluviatilis*) but because the two species are indistinguishable at the juvenile stage they are treated as paired species. It is likely that the brook lamprey is however the more widespread within the catchment. Both species are classed as Least Concern by the IUCN but both are Annex II species under the EU Habitats Directive.

The Marine Institute elver trap at Islandbridge weir catches inwardly migrating glass eels, elvers and bootlace eel. Figure 7-10 presents the annual data for glass eel catches in the trap from 2012-2018 which shows the preponderance of upstream movement in the months of April and May with an occasional year with some June migrants also. Glass eel are likely to arrive to the Dublin Bay and Liffey estuary in waves from October to April (pers comm. Dr Russell Poole MI), especially from November – December onwards. The fact that they do not appear in the elver trap at the head of the tide at Islandbridge until April is believed to be related to water temperature, i.e. glass eels only become active and move up into the water column when water temperatures rise above 9-10°C. Studies in the Burrishoole catchment in Co Mayo (pers comm Dr Russell Poole) suggest that, in the late winter/early spring period, they remain inactive close to the bed of the estuary under stones, amount seaweed etc., only moving upstream in numbers once the temperatures rise above 9-10°C. The fact that they only appear in the trap from April onwards means that they have been resting on the bottom or buried in the sediments awaiting a suitable cue to commence their migration. When the temperature rises above 9-10°C glass eels rise from the bottom on the flooding tide and are carried upstream in a series of tidal pulses. The record would therefore suggest that from about mid-February until late May mainly, glass eels are moving upstream from the estuary. Elvers which are a pigmented next stage in the development of juvenile eels and are active swimmers appear in the Islandbridge trap in increasing numbers from May onwards, tapering off in August usually peaking in June-July (Figure 7-11). Elvers, which are the next stage in the development of the eel are pigmented and active swimmers, actively migrating into fully freshwater from the estuary. They appear in the trap in much larger numbers than glass eels. Elvers have undergone significant morphological and physiological changes from the essentially marine, poor swimming, non-feeding glass eel stage to a freshwater-adapted, feeding and actively migrating animal. It should be noted also that some glass eels will commence feeding in the estuary, and either remain there eventually becoming yellow eels or move into freshwater continuing their development there. Elvers do not occur in the development area where the salinity averages 33.7ppt (33.2-33.8ppt) on the bottom effectively full salinity, whereas salinity at Heuston Station Bridge 1.5km head downstream of Islandbridge Weir and between 6km and 7.5km upstream, the bottom salinity averaged 12.1 ppt (4.9-15.9ppt) on the bottom. Thus, as glass eels enter the estuary from the sea in mid-late winter to early spring they gradually move upstream, toward the head of the tide, provided the temperatures are higher than about 6°C i.e. the temperature below which French glass eel fishermen noticed a pronounced drop in catches caused by the halt in movement of the eels due to the cold. As they reach the head of the tide they delay their migration farther upstream until they transform to elvers which then move upstream in larger numbers from the end of April when the temperatures rise. The rate at which glass eels transform to elvers accelerates as the temperature raises from 8 to 12°C, for example, reducing from 50 days at the lower temperature to just 14 days at the higher (see Harrison *et al,* 2014).   .

Table 7-12 Salmon counter returns for the River Liffey (based on IFI online reports)

Year	River Liffey
2017	881
2016	1110
2015	1170
2014	893
2013	1091
2012	1091
2011	1922
2010	2123
2009	893
2008	1224

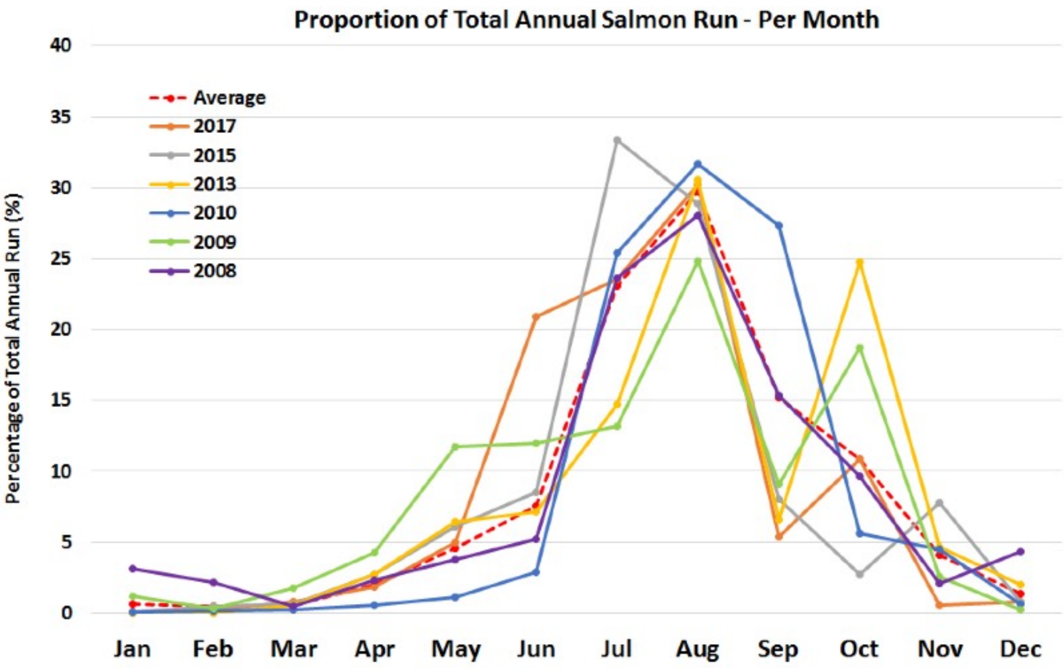

Figure 7-9 Salmon counter data from the Islandbridge weir on the Liffey from 2010-2017. (Data courtesy ESB Fisheries)

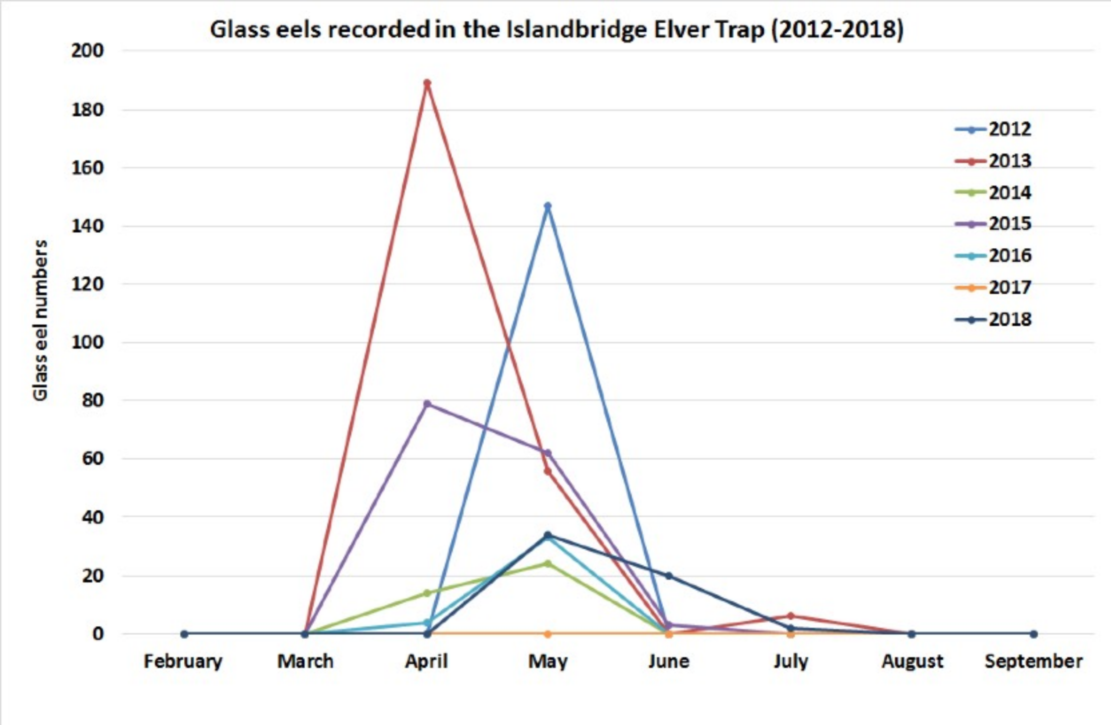

Figure 7-10 Glass eel numbers taken in the Islandbridge elver trap between 2012 and 2018 (data courtesy of the Marine Institute)

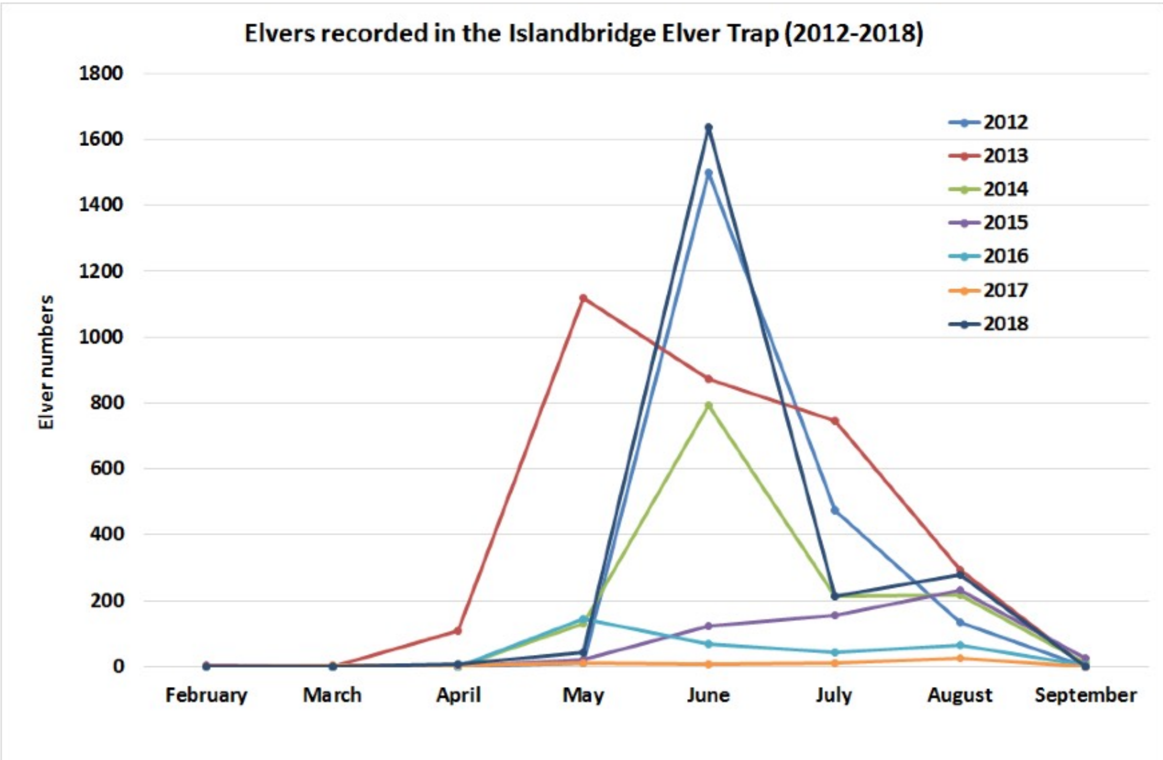

Figure 7-11 Elver numbers taken in the Islandbridge elver trap between 2012 and 2018 (data courtesy of the Marine Institute)

7.3.3.2 Disposal Site

Benthos

It is proposed that the Burford Bank disposal site will be used to dispose of dredge spoil removed from the project site. The Burford Bank disposal site is located approximately 7 km east of Poolbeg, immediately west of the Burford Bank in depths ranging from -12m C.D. to -24m C.D., covering an area of 2.27 km^2 (Figure 7-12). The disposal site is currently licensed and used by Dublin Port to dispose of dredge spoil from the port area to dispose circa 1.1 million m^3 of sediment per annum as part of the ABR Project. This is expected to finish in 2022-2023 and there will be no overlap with the dredge disposal from the MP2 Project. It has also previously been used by Dun Laoghaire Harbour commissioners, Howth Yacht Club and Dublin local authorities for the disposal of sediments.

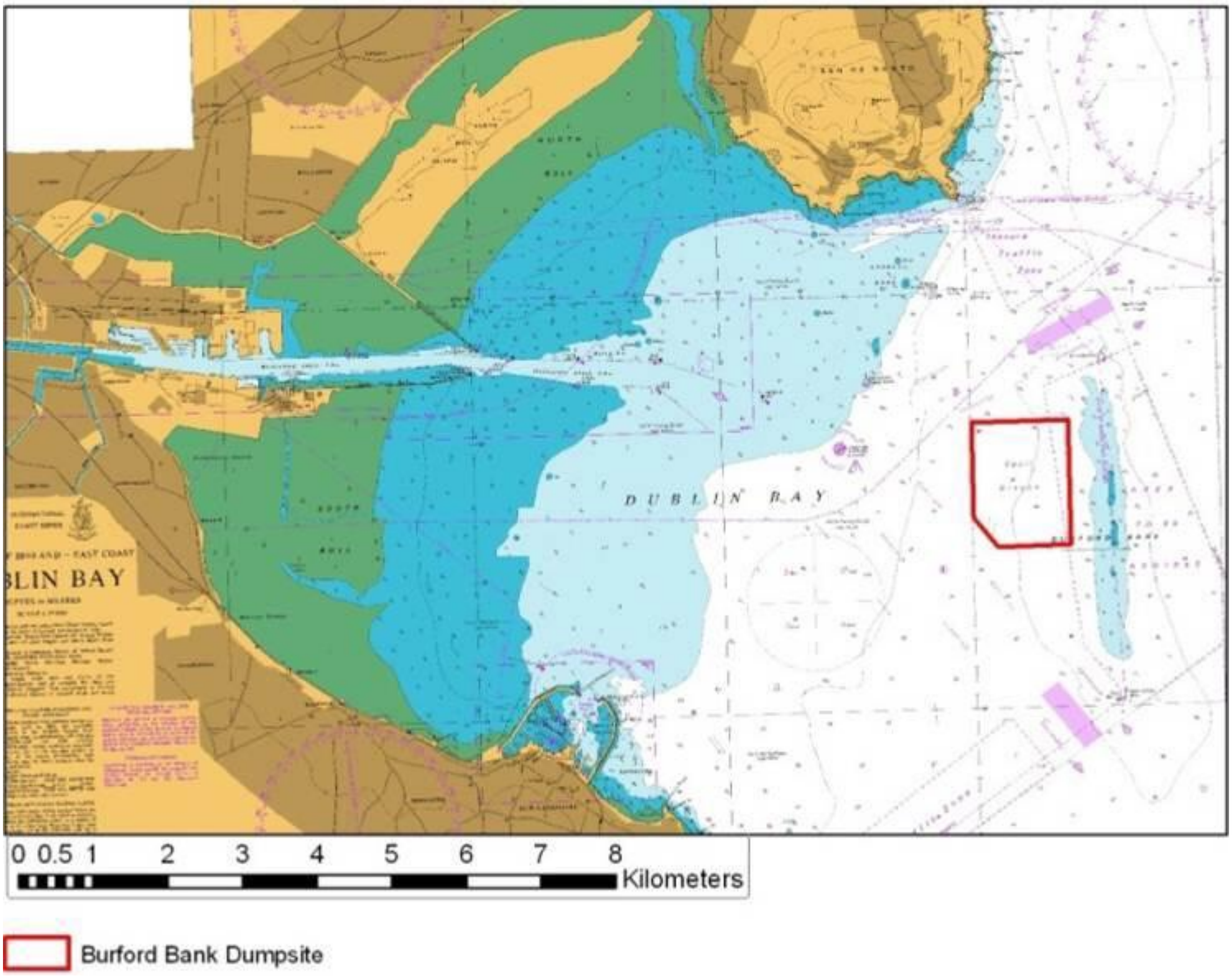

Figure 7-12 Burford Bank disposal site location

The site has been in operation since 1996, after the previous disposal site located nearby closed. The area has been subjected to regular dredge spoil disposal since it opened. Table 7-13 outlines the dredge spoil tonnages disposed at the site since 1996. The ecological impacts associated with dredge spoil disposal are considered to be site specific (Ware *et al.* 2010). The main factors which affect the level of impact include: the volume disposed, frequency & timing of disposal, type & quality of dredge spoil, hydrodynamic regime of the receiving environment and habitat type of the receiving environment.

Table 7-13 Total quantity of dredge spoil disposal at the Burford Bank disposal site location.

Year	Total Quantity Disposed (Tonnes)
2001/2002*	3,427,200
2003	175,000
2004	254,450
2005	
2006	251,128
2007	253,643
2008	251,128
2009	6,400
2010	
2011	
2012	1,582,805
2013	
2014	
2015	
2016	398,932
2017	1,178,100
2018	1,077,450

** these years have been merged together as the disposal activities overlapped across these years*

The sediments to be disposed consist primarily of sands (40.9%) and clay/silt (43.8%), with gravels making up 15.3% of the overall sediment. There will be no rocks dredged during this operation.

The hydrodynamic modelling from the ABR Project indicated that the behaviour of silt and sand at the disposal site will be markedly different. It is expected that the sand fraction will stay largely within the footprint of the disposal site under normal tidal conditions, while the silt fraction will disperse from the site under normal tidal conditions (ABR Project EIS, 2016). As with the ongoing disposal operations currently being undertaken at the site, disposal for the MP2 Project will occur during the winter months and it is expected that storm events and tidal effects will disperse the silt fraction more rapidly, and that the sand fraction of the dredge spoil will also disperse as a result of bed movement and wave action, especially during storm events.

Geological surveys undertaken at the location of the disposal site (INFOMAR, 2010), indicate that the site is dominated by fine to medium sands, with pockets of coarser material also present, (Figure 7-13). The sediment is coarser along the western stretches of the disposal site, with sediment dominated by medium sands and gravel. Sediment along the eastern area of the disposal site is dominated by fine sands, with small amounts of mud also present. In 2016, ASU undertook a survey of the disposal site prior to the ABR Project capital dredging disposal works and results mirrored the findings of the INFOMAR Project, with coarse and mixed sediments identified to the north, as well as the western edge of the disposal area and fine sands, as well as fauna typical of finer sediments along the western part of the box and western approaches to the disposal area. The sediment types present are an indication of water movement in the area, and the presence of coarse sediments points to the occurrence of relatively strong currents in the area. It is considered that this is baseline for the site, and although it is important to note that this will change following ongoing dredge spoil disposal at the site, it is expected that the site will return to baseline following cessation of all dredging activities.

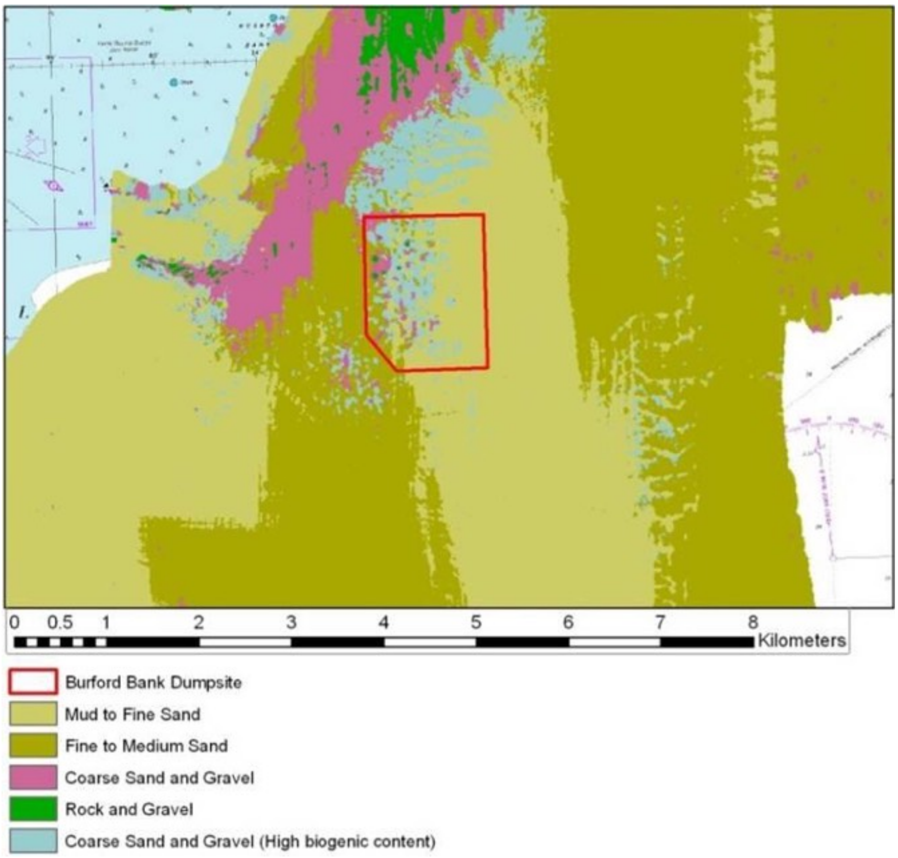

Figure 7-13 Sediment characterisation across the seabed of the disposal sitedisposal area. Data reproduced from INFOMAR (2010)

Work undertaken by ASU in June 2016, as part of the monitoring programme for the ABR Project, identified 2 faunal communities in, and adjacent to, the disposal site at the Burford Bank (ASU, 2017). These faunal communities were closely related to the sediment distribution in the area, with the fine muddy sands of the western part of the disposal sitedominated by the *Amphiura filiformis, Mysella bidentata* and *Abra nitida in circalittoral sandy mud* biotope. The coarser sediments located to the north and east of the disposal site contained a community which conformed to the *Abra prismatica, Bathyporeia elegans* and *polychaetes in circalittoral fine sand* biotope. This biotope is known to grade into the *Amphiura filiformis, Mysella bidentata* and *Abra nitida in circalittoral sandy mud* biotope. Further studies in 1980 (Walker & Rees), 2007 (Kennedy, 2008) and 2011 (Dublin City Council, 2012) recorded similar communities to those identified in 2016 for the area in and around the disposal site at the Burford Bank highlighting the stable nature of the benthos in Dublin Bay. In May 2018, a further survey of the disposal site was undertaken to assess impacts associated with the ABR

Project capital dredge spoil disposal from 2017/2018 (ASU, 2018). This found that although abundances and biomass were reduced, the faunal communities present were similar to those identified prior to commencement of the ABR Project capital dredge spoil disposal.

Fisheries

Based on beam trawl surveys in the outer areas of Dublin Bay as part of the ABR Project, the following bottom or near bottom dwelling species would be expected to occur in and around the Burford Bank disposal site, (Table 7-14). This is a list of all of the species that can be expected to occur with reasonable frequency. Pelagic species such as sprat, herring and mackerel will move through the waters in the area depending on the season.

Table 7-14 Species likely to occur at the Burford Bank disposal site based on ASU surveys outer Dublin Bay in 2012, 2016 and 2018.

Plaice	*Pleuronectes platessa*	Grey gurnard	*Eutrigla gurnardus*
Dab	*Limanda limanda*	Lesser spotted dogfish	*Scyliorhinus canicula*
Scald fish	*Arnoglossus laterna*	Thornback ray	*Raja clavata*
Brill	*Scophthalmus rhombus*	Lesser weever fish	*Echiichthys vipera*
Sand goby	*Pomatoschistus minutus*	Grey gurnard	*Eutrigla gurnardus*
Dragonet	*Callionymus lyra*	Lesser sand eel	*Ammodytes tobianus*
Cod	*Gadus morhua*		
Whiting	*Merlangius merlangus*		
Poor cod	*Trisopterus minutus*		

Commercial Fishing

Commercial fishing does not take place in or adjacent to the MP2 Project. Indeed within the open waters of Dublin Bay, commercial fishing is quite limited. Traditionally, the bay was the site of three types of commercial fishing, namely drift netting for salmon, inshore trawling (up to about the 14m contour) for rays and plaice, and potting for brown and velvet crabs, lobster and whelk. Drift netting for salmon ceased in January 2007 following the countrywide ban on the practice, while trawling declined in the 1980's due to the increase in the size of fishing vessels and the perceived lack of fish within the bay. According to DPC, pots for crab are placed on the eastern (seaward) side of the Burford Bank during summer months and that has generally not caused any problems for navigation. There used to be lobster potting close to the Burford Bank in the past but this appears to have stopped. Some fishermen also pot for whelk in this area, an activity that is generally, though not invariably, scaled back or stopped between November and March each year, depending on the price and market demand. Potting for crab and lobster is carried out on hard ground on the northern and southern approaches to the bay around Howth and Dun Laoghaire. Vessels laying pots are all generally less than 10m in length. There are no classified production areas for bivalve molluscs within Dublin Bay so no commercial harvesting of bivalves can take place. Aquaculture is not undertaken within Dublin Bay.

Recreational Fishing

Sea angling is undertaken from all the piers and harbours around Dublin Bay from Howth to Dun Laoghaire with the most relevant marks to the MP2 Project are given in Table 7-15, based on Dunlop (2009) and current IFI data online.

Table 7-15 Principle angling species at fishing marks nearest to the MP2 Project area

Location	Type	Species
Bull Wall	shore	small pollack, codling, whiting, bass and flounder.
Lower Liffey	shore	mullet as far upriver as Heuston Station
Dodder	shore	mullet and bass
Ringsend Powerstation	shore	immature fish (mullet & bass)
Poolbeg Lighthouse	shore	bass and mackerel, small pollack occasional conger and smooth hounds (in May and June)

7.3.4 Impact Assessment

For ease of presentation, potential impacts are addressed under the broad headings of benthic and fisheries impacts with the following list of sub-headings:

- Habitat Removal
- Habitat Disturbance Due to Dredging
- Impacts Associated with Dredge Spoil Disposal
- Impacts of Piling Noise

Impacts assessments were made using the following guidelines:

- Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017)
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. (CIEEM, 2018)
- The EC Guidance on the preparation of the Environmental Impact Assessment Report (2017)
- The EC Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013)

The MP2 Project will require dredging of approximately 424,644m^3 of sediment associated with the proposed dredging elements of the project. It is proposed that dredging and disposal events will only occur during winter i.e. a six month period from October to March and there will be no overlap with the ABR Project capital dredging or any other Dublin Port Company dredging campaign. It is important to note also, that the dredging and disposal operations for the MP2 Project will span at least four winter seasons, between 2024 and 2031, with no more than 272,000m^3 of spoil being disposed of in any given winter season.

7.3.4.1 Habitat Removal

Benthos

The MP2 Project includes the reclamation of 2.18 ha of benthic soft sediment with the infilling of Oil Berth 4. Results from the present survey indicate the communities present in this area are dominated by highly opportunistic species, such as *Capitella capitata*, which are common in the general area of the Port. This impact is considered permanent, slight negative.

Part of the development will result in the removal of Pier Head at the Eastern Breakwater. This will result in a gain of 0.28 ha of subtidal soft benthos. This impact is considered permanent, slight positive.

As part of the construction works, it is proposed to place concrete mats on the sloping edges of the dredge areas across a limited area to prevent slumping of sediment in the area (See next sub section: Fisheries). This will result in the permanent loss of 1.9 ha of soft sediment benthos in these areas. However, the introduction of almost the same area of hard-benthos associated with the placement of the 1.78 ha of concrete mattresses will result in an increase in biodiversity, as seaweeds, epifauna and encrusting organisms will settle on this new substrate. The impact associated with the placement of these mattresses is therefore considered permanent, slight positive.

Fisheries

The development of Oil Berth 4 will require the infilling of 1.7 ha of subtidal habitat which will be partly off-set by the removal of Pier Head at the end of the Eastern Breakwater (0.28 ha) which will revert to subtidal soft benthic habitat leaving a net habitat loss of 1.42 ha which equates to 0.3% of the area of the Lower Liffey estuary (4.8km^2). There is nothing unique about the habitat involved from a fisheries standpoint and its removal will have a negligible impact on the overall resident fish community and can be classified as slight, adverse and permanent. It will have no impact on the migratory Annex II fish (salmon and lamprey) entering the Liffey.

Over a period of at least four seasons (between 2024 and 2031), [1]10.331 ha of subtidal habitat will be temporarily disturbed due to the requirement to dredge deeper berth pockets and to widen the channel adjoining Berth 53. This will result in the removal of the surface biologically active layer in these areas thereby reducing the benthic food (e.g. marine worms and bivalves etc.) available to bottom dwelling species such as plaice, flounder, pogge and dragonet. This will be a temporary disturbance with recovery occurring rapidly over the following 1 to 2 seasons during which time the soft sediment bottom will be re-colonised by all the same species and during which time fish feeding will still take place. This impact can be classified as minor, negative and short-term in the context of the widespread availability of feeding benthic feeding habitat in the Lower Liffey Estuary and adjoining Dublin Bay.

In order to prevent the dredged side slopes from slumping where Berth 53 adjoins the SPA on the north side of the channel, 1.78 ha of concrete matrasses (Figure 7-14) will be laid along the Berth 53 side slopes. These will

[1] This excludes the area of the infill of Oil Berth 4 (2.18ha)

introduce a hard benthic substrate into an otherwise soft benthic environment in both these locations. This new substrate is likely to gradually become colonised with a range of algae species, especially in the shallower sections as well as typical encrusting organisms such as barnacles, bryozoans, sea anemones and encrusting sponges. The lower sections may well become covered in fine sediment and develop the same community currently present in the area. These changes will tend to favour fish species more associated with rocky shores such as butterfish, certain gobies, wrasse, juvenile pollack, pipefish etc. In contrast there would be a displacement from these areas of flat fish, plaice and flounder in particular, and perhaps to a lesser extent pogge and dragonet. It is likely to take several years before the succession on the matrasses reach full and stable community even though colonisation will begin as soon as they are laid. The fish community will also gradually evolve and stabilise although that will not be as substrate specific given fishes generally mobility. These changes will introduce a greater representation of rocky shore species into the area. The actual diversity is unlikely to alter very substantially because most of the species in question are likely to be represented in the general area but it will alter the community balance to favour species less represented over purely sedimentary bottoms. Overall this change can be classified as neutral to slight positive and permanent.

Figure 7-14 An example of concrete mattresses to be used to stabilise dredge slopes in the Berth 53 area

7.3.4.2 Habitat Disturbance due to Dredging

Benthos

The MP2 Project will result in the dredging of 10.33 ha of soft sediment subtidal benthos, less the 1.78 ha of concrete mattresses which will be placed on the seabed. The communities present in these area are dominated by highly opportunistic species, such as *Capitella capitata* and *Tubificoides* spp. One location on the southern shore area showed levels of high organic enrichment, with very high numbers of *C. capitata* and *Tubificoides* spp. This station (S11) is located immediately adjacent to the Ringsend Waste Water Treatment Plant on the southern shore of the River Liffey. Dredging of these areas will result in the temporary removal of these communities in the footprints of the dredge areas. However, recovery in these areas is expected to be rapid due to the highly opportunistic nature of the fauna present and the large area of similar habitat which is present in the general area of Dublin Port. As such, the impact on the benthos associated with the dredging in the MP2 Project area is considered a negative, temporary to short-term, slight impact.

Fisheries

Dredging of the berths and the manoeuvring areas will result in the evolution of locally high concentrations of suspended solids in the water column in the dredger plume, which will rapidly decline with distance from the dredger. As the bulk of the dredging will be undertaken using a trailer suction dredger some fish entrainment will occur.

Dredgers generate plumes of elevated suspended solids in their wakes, which are greater when there is overflow from the hopper, which occurs when a dredger is attempting to increase the load in the hopper. These will vary depending on local hydrodynamic conditions, the depth, and the type of material being dredged and the rate of dredging, among other factors. In general, suspended solids concentrations are highest within the first 50 to 100m of a dredger (up to several hundred milligrams per litre or more) and with the highest levels concentrated in the middle and bottom layers of the water column. As the distance from the dredger increases the suspended solids load drops off very rapidly, and although a turbidity plume of the finest material may still be visible for up to a kilometre or more down current from the dredger, the actual amounts of solids in suspension tend to be very low beyond the first 100-200m. The higher the amount of sand in the material being dredged the more rapid the drop in suspended solids concentrations.

Suspended solids can have the following impacts on fish in the environment:

1. Behavioural - altered swimming behaviour, breakdown in schooling, altered foraging rates and success, avoidance (lateral and or vertical);
2. Sub-lethal - physiological changes including increased blood sugar, increased blood cortisol, increased coughing response and reduced feeding success all of which are considered signs of stress or alarm. Repeated stress can lead to reduced growth rates; and
3. Lethal - direct mortality due to severe gill damage.

The effects of suspends solids depends principally on a combination of concentration and duration of exposure. The nature of the solids involved is also a factor with larger angular silt and sand particles considered more damaging than smaller particles. Essentially, the higher the concentration of solids and the longer the exposure period, the higher the risk is of adverse impacts for fish. Direct mortalities from high suspended solids in nature is likely to be rare because in experiments these effects are not normally observed until concentrations of tens or hundreds of thousands of milligrams per litre of suspended solids are in question and these levels rarely occur in nature (Alabaster and Lloyd 1980, Newcombe & Jensen 1996).

As fish are mobile, they can and do avoid turbidity plumes e.g. herring and cod: (Westerberg et al, 1996) and sprat: Shelton (1973) quoted in Moore 1977. Fish are also known to differ in their response to suspended solids levels with some species more tolerant than others. For example bottom dwelling species such as flat fish tend to be more tolerant of solids exposure than pelagic species (Moore, 1977), presumably because they are more likely to be routinely exposed to more turbid conditions close to the sediment–water interface. In the current project it is unlikely that individual fish will be exposed to very high suspended solids (i.e. >100mg/l) for extended periods because the dredger will be moving and therefore the area of peak suspends solids will also be constantly moving. The time of the greatest perceived risk would be during the outward migration of smolts from the Liffey, however, given that the dredging will be undertaken between October and March, this will not be an issue. Overall, therefore, few if any direct mortalities are expected to occur to resident fish due to turbidity plumes. However, it is conceivable that some weaker individuals in the population may succumb to gill disease as a result of the increased turbidity. This is not however, expected to result in a significant impact at the local population level of any species.

Suction dredgers are known to entrain fish during dredging operations and this will also occur during the current project. The species most likely to be entrained are the bottom or near bottom dwelling species recorded from the area which will include plaice, flounder, sand gobies, pogge and dragonet in particular and also butter fish, eel juvenile gadoids etc. Fish moving higher in the water column such as mullet, herring mackerel and sprat are likely to be less susceptible, to entrainment but these fish will also be entrained if close to the drag head. Essentially the likelihood of entrainment will be a combination of local frequency of occurrence, combined with susceptibility and seasonality.

The greatest impact of entrainment would be to a group of high value or protected species (e.g. Annex II fish) concentrated into a narrow channel where there would be a greater chance of entrainment. For the MP2 Project, that would mainly refer to salmon smolts. However, as the dredging will occur between October and March smolts will not be adversely impacted. River lamprey which may migrate up river from estuarine and coastal waters at any time from autumn to the following spring, would be susceptible to entrainment if they pass close to the drag head. The significance of this risk is unknown and difficult to estimate in the absence of more detailed information on the numbers entering and their distribution across the channel as they migrate. If they are at risk, this would be greatest in the narrowest portion of the channel upstream of Dublin Port diminishing with distance downstream as the channel widens. Where the proposed dredging will take place the channel ranges from 200-400m wide. River lamprey are known to migrate preferentially during dark lunar phases, so that any risk will not be constant during the dredging. It is also important to note that the bulk of lamprey within the system at any one time are present in the freshwater portion of their range where the juveniles (ammocoetes) remain buried in fine silts for 3-5 years as they prepare for metamorphosis to the adult migratory stage. This, combined with the extended migratory period (autumn and spring), in effect means that at any given time only a small portion of the population is exposed to the potential risk of entrainment.

In addition to fish, most mobile epibenthic species, notably, brown shrimp and crabs are all likely to be entrained in the path of the dredger. Overall the loss of fish and invertebrates as a result of dredging can be categorised as slight adverse and short-term, as the vast bulk of what will be entrained will be the most widespread and common species and the impact will be confined to a small area relative to the wider Liffey Estuary and Dublin Bay where all the same species will occur to varying degrees.

7.3.4.3 Likely Impacts Associated with Dredge Spoil Disposal

Benthos

The Burford Bank disposal site is located within the Rockabill to Dalkey Island cSAC (Site Code 3000). With respect to the benthos, there are no qualifying interests present within the footprint of the disposal area. The closest intertidal reefs within the cSAC to the disposal site are located approximately 3km East Northeast of the northern extent of the disposal site on the southern coast of Howth Head, with the closest sub-tidal reefs located over 5 km East Southeast of the southern extent of the disposal site on the Eastern coast of Dalkey Island.

The disposal site at the Burford Bank is considered a dispersive, active site which is regularly used to dispose of sediments from Dublin Port maintenance dredging, as well as historic works by Howth and Dun Laoghaire harbours. The depths at the disposal site range from -12m Chart Datum (C.D.) to -24m C.D. and the site has a peak tidal flow of 0.82 m/s. Biological communities at dispersive active sites, as well as sites which are subjected to regular naturally-occurring stress factors (such as bed load movement, increased wave action, strong currents), are more adaptive and as such tend to have a higher resilience to disposal events (Bolam & Rees 2003; Bolam et al., 2011). Dublin Bay is a shallow coastal environment with biological communities well adapted to frequent disturbances due to water and sediment movement. The Burford Bank disposal site has been subjected to regular disposal events, since it was opened in 1996, and results from previous surveys highlight the stable nature of the biological communities throughout the embayment, including the disposal site and reflect the adaptive nature of the fauna within Dublin Bay to hydrodynamic disturbance (Walker & Rees 1980, Kennedy 2008, Dublin City Council 2012, (ASU 2017).

Recovery at a dredge spoil disposal site follows a typical pattern. After spoil deposition, macroinvertebrate species diversity, abundance and biomass will be 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 is known to 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 complimented by lateral migration of mobile fauna from adjacent areas and through larval settlement from the plankton. The MP2 Project requires the deposition of approximately 424,644 m^3 of mixed sediments from dredging activities associated with the MP2 Project. The dredging and associated spoil disposal will be spread over at least 4 winter seasons between 2024 and 2031. The sediment to be disposed of consists primarily of sands and clays. Due to the high levels of silt/clay present in the MP2 Project dredge spoil, the recovery is expected to occur in a number of stages. In high dynamic areas, such as those identified in the disposal 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 leaving coarser sandier sediment behind which will gradually revert, through the process of recolonisation, to a community more closely resembling that which pertained before disposal, i.e. typical of the dominant substrate and the prevailing hydrodynamic regime.

Surveys undertaken as part of the ABR Project monitoring programme in 2018, 3 months following disposal of circa 1.3 million m^3 of sediment in 2017/2018, indicate that although biomass and diversity is reduced, faunal groupings present in large parts of the area are similar to those of the baseline survey in 2016. This illustrates the resilience of the faunal communities at the disposal site. As such, the impact associated with the proposed disposal of 424,644m^3 of mixed sediment is considered a negative, short-term, moderate impact, and recovery on site is expected to occur within 1-3 years following cessation of disposal activities at the site.

Fisheries

A review of the turbidity generated in open water dredge spoil disposal sites (Truitt, 1988) showed that significantly elevated turbidity levels are generally confined to the lower 15-20% of the water column depth, declining by orders of magnitude toward the surface. Turbidity levels at all depths decline rapidly, approaching background levels within a matter of minutes to tens of minutes, with the bottom levels declining slowest. In view of the rapid dissipation of water column turbidity after each disposal event, it is not expected that this aspect of the operation will give rise to any significant impacts on fish species in the area, due to the very short period of exposure to elevated turbidity. In the case of the Dublin Bay disposal site high concentrations up to several thousands of milligrams will occur near the dredger during disposal with levels dropping rapidly within the plume toward the edge of the disposal site to the low hundreds of milligrams or less. Thus, each dumping event will be associated with a unique and rapidly dissipating suspended solids plume. Fish living on or very close to the bottom immediately beneath the dredger hopper during a disposal event may be buried by the descending bulk spoil whereas others within the water column in and adjacent to the plume are likely to avoid the area. Such effects are expected to be localised to the disposal site area. A reduction in the biomass of benthic infauna (worms, bivalves, crustacean etc), as well as mobile epibenthos e.g. shrimps and crabs as a result of the dredge spoil disposal would be expected to temporarily reduce the available food for fish in the area. Again this effect will be mainly confined to the disposal area and diminish with time. This does not mean that bottom dwelling fish will be absent from the site following the spoil disposal but that the food available for them will be reduced. It is worth noting however that the benthic community which initially colonises dredge spoil disposal sites is often dominated by rapidly growing, small-bodied infauna, situated close to the sediment surface, especially if the material being disposed of is high in organic matter such as the sediments from the MP2 Project. The high density of these invertebrates can significantly increase the secondary production of disposal sites providing an increase in food for benthic feeding fish, especially juveniles (see Lunz 1983 quoted in LaSalle et al., 1991). This impact is categorised as slight, adverse and short-term because of the widespread adjacent availability of comparable fish feeding habitat in that sea area. This will therefore not have a knock-on adverse impact on any European site or protected species in the area.

<u>Indirect Impact on Harbour Porpoise Diet</u>

Harbour porpoise are known to eat a wide range of fish including small benthic species (see Section 7.4, Marine Mammals) which will likely be impacted on the disposal site as outlined above. Harbour porpoise have been frequently sighted within the disposal site area (Russell et al., 2018) (see Section 7.4, Marine Mammals), including evidence from acoustic monitoring of extensive foraging behaviour. As indicated, there may be a reduced biomass of benthic and near benthic fish foraging within the disposal site, so available prey to harbour porpoise from that area may be reduced for at least a few seasons after the dumping process. However, the area of the Rockabill to Dalkey Island cSAC where the species is protected covers 273 km^2 and they are highly mobile species with sightings from all adjacent areas (see Section 7.4, Marine Mammals). For these reasons the porpoise population will not be directly or indirectly impacted due to a relatively localised potential reduction in fish biomass at the Burford Bank disposal site. Moreover, a recent survey of the disposal site and its immediate area confirmed the presence of a fish community typical of similar habitats in the Irish Sea with a total of 14 species recorded, just 6 months after the first ABR Project capital dredge spoil disposal exercise (ASU, 2019).

7.3.4.4 Impacts of Piling Noise

Piling will be required for new quay walls and for new mooring dolphins, as described in Chapter 11. Piles driven in water give rise to noise levels well above ambient levels. Circular piles such as those which will be used for mooring dolphins and new quay walls give rise to higher noise outputs depending on their diameter than sheet piles. Impact pile driving for driving circular steel piles uses a heavy weight (hammer) to ram piles into the substrate. The noise generated is intermittent consisting of discrete noise outputs for each hammer impact. The sound generated also has several features, which characterise it. Firstly it is a loud sound i.e. it generally has a high amplitude. It is also a sharp sound with a very short rise time to reach peak pressure (measured in milliseconds). It has a broad spectrum i.e. the sound is spread over a wide range of frequencies from a few hertz (Hz) to several thousand hertz i.e. several kilohertz (kHz). Sound is measured in units of pressure i.e. Pascals. Sound is generally expressed in decibels (dB), which is a log scale of the ratio between a reference pressure to the actual measured pressure. A 6 dB increase or decrease in sound equates to a doubling or halving of the SPL (Sound Pressure Level) respectively.

When assessing the impact of pile-driving sound on fish, a number of metrics have been used to analyse the sound in a way that can be correlated to an effect on fish. In general, the potential effects include: a range of non-auditory tissue damage up to mortality, auditory tissue damage, which results in a reduction in the hearing ability which may be permanent (known as PTS or Permanent Threshold Shift), a temporary reduction in hearing sensitivity (TTS or Temporary Threshold Shift) or finally behavioural affects, e.g. startle or avoidance responses. TTS, because fish recover from it, usually within a day or less, is not considered an injury (although it may or may not have significance for the affected species). The total energy associated with a single pile strike is given as SEL or Sound Energy Level and it is one of the sound metrics used when assessing the effect of impact piling noise on fish. Another is SELcum (or cumulative SEL) which is a measure of the total energy generated by several piles strikes, as occurs when a pile is driven. Extensive research has been undertaken in recent years to relate sound energy output from impact piling to adverse impacts in fish including mortality, recoverable injury and behavioural responses.

Currently there are no Irish or European regulations or guidance governing the impact of piling noise on fish. However, Popper *et al,* (2014) after reviewing extensive targeted research on the subject, issued guidance on the levels of sound energy for different broad categories of fish associated with a range of adverse impacts (Table 7-16 reproduces the guidance in Table 7.3 from Popper *et al.,* (2014). These data have been used to assess potential adverse impacts of piling on fish in the Liffey as a result of the MP2 Project. Table 11-30 in EIAR Chapter 11 sets out the noise impact zones for fish as a result of the sound output from driving circular piles for the MP2 Project. These zones were derived from an underwater noise model described in Section 11.2.5.4 of EIAR Chapter 11. Table 11-30 indicates that fish within a radius of 12 m from an active pile are potentially susceptible to being killed or injured. The more important species including salmon, river lamprey and eel are all migratory and apart from yellow eels that are resident in the estuary, generally tend to move through the piling area either upstream or downstream on inward or outward migrations, rather than delay in the active piling area. This immediately reduces risk to them as the SELcum threshold presupposes a stationary fish exposed to that level of sound before an injury is sustained. Moreover, each of these species is likely to use selective tidal transport on their upriver migrations as a method to efficiently and more quickly reach freshwaters. This entails moving into the main tidal flow on flooding tides and moving to the margins and or bottom during ebb tides to stem seaward displacement. On outward migrations displacement will generally be faster as the fluvial flow will work in tandem with the ebbing tide. A combination of these tidally-induced responses will reduce the likelihood of any given animal entering the high impact zone close to an active pile. Both salmon and eel, although not sound specialists, do actively avoid loud sounds (Knudsen, 1992, Sand *et al.,* 2000) and this will also be likely to keep individual fish away from the high impact zone of an active pile, thereby reducing potentially injurious levels of sound exposure.

Table 7-16 Sound exposure levels associated with adverse effects in fish taken from Popper et al., (2014)

Table 7.3 Pile driving. Data on mortality and recoverable injury are from Halvorsen et al. (2011, 2012a, c) based on 960 sound events at 1.2 s intervals. TTS based on Popper et al. (2005). See text for details. Note that the same peak levels are used both for mortality and recoverable injury since the same SEL_{ss} was used throughout the pile driving studies. Thus, the same peak level was derived (Halvorsen et al. 2011).

Type of Animal	Mortality and potential mortal injury	Impairment			Behavior
		Recoverable injury	TTS	Masking	
Fish: no swim bladder (particle motion detection)	>219 dB SEL_{cum} or >213 dB peak	>216 dB SEL_{cum} or >213 dB peak	>>186 dB SEL_{cum}	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: swim bladder is not involved in hearing (particle motion detection)	210 dB SEL_{cum} or >207 dB peak	203 dB SEL_{cum} or >207 dB peak	>186 dB SEL_{cum}	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{cum} or >207 dB peak	203 dB SEL_{cum} or >207 dB peak	186 dB SEL_{cum}	(N) High (I) High (F) Moderate	(N) High (I) High (F) Moderate
Sea turtles	210 dB SEL_{cum} or >207 dB peak	(N) High (I) Low (F) Low	(N) High (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) High (I) Moderate (F) Low
Eggs and larvae	>210 dB SEL_{cum} or >207 dB peak	(N) Moderate (I) Low (F) Low	(N)Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low

Notes: peak and rms sound pressure levels dB re 1 μPa; SEL dB re 1 $\mu Pa^2 \cdot s$. All criteria are presented as sound pressure even for fish without swim bladders since no data for particle motion exist. Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

Lamprey do not have a swim bladder which means that they are not likely to be injured by impact piling noise. It also indicates that they are not hearing specialists. Nevertheless, they are likely to be sensitive to particle motion associated with the fluid vibration caused by impact piling and therefore also likely to avoid the high impact area by active swimming. Lamprey are known to preferentially migrate at night and in particular during the dark phase of the moon, behaviour which combines to reduce their potential exposure to piling noise. Data for 2018 from the Marine Institute noted that the peak migration of river lamprey at Islandbridge Weir was during the months of March and April (Figure 7-10). Glass eels, which are the inwardly migrating early life stage of eels are poor swimmers and rely on tidal transport to bring them progressively up through estuaries to the head of the tide. On flood tides they tend to be well distributed throughout the water column but particularly in the main tidal flow, whereas at early ebb they move toward the margins and during full ebb they move toward the bed of the estuary in order to bury into sediment or to remain in slacker flows so as to reduce seaward displacement (Harrison et al., 2014). This oscillating cycle of a big step upstream on the flood and a shorter backward step during ebb is the mechanism whereby glass eels eventually arrive at the tidal limits where they undergo physiological changes to enable them to migrate further upstream into rivers and streams. The fact that glass eel have the ability to move up and down in the water column would suggest that they may have some limited ability to move away from the inner higher noise impact zones around active piles. Nevertheless, the possibility that some migrating glass eels may be displaced during an ebb tide into the higher nose impact zone of the pile cannot be ruled out. If this occurs, then some at least of these eels will either suffer recoverable injury or, if closer to the pile (within 14m), may be killed. The proportion of the glass eel population which will be adversely affected in this way is likely to be very small for a number of reasons as follows:

(i) the noise mortality zone is spatially very limited in extent i.e. 14m in diameter and confined to the active pile, whereas the length of the shore from the mouth of the estuary at the Bull Lighthouse to Islandbridge weir at the head of the tide is 11km with a channel width in the development area of between 200 and 400m;

(ii) during the day, the piling process will not be continuous, with substantial gaps related to the management of the installation of individual piles during which no noise impacts will occur;

(iii) piling will not occur at night and although some daytime migration will likely occur, especially if the conditions are turbid at the time, glass eels tend to migrate preferentially at night;

(iv) glass eel migration is spread over several months;

(v) there will be no riverside piling in the months March-May inclusive to protect outward migrating salmon smolts and given that the trap data at Islandbridge (Figure 7.3.9) indicates that these are the times of greatest passage of glass eels, this seasonal moratorium on riverside impact piling will also serve to provide at least partial protection for glass eels as well. The protection is partial because the absence of glass eels in the Islandbridge trap does not mean that they will not be moving through the development area which will probably depend on temperature in particular; and

(vi) finally, eels do not home to natal rivers, so that a minor reduction in recruitment in the Liffey associated with piling (even though this is not predicted in this case) would have an imperceptible impact on the potential for future glass eel recruitment to the same river.

Elvers are likely to be unaffected by piling as these are unlikely occur in the development area due to its high salinity.

<u>Common resident marine and estuarine species</u>

There is the potential for some of the resident or seasonally transient fish species of non-conservation importance within the Liffey Estuary, especially most of the common ones, to be present near an active pile. However, all of these species are active swimmers and are more likely in the main to avoid the area around the active pile rather than move close enough to it to be killed, i.e. within 4.5m for fish without a swim bladder (e.g. flat fish), 14m for fish with swim bladders not used in hearing (e.g. eel) and 20m for fish that use their swim bladder in hearing (e.g. sprat and herring). That said, fish larvae or small fish with poorer swimming ability may be less able to avoid the immediate area if tides or strong winds are carrying them toward the high noise zone of an active pile. In the latter cases fish may be killed or injured. However, the footprint of this impact zone is so small compared to the overall area of the Lower Liffey estuary, that this impact is likely to be imperceptible and not significant at the population level of any of the species present, due to their widespread occurrence around the development area. It is important to note in this regard that only a single king pile rig will operate along the Liffey edge at any one time. It is also important to note that the impact radius for SELcum, i.e. up to 20m for the most sensitive species, pre-supposes that the affected fish would remain in that zone for all or a substantial portion of the driving of a pile. In reality fish, however, will be moving and in a stressful situation are would likely be actively avoiding these areas, thereby reducing the risk of injury or death.

Overall therefore, piling is predicted to have a localised non-significant impact on species of non-conservation interest and at most a slight adverse impact on species of conservation importance including salmon, river lamprey and eels, none of which will be significantly impacted at a population level.

Recreational Fishing Impacts

The shore angling marks listed in Table 7.3.12 above range in distance from 500m to several kilometres away from the site of piling such that the received sound pressure at these will vary very significantly, with the one closest (i.e. Poolbeg Lighthouse) most likely to experience any effect. The species listed for that mark include juvenile mullet and bass. Bass are known to show behavioural reactions to loud sounds including sudden diving and tighter shoaling (Neo *et al.,* 2014). The response of mullet is not known but may follow a similar pattern. It is difficult to say how these potential responses would impact angling success but it seems unlikely that they would improve it. The fact that piling will not occur on a Sunday will partially reduce the potential for adverse impacts on angling success at this angling mark.

7.3.4.5 Cumulative Impacts

There are 3 projects that will potentially have cumulative impacts on the MP2 Project as follows:

- ABR Project
- DPC Post 2019 Maintenance Dredging Campaign
- The Howth Yacht Club – Marina Extension

ABR Project

The permanent net loss of 3.68 ha of soft benthic habitat (1.78 ha from the placement of concrete mattresses, 2.18 ha loss from the infilling of Oil Berth 4 and the 0.28 ha gain from the removal of Pier Head at the Eastern Breakwater), in addition to habitat loss as a result of the ABR Project will have a slight negative impact on the soft-sediment benthos in the immediate vicinity of Dublin Port. However, the increased amount of hard benthos resulting from the placement of 1.78 ha of concrete mattresses will lead to increased benthic biodiversity within the development area. This is considered a slight positive impact.

The impact associated with the dredging of approximately 424,644m^3 of sediment from 10.33 ha within the development area, in addition to ongoing capital dredge works associated with the ABR Project and regular maintenance dredging will have no cumulative effect, as there will be no overlap between the MP2 Project works, and either the capital dredging works associated with the ABR Project or ongoing maintenance dredging. These works will be undertaken separately from each other, allowing recovery to occur at each site as dredging is completed. As such, the cumulative impacts associated with these dredging activities is considered slight, negative.

The Burford Bank is currently being used to deposit circa 6 million m^3 of mixed sediments from the capital dredging works associated with the ABR Project. In addition, on-going maintenance dredging is also being undertaken, with disposal of this spoil also taking place at the disposal site. As a result a significant amount of spoil will be deposited on the site prior to the disposal of the MP2 Project sediments. It should be noted that there will be no overlap between the disposal of sediments from either on-going maintenance dredging or capital dredging works associated with the ABR Project and the proposed disposal programme. The nature of the disposal site is such that recovery is expected to occur rapidly after the cessation of disposal activities. The volumes associated with the proposed disposal is less than half of to the annual disposal volume from the ABR Project capital dredging works. As such, the anticipated cumulative impact is considered short-term, moderate, negative. Recovery is expected to occur rapidly (1-3 years) following cessation of all dredge disposal at the site.

DPC Post 2019 Maintenance Dredging Campaign

DPC proposes to apply for a new maintenance dredging permit for 2020 & 2021 and thereafter an 8 year maintenance dredging permit take to it to 2029. The maintenance dredging will entail the disposal of between 200,000 and 450,000 m^3 of sediment from the shipping channels per dredge campaign. This dredging takes place in the April - September period, for example in June/July 2016 425,000m^3 were disposed of at the site, in September 2017 189,000 m^3 and in April 2018 128,000 m^3. In the EIS for the ABR Project it was predicted that the capital disposal each year of 1.7M m^3 of capital dredge spoil at the disposal site would depress both the species diversity and biomass at the site but that recovery would begin each year at the end of the October to March disposal period and that by the start of October the at the beginning of the next 6 month round of disposal there would be a partial recovery in the biomass and diversity of benthos. What the intervening disposal of maintenance dredge spoil does is interrupt that recovery process and reduces the extent of its recovery. That in turn will reduce the biomass for fish feeding at the site. It is expected that the disposal of approximately 424,644m^3 of sediment for the MP2 Project during the October-March disposal period, if followed in the same year by maintenance dredge spoil disposal for DPC’s new dredging campaign, will slow the recovery of biomass and diversity at the disposal site that year. It is important to note, however, that the MP2 Project disposal volume will not be disposed of all at once but instead across a minimum of 4 winter disposal events with any given one not amounting to more than 260,000 m^3 thereby reducing the impact of any given event. This cumulative impact will not however change the overall conclusions regarding the impact of the MP2 Project dredge spoil deposition at the disposal site as outlined above regarding benthos and fisheries.

The Howth Yacht Club – Marina Extension

Howth Yacht Club (HYC) is proposing to extend the marina at Howth within the confines of the existing breakwater. A Dumping at Sea (DAS) Permit was granted in August 2011 (Reg No. S0010-01) for the disposal of 120,000 tonnes of dredged material at the licensed offshore disposal site located to the west of the Burford Bank, the same offshore site proposed for the dredge spoil for the MP2 Project.

A breakdown of the dredged material was provided in HYC's response to an RFI issued during the licensing period as follows:

- Rock: 95,000 tonnes (thinly bedded, highly fractured and weathered limestone)
- Sediment: 25,000 (un-compacted grey black sandy silt)

A bulk density of 1.65 tonnes/m^3 was used in HYC's calculations to convert the total volume of silt to tonnage. The total volume of silt is therefore 15,150m^3 which equates to 1.44% % of the total amount of dredge spoil. The estimated rate of dumping from HYC will be 1,200 tonnes per day.

The DAS permit issued to HYC allows for the dumping of 120,000 tonnes of dredged material over a period of one year from the commencement of works. At rate of 1,200 tonnes per day that would equate to around 100 days of dredging and disposal to complete the operation. Notification must be given to Dublin's Port Harbour Master in advance of the dumping taking place.

The potential cumulative effects are twofold: the potential impact of an increased suspended solids loading (dredge plume) during simultaneous disposal of silts; and the potential impact on the benthic communities of the disposal site due to sequential winter, summer, winter capital dredging campaigns. An appraisal of each of these potential impacts is presented.

<u>Potential impact of an increased suspended solids loading (dredge plume)</u>

The cumulative impact appraisal of the disposal of dredged silts at the licensed offshore site from the Howth marina extension was previously assessed as for the Request for Further Information (RFI for the Dumping at Sea application (Ref: S0024-01) of the ABR Project in which report (Appendix 1 of the ABR Project Dumping at Sea RFI) a worst case scenario was modelled whereby the dumping of dredged material was to take place at exactly the same time for both projects. In reality, this would not be permitted by the Harbour Master from a navigational safety point of view. The appraisal was undertaken by repeating the computational model runs presented in Section 9.9.3 of Chapter 9 of volume 1 of the ABR Project EIS (Figures 9.41 – 9.48) to simulate the cumulative impact of dumping dredged material from the ABR Project in combination with that of the Howth marina extension. The results of the model simulations were presented in Appendix 1 of the ABR Project Dumping at Sea RFI. The results showed that suspended solids concentrations at the offshore disposal site remain below 25mg/litre above background except in the area around the dump barge. The MP2 Project dredging and dumping protocol has been designed to ensure that suspended solids concentration at the boundary of the of the disposal site will be in the same range as that for the ABR Project and therefore it is reasonable to assume that the worst case scenario presented previously where both the HYC dredge spoil disposal would take place at exactly the same time as that from the MP2 Project that the same outcome would arise in terms of solids concentrations at the boundary of the site and therefore no cumulative impacts are predicted.

Impact of dredge spoil disposal on the benthos at the disposal site

Deposition of circa 120,000 tonnes of mixed sediment (rock and sandy silt) from the HYC capital dredge works will result in an interruption of the recovery process which will be underway following disposal of sediments as part of the MP2 Project if disposal of sediment occurs within the predicted recovery period for the deposition of the MP2 Project sediments. The converse of this is also true if HYC spoil is disposed prior to MP2 Project sediments.

The volumes of sandy silt associated with the HYC dredging are relatively small in comparison the MP2 Project volumes, with just 1.44% of the total volume. The cumulative impact of the MP2 Project disposal is expected to be negligible considering the volumes of sandy silt to be disposed of from HYC.

Overall, the potential cumulative effect as outlined above will not alter any of the conclusions in this EIAR with regard to the predicted residual significance of impacts described.

There are no additional, additive, incremental, associated, or connected effects resulting in synergistic impacts above a magnitude already predicted in the EIAR.

7.3.5 Remedial and Mitigation Measures

7.3.5.1 Habitat Loss

Infilling of 1.9 ha (net) of subtidal habitat that provides feeding habitat for resident fish will be partly offset by the introduction of hard elements into the area of the estuary including piles and 1.78 ha of concrete mattresses which will develop encrusting plant and faunal communities which will favour rocky-shore associated fish, which are less common in this area of the waterbody.

7.3.5.2 Dredger Overflow

There will be no overflow from the dredger due to the high proportion of fines in the sediment to be dredged. This will help to minimise the extent of suspended solids in the dredger plume.

7.3.5.3 Dredger Operation

It has been shown that the drag-head will tend to entrain more fish and mobile epibenthic crustaceans when it is lifted from the sediment surface while the pumps are still running. This occurs when the dredger comes to the end of a dredged line and turns to dredge back up along an adjacent line. In order to avoid the associated risk of increased entrainment during turning, the pumps will be switched off while the drag-head is withdrawn from the seabed and not engaged again until it is replaced onto the seabed to dredge the next line.

7.3.5.4 Spoil Disposal

Dredge disposal model simulations carried out for the ABR Project and reported in the ABR Project CEMP Rev F (August 2018) indicated that for disposal of finer silts dredged without overflow from the hopper would require a modified disposal regime in order to ensure low suspended solids levels outside the boundary of the disposal site. This same dredging protocol will be employed for the MP2 Project. This will require a smaller trailer suction dredger with a 4,100 m^3 capacity hopper, equivalent of approximately of 2,030 tonnes (wet weight), dredging every 3 hours for 6 months (October-March) (Figure 3.5.12.7, page 147 of the ABR Project CEMP Rev F, August 2018).

To facilitate more rapid recovery of the benthic communities, the depth of the over burden on the faunal communities will be minimised. Studies have shown that where the thickness of the deposited layer is kept to 15cm or less, vertical migration of fauna through the sediment will compliment lateral migration and larval recruitment to facilitate recovery (Wilber et al., 2007). The deposition of 150,000m^3 of sediment over the whole disposal area will result in the deposition of 6-7cm of sediment per calendar month (before finer sediments are winnowed away). The disposal of sediment will be spread over the whole disposal site as evenly as is practicable per calendar month to allow the greatest opportunity for deep burrowing invertebrates to move vertically through the newly deposited layers of spoil. This is less likely to be beneficial during the disposal of the muddier material within the spoil as upward migration of sand dwelling species through mud is generally poor.

7.3.5.5 Piling

No riverside piling will take place during the three months of the year when smolts are likely to run in their highest numbers (i.e. March to May inclusive). This recognises the smaller size of smolts compared to returning adults and lamprey. It also takes account of the fact that smolts have a swim bladder which makes them more susceptible than lamprey to pressure trauma due to piling noise. This measure will also benefit glass eel and river lamprey many of which migrate within the same window.

Furthermore, the larger tubular steel piles will only be driven by one rig at a time, so that the area of noise exposure involved will be very small in the context of the 200-400m width of channel adjoining any given active pile, where fish can pass without incurring injury. This will be to the benefit of all migrating species.

It is also the case that the piling of large circular piles is not a continuous process, rather an intermittent one with breaks required for checking pile alignment and adjustment. These gaps have the effect of reducing the degree of cumulative noise exposure to fish migrating past the piling area thereby reducing their risk of noise – related injury. Such routine non-piling intervals during the day will also reduce the noise exposure for resident fish in the area.

The use of vibratory pile drivers has been shown to be associated with lower peak sound levels than impact piling and is generally believed to be less likely to cause noise-associated trauma in fish. Vibratory piling will be used to drive the sheet piles which are by far the more numerous type on the project.

The piling of large circular piles is not a continuous process, rather an intermittent one with breaks required for checking pile alignment and adjustment. These gaps have the effect of reducing the degree of cumulative noise exposure to mobile fish migrating past the piling area thereby reducing their risk of noise – related injury. Such routine non-piling intervals during the day will also reduce the noise exposure for resident fish in the area.

7.3.5.6 Fisheries Enhancement

DPC are committed to working with IFI and 3rd level institutions to explore fisheries enhancement measures within the framework of the MP2 Project area, concentrating in particular in optimising biodiversity and fisheries biomass associated with new harbour structures.

7.3.6 Residual Impacts

7.3.6.1 Habitat Loss and Habitat Alterations

The MP2 Project will result in a permanent net loss of 1.42 ha soft sediment subtidal habitat in Oil Berth 4. This will be partly offset by a change of 1.78 ha of soft sediment habitat on dredge slopes of the Berth 53 manoeuvring area when that area will be covered with concrete mattresses to stabilise the slopes. This will recolonise with a faunal and flora community more typical of hard benthos area thereby increasing the biodiversity in this part of the estuary. These combined changes are categorised as a slight, permanent negative but not significant impact in terms of the areas overall benthic and resident fish communities.

7.3.6.2 Dredging

No residual impacts associated with the dredging activities are expected following recovery of the benthos in dredged areas. It is expected impacts will be temporary in nature and a recovery to pre-dredge levels for faunal biomass and diversity is expected rapidly given the nature of the fauna in the area.

With the adoption of the non-dredge windows for smolts for the dredging of the inner portion of the navigation channel, no adverse impacts are anticipated for this life stage. Some returning adult salmon will overlap with the dredging, however their larger size and strong homing instinct is likely to take them through the active dredging areas, regardless of the timing of operations. The possibility of entrainment of returning river lamprey cannot be ruled out but this would not be a significant adverse impact on the River Liffey population.

7.3.6.3 Dredge Spoil Dumping

It is expected that the deposition of approximately 424,644 m^3 of sediment will be deposited over at least four October-March disposal seasons, which will each see a reduction in species diversity of the benthos which will likely be associated in a reduction of available food for bottom feeding fish. The impacted communities are expected to begin recovery immediately after the cessation of the dredging process and have substantially recovered within 1-3 years post disposal. The fact that the disposal volume will be deposited over more than one season will ensure a more rapid recovery than if all the spoil was disposed of in one go. The residual impacts on the benthos associated with the dredging are therefore considered to be moderate, adverse and short-term. The far-field deposition of up to 0.3 g/m^2 of fine sediments within Dublin Bay is expected to have no residual impact.

7.3.6.4 Noise

In circumstances where the recommended non-piling windows are implemented, then no significant impacts are likely to occur to Annex II species. Impacts on resident species will be minimised by additional mitigation measures outlined, principally, the use of vibratory piling where feasible and spacing the driving of larger piles as much as possible.

7.3.7 Monitoring

DPC will extend the current monitoring programme for the disposal site near the Burford Bank to include the timescale within which the MP2 Project sediments will be disposed of at this site. This currently entails undertaking grab sampling surveys to assess the macroinvertebrate infauna and beam trawls surveys to assess the nature of the fish and mobile epibenthic communities at and adjacent to the disposal site.

These were undertaken 3 months and 6 months after the first ABR Project winter season dredge-spoil disposal event which took place between October 2017 and March 2018. The monitoring was undertaken to gauge the extent and rate of recovery of the disposal site after a disposal event.

7.4 Marine Mammals

7.4.1 Introduction

This section assesses the potential impacts of the MP2 Project on marine mammals and their habitats (marine mammal biodiversity). The methodology for data collection is presented. The environment of the MP2 Project for marine mammals is described. Impacts are predicted and mitigation measures are presented.

7.4.2 Assessment Methodology

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. Other species such as bottlenose dolphin and minke whale regularly occur and both are entitled to strict protection under EU legislation (both on Annex IV of the EU Habitats Directive). Humpback whales and common and Risso's dolphins are occasionally recorded adjacent to Dublin Bay and are also entitled to strict protection under EU legislation (both also on Annex IV of the EU Habitats Directive).

Field surveys of cetaceans before 2016

The Irish Whale and Dolphin Group (IWDG) have run a Cetacean Sighting Scheme since 1991, which validates and logs all cetacean sightings both casual and those with associated effort, if available. The data is accessible online and is regularly reviewed (Berrow et al. 2010; Wall et al. 2013). The IWDG database was accessed in March 2017 to prepare distribution maps for the Dublin Port Masterplan 2040, reviewed 2018 and supporting Strategic Environmental Assessment.

Dedicated harbour porpoise surveys off Co Dublin were first carried out in 2008, when distance sampling was used to calculate density and abundance estimates in North County Dublin and Dublin Bay (Berrow et al. 2008; 2014). Subsequent to SAC designation as the Rockabill to Dalkey Island SAC in 2011, surveys of the site were carried out in 2013 and 2016 (Berrow and O'Brien 2013; O'Brien and Berrow 2016).

Despite the importance of the area for harbour porpoise little is known about their general ecology. The only studies on their diet of harbour porpoise in Ireland were carried out by Rogan and Berrow (1996) and Rogan (2008) but there were few data from the east coast.

Field surveys of seals before 2016

Dublin Bay was surveyed for both grey and common seals between 1997 and 1998 by Kiely et al. (2000) and during All-Ireland seal surveys in 2003 (Cronin et al. 2004) and 2005 (O'Cadhla et al. 2007) and between 2009-2012 (O'Cadhla et al. 2013) and in 2012 (Duck and Morris, 2013).

The ecology and foraging behaviour of common and grey seals off Dublin is not known. Kiely et al. (2000) carried out some photo-identification of grey seals between Skerries and Ireland's Eye to explore movements and site fidelity. The diet of common seals off southwest Ireland was described by (Kavanagh et al. 2007) but not from samples from the east coast.

Field surveys of harbour porpoise between 2016 and 2018

A number of field studies have been carried out under the ABR Project marine mammal monitoring programme which has led to a significant increase in our knowledge of harbour porpoise in Dublin Harbour, Dublin Bay and in the surrounding area. These include sightings during maintenance and capital dredging campaigns (2017-2018) and acoustic monitoring.

Under the ABR Project, a Static Acoustic Monitoring programme using C-PODs was initiated to better inform on how harbour porpoise use the spoil grounds prior to, and during, the capital dredging campaign and to monitor if any displacement occurred. Four locations were monitored between September 2017 and March 2018. SAM is independent of weather conditions once deployed and thus ensures high quality data is collected but only at a small spatial scale. Static Acoustic Monitoring using C-PODs can identify feeding buzzes which can provide information of feeding rates. Data collected during acoustic monitoring as part of the ABR Project was explored to determine the influence of seasonal and diel and tidal patterns on occurrence.

Field surveys of seals between 2016 and 2018

A number of field studies have been carried out during the ABR Project which has led to a significant increase in knowledge of seals in Dublin Harbour, Dublin Bay and in the surrounding area. These include sightings during maintenance dredging campaigns in 2016 and 2017 and capital dredging in 2017-2018 and monthly seal counts of a haul out site on Bull Island since May 2016.

7.4.3 Receiving Environment

Dublin Bay is defined as around 10 km wide stretching from Howth Head to the north to Dalkey Island to the south. Dublin Bay is bordered to the west by Dublin Harbour and to the east by the Rockabill to Dalkey Island cSAC, which includes harbour porpoise as a qualifying interest. The spoil ground for dredged material occurs within this cSAC. To the north of Dublin Bay is Lambay Island cSAC which, although is greater than 15km from Dublin Port, includes both harbour and grey seals as qualifying interests. Seals are highly mobile and seals from Lambay Island are likely to forage in Dublin Bay and Harbour.

These Natura 2000 sites are designated for 3 species of marine mammals that are qualifying interests (see **Error! Reference source not found.**).

Table 7-17 Qualifying Interests of Special Areas of Conservation in the vicinity of Dublin Bay

Qualifying Interest Species	Rockabill to Dalkey Island SAC	Lambay Island SAC
Harbour porpoise *(Phocoena phocoena)*	Yes	No
Grey seal *(Halichoerus grypus)*	No	Yes
Common seal *(Phoca vitulina)*	No	Yes

It should be noted that the likely significant effects of the project on the European sites and their Qualifying Interests are appraised in the Natura Impact Statement submitted with the application for permission.

Cetaceans, other than harbour porpoise

Bottlenose dolphin and minke whale are frequently recorded in, or adjacent to, Dublin Bay. Bottlenose dolphins have been reported throughout the year, though mainly in the summer and from all along the coast, but mainly off Howth Head and especially from Dún Laoghaire and south to Wicklow. Most sightings are of small groups though occasionally large groups of greater than 20 dolphins occur but usually only for short periods. A small group of 3 individual bottlenose dolphins frequented Killiney Bay from August 2010 to August 2012. Bottlenose dolphins off Dublin are part of the highly mobile coastal population which has been recorded all around the Irish coast and some individuals reported off Scotland (O'Brien *et al.* 2009; Robinson *et al.* 2012). Surprisingly, there was no evidence of movement between the east coast of Ireland and Wales, which holds a large number of this species. This highly mobile Irish coastal population is thought to number between 200-400 individuals. Risso's dolphin were regularly recorded to the south of Dublin Bay, in the spring and early summer for a number of consecutive years from 1999 to 2006 but have not been recorded regularly since 2013. They were likely part of a wider Irish Sea population whose occurrence is associated with the presence of squid, which may be an unpredictable food source.

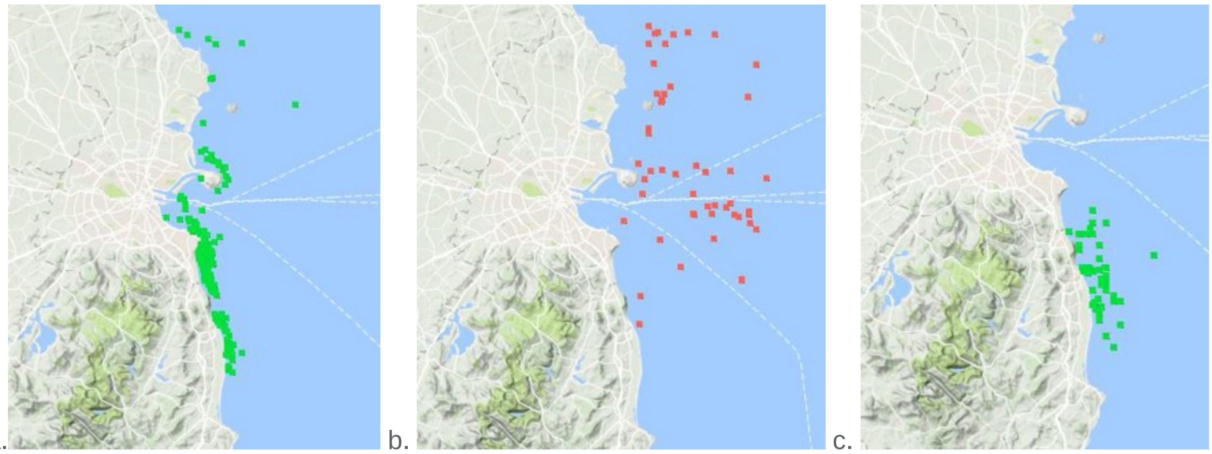
a. b. c.

Figure 7-15 Sightings of a. bottlenose dolphin b. minke whale and c. Risso's dolphin off Dublin Bay

Minke whales occur seasonally, especially off north County Dublin from Howth Head to Lambay Island and on the Kish Bank. They are usually solitary but up to 5 have been seen foraging in the same area at any one time.

Common dolphin and humpback whales have also been recorded. Common dolphins are thought to be more abundant in the Irish Sea in the summer and tend to occur further offshore than bottlenose or Risso's dolphins. They have been recorded from Rockabill to Dun Laoghaire. Single humpback whales were recorded in July for two consecutive years in 2010 and 2011 off north Dublin and are thought to be increasing in number in Irish coastal waters, suggesting they are likely to be more frequently observed off Dublin in future years.

Harbour porpoise

Dedicated porpoise surveys off Co Dublin were first carried out in 2008, when density estimates of 2.03 porpoises per km^2 were recorded in North County Dublin and 1.19 porpoises per km^2 in Dublin Bay (Berrow *et* *al.* 2008). The densities off North County Dublin ranged from 0.54 to 6.93 and were the highest recorded at any of the eight sites surveyed by Berrow *et al.* (2014), including two cSACs off the southwest which were designated to protect harbour porpoise. A survey of the Rockabill to Dalkey Island SAC in 2013 resulted in density estimates ranging from 1.13-2.61, with an overall density of 1.44 porpoises per km^2 which was similar to an overall density of 1.61 for the two sites combined in 2008. A second survey was carried out in 2016 which reported densities between 1.37 and 1.87 porpoises per km^2 and with an overall density of 1.55 porpoises per km^2. All these density estimates are very consistent and high compared to other sites in Ireland supporting the conclusion that Dublin Bay, and especially North County Dublin, provide some of the most important habitats for harbour porpoise in Ireland. Calves consistently accounted for around 7% of the porpoises surveyed and porpoise are thought to move offshore to calve in April-May before moving back inshore. The diet of harbour porpoise is poorly known but thought to consist of small benthic or demersal fish such as gobies, sandeels, whiting and other gadoids and pelagic species such as herring and sprat when available (Rogan 2008).

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

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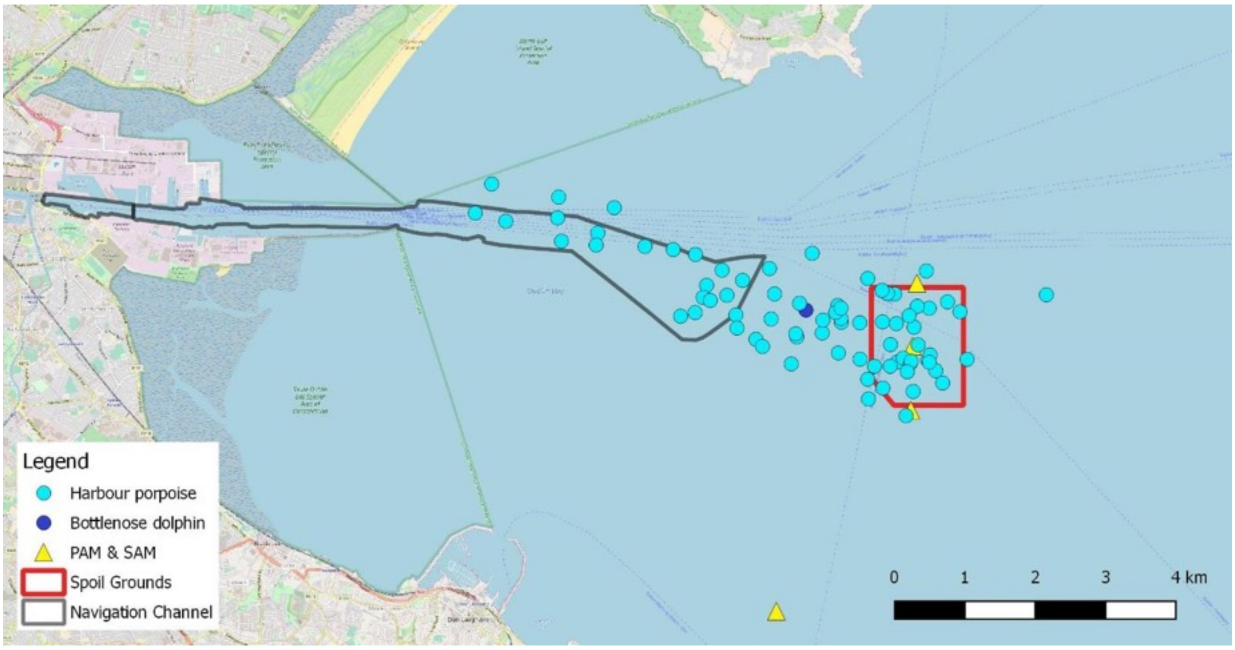

Figure 7-16 Harbour porpoise and bottlenose dolphin sightings during the 2017-2018 Capital Dredging Campaign

A similar pattern was recorded during two maintenance dredging campaigns from 14 to 30 September 2017 and 9 to 22 April 2018 with 29 (16%) and 35 sightings (32%) of harbour porpoise (**Error! Reference source not found.**).

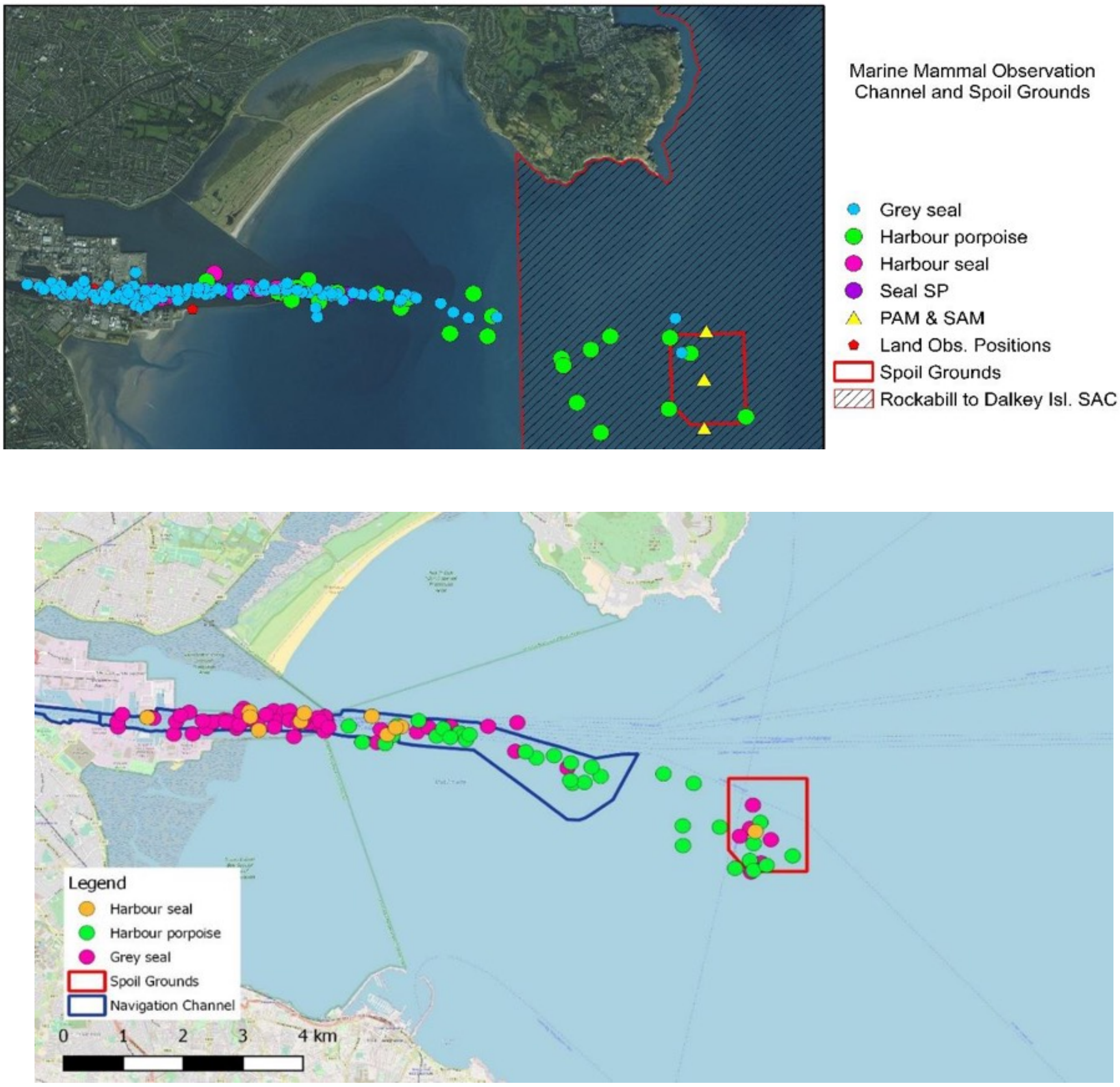

Figure 7-17 Marine mammal sightings during the 2017 and 2018 Maintenance Dredging Campaign

During a Static Acoustic Monitoring programme under the ABR Project, four locations were monitored using C-PODs. The sampling period varied between 140 and 259 days at each location. The highest detections were at Buoy 1 and 2, with the lowest at Buoy 3 and 4 but this could be an artefact of the early retrieval of the C-POD on Buoy 3 and the loss of the C-POD from Buoy 4, resulting in lower number of monitoring days. Results from this deployment showed that porpoises were the most frequently detected odontocete species, with few confirmed dolphin detections during this deployment apart from detections at Buoys 1 and 3 (**Error! Reference source not found.**).

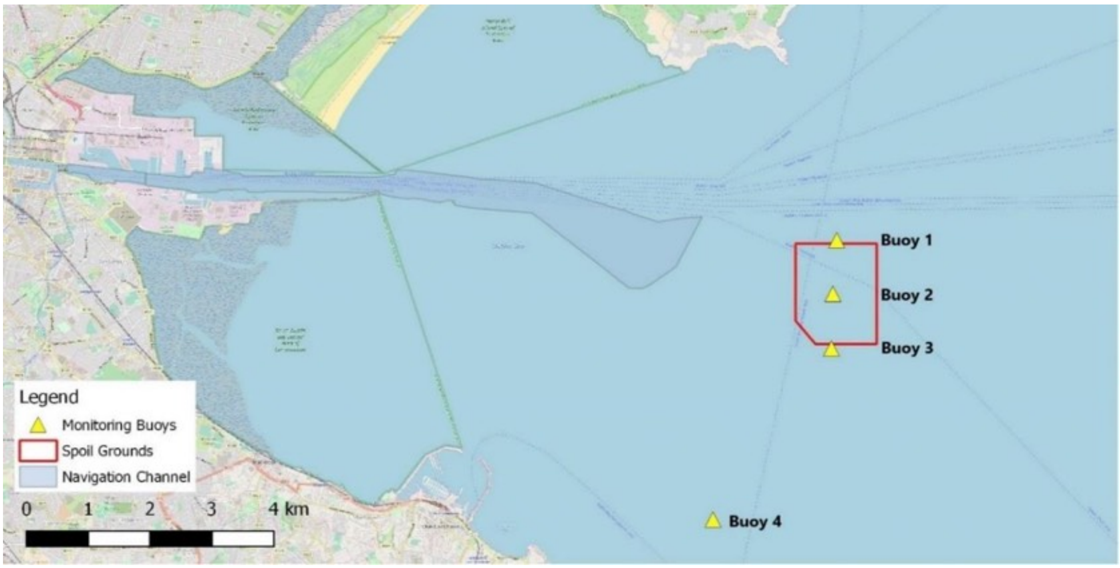

Figure 7-18 Monitoring buoy positions within the spoil grounds and Dublin Bay (Buoy 1: PAM & SAM, Buoy 2: PAM & SAM, Buoy 3: SAM and Buoy 4: SAM)

Table 7-18 Summary of results of Static Acoustic Monitoring from September 2017 to March 2018.

Location number	Location	No. of days	Dates	Porpoise	Dolphin	Total	% days detected	Mean DPM/day
Buoy 1	North Spoil Ground	173	18/09/2017-09/03/2018	9,238	262	9,500	99	53.1
Buoy 2	Middle SG	173	18/09/2017-09/03/2018	15,919	65	15,984	100	91.4
Buoy 3	South SG	140	18/09-03/11 22/12/2017-23/03/2018	6,341	101	6,442	97	44.9
Buoy 4	Control off Dalkey	259	18/09/2017-31/05/2018	13,048	32	13,080	100	50.5

Generalized linear mixed-effect models (GLMM) were carried out to assess significant differences between monitoring locations, allowing for a detailed but preliminary assessment of fine scale use of the survey area during the dredging campaign by harbour porpoise. Results across all days monitored at each of the sites showed harbour porpoises to be present on average 97-100% of days monitored. Presence was highest during autumn months for Buoy 3 and during the winter months for Buoy 1 and 2 and during the hours of darkness (incl. dawn and dusk) and a range of tidal cycles and phases (**Error! Reference source not found.**).

Table 7-19 Significant results from the long-term dataset at each site; Buoy 1 = North SG, Buoy 2 = Middle SG, Buoy 3 = South SG and Buoy 4 = control off Dalkey Island

Significant factors	Buoy 1	Buoy 2	Buoy 3	Buoy 4
Season	Winter	Winter	Autumn	Summer
Diel	Night	Night	Night	Evening
Tidal phase	Neap/Trans	Neap	Trans	Trans
Tidal cycle	High	High	Ebb	Low

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 dredging and dumping of spoil and shipping traffic and not construction activities or site investigations within the Liffey channel.

Seals

Between 1997 and 1998, Kiely *et al.* (2000) identified six islands off North Dublin as grey seal haul out or breeding sites. Lambay Island and St Patricks Island, Skerries were the most important sites for immature and adult seals while Colt and Shenick Islands off Skerries the least important with around 1.5 seals on average. Rockabill and Ireland's Eye both held around nine seals on average. The distribution of seals was found to vary significantly with season, though were present throughout the year. Cronin et al. (2004) also recorded 16 grey seals in Dublin Bay in 2003 and 131 between the Baily lighthouse and Knocknagin and a further 64 were recorded on Lambay Island. In 2005, two grey seal pups were recorded on St Patricks Island off Skerries, three on Islands Eye and 2 on Dalkey Island with a further 49 pups on Lambay Island (O'Cadhla *et al*. 2007). Further surveys conducted in 2009 recorded 58 pups on Lambay Island and Ireland's Eye resulting in a minimum pup production of 77 pups between 2009-2012, which provides an all age population size of between 270-347 individuals (O'Cadhla *et al*. 2013).

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.

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).

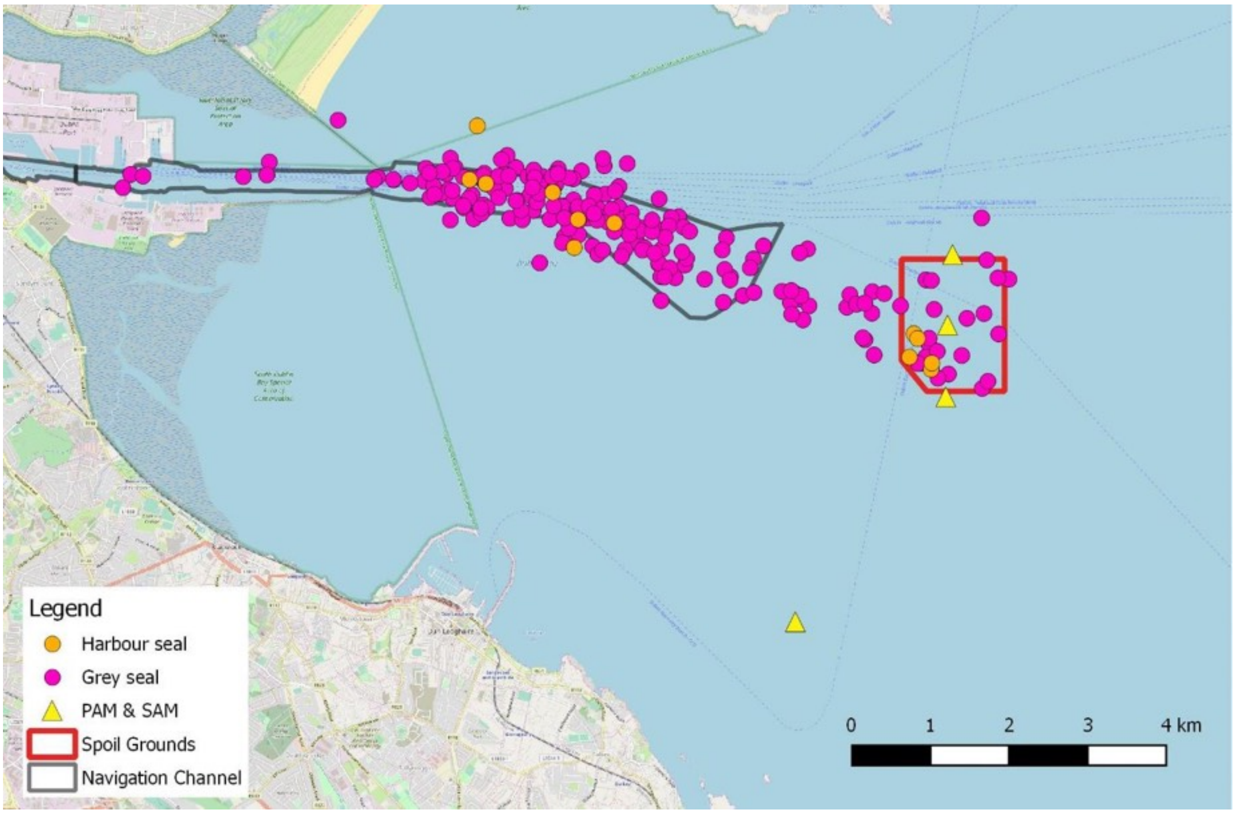

Figure 7-19 Seal Sightings during the 2017-2018 Capital Dredging Campaign

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.

There were 143 sightings (76% of total marine mammal sightings) of grey seals during the 2017 maintenance dredging campaign (14 - 30 September 2017) with 12 sightings (6%) of common seal.

There were 65 sightings (58% of total marine mammal sightings) of grey seals during the 2018 maintenance dredging campaign (9 - 22 April 2018) with 11 sightings (10%) of common seal.

These figures suggest the areas of the port that will be affected by construction by the MP2 Project, the Liffey Channel is used by seals and is the same area as affected during the ABR Project. Seals using the outer harbour and in Dublin Bay will only be affected by dredging and dumping of spoil and shipping traffic.

Seals using Bull Island as a haul out site

Bull Island was surveyed for the presence of hauled out seals each month under the ABR Project Marine Mammal Monitoring Programme from May 2016 and August 2018. Grey seals were recorded hauled out on 52% of survey days with highest numbers of individuals recorded in June 2017, with 34 grey seals present (**Error! Reference source not found.**). Their abundance peaked from June to August, with low numbers from September to November and no seals were present in December, which coincides with their breeding and moulting seasons. Grey seals may move to Lambay Island or Ireland’s Eye to breed, which are known breeding sites.

Common seals were present year around on North Bull Island and on 87% of survey days yet there did appear to be a seasonal affect with numbers declining in the summer months and peaking in the winter months. Harbour seals breeding season occurs from approximately May to June and their annual moult occurring in August to September when they would spend a significant time resting on land, Irelands Eye and Lambay Island. The highest abundance recorded was in January with 22 seals present. Common seals were present on 20 out of 23 surveys carried out to date.

Seals using Bull Island as a haul out site

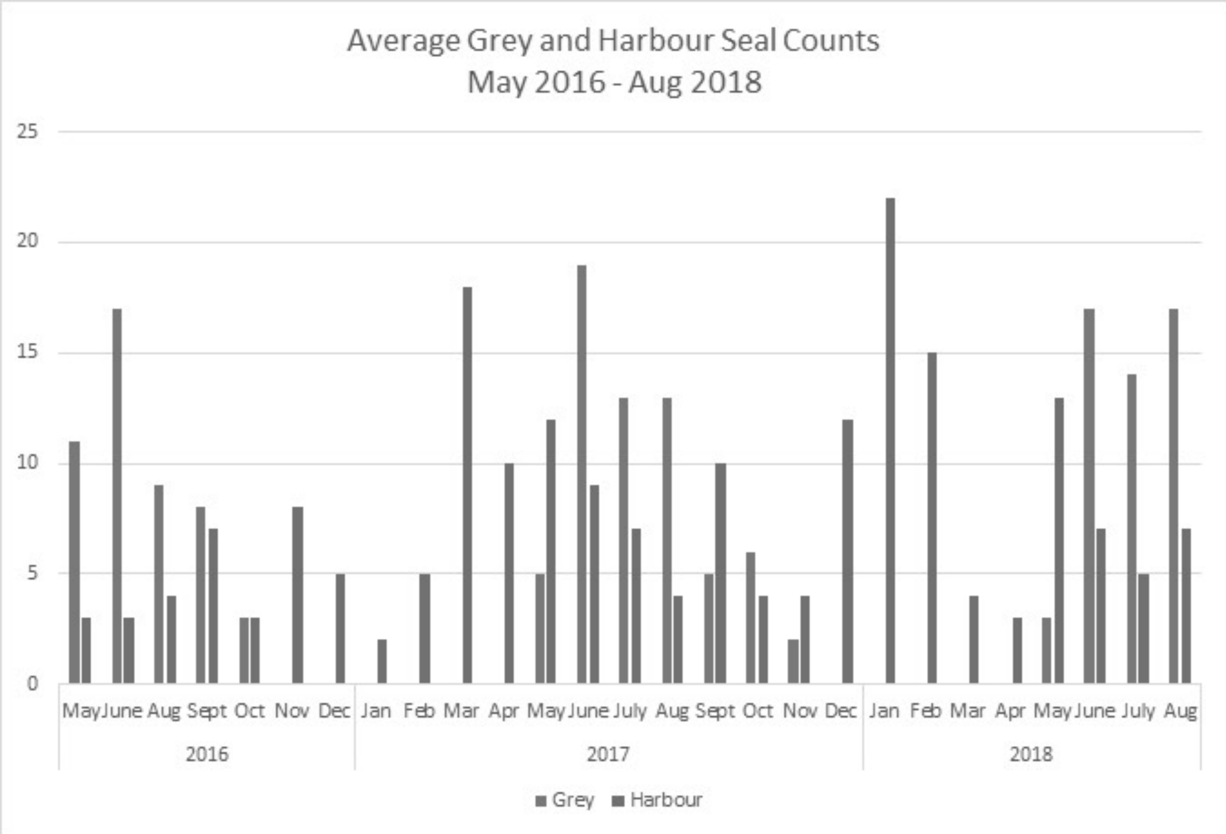

Figure 7-20 Numbers of grey and harbour seals hauled out on Bull Island between May 2016 and August 2018

7.4.4 Potential Impacts on Marine Mammals

7.4.4.1 Direct Impacts

The main potential impacts of the MP2 Project on harbour porpoise will be disturbance during dredging outside Dublin Harbour along the approach channel, and dumping at the proposed disposal site. The disposal site is situated within the Rockabill to Dalkey Island cSAC which includes harbour porpoise as a qualifying interest. The likelihood of impacts on harbour porpoise without mitigation is moderate. However, with the implementation of mitigation measures (as set out below), there are no residual impacts predicted.

The main impact of the MP2 Project on seals will be exposure to demolition and piling operations within Dublin Port and disturbance during dredging inside Dublin Harbour and along the approach channel and dumping at the proposed disposal site. The likelihood of impacts on seals without mitigation is moderate. However, with the implementation of mitigation measures (as set out below), there are no residual impacts predicted.

7.4.4.2 Indirect impacts

There is a potential for moderate indirect impacts through disturbance from long term increases in vessel noise associated with increased marine traffic and potential impacts on the distribution and abundance of preferred prey species through dredging and dumping.

Seal haul out sites are used during breeding, moulting, resting between foraging trips in the open sea, and to engage in social activity (Bonner 1990). Bull Island provides an important haul-out site for grey and harbour seals and they often haul-out on man-made structures. The likelihood of indirect impacts of disturbance on seals at Bull Island from activities in Dublin Port is low.

No long-term impacts on fish distribution or abundance is predicted (See Section 7.3), thus the likelihood of indirect impacts on prey abundance and distribution is low.

7.4.5 Description and Significance of Impacts

7.4.5.1 Predicted Direct impacts on Marine Mammals

Potentially, direct impacts on marine mammals may occur during pilling and dredging and dumping. Potential direct impacts from dredging and dumping may arise if harbour porpoise are very close to the dredger during start up or during dumping of sediment at the spoil ground leading to injury. Hopper dredges produce broadband sound between 20-1000 Hz and the highest levels occur during loading. Evans (2000) suggested dredging activities produce sounds varying from 172-185 db re 1 ųPa at 1 metre over the broadband range 45 Hz to 7 kHz. Even without the implementation of the recommended mitigation measures, the likelihood of impacts is extremely low and the impact of any such is low. The impact of dredging noise is not regarded as likely to have a significant effect as outlined in Section 11.2.8, the worst case underwater noise level will arise from impact piling (See Chapter on Noise and Vibration). Proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact further.

7.4.5.2 Noise disturbance during construction

Piling

Most concerns of the effects of pile driving on marine mammals has been around the construction of offshore wind farms (Bailey et al. 2010). There has been limited work on the effects of piling during coastal and harbour works. Attenuation of sound pressure levels at coastal sites will be more rapid depending on the topography and nature of the bedrock. Noise measurements were taken during pile driving activities at Alexandra Basin East in June 2014 to determine the acoustic noise generated during piling operations (McKeown 2014). The measurements took place while H-section piles with a cross sectional area of 333 cm^2 were being driven to depths of 35m. The ABR Project has a worst case scenario requirement for piles of approximately twice the cross sectional area which would result in an increased acoustic output. The estimated noise levels have therefore been increased by 6 dB to provide worst case noise levels. Peak sound energy occurred at below 1 kHz but there was substantial energy up to 10 kHz, with high frequencies rapidly attenuated. The study concluded that noise level attenuates rapidly so that at 500m the levels are at background noise levels.

Noise disturbance during activities such as demolition, piling and dredging and dumping could potentially lead to disturbance and displacement, however harbour porpoise have not been recorded in the Liffey Channel and are only very rarely inside the harbour, thus with the implementation of mitigation measures, the likelihood of this is extremely low and the impact negligible. Piling noise will not impact underwater noise levels at the Rockabill to Dalkey Islands cSAC due to transmission loss between the two sites (McKeown 2014).

Dredging and dumping

Dredging has been shown to displace bottlenose dolphins from a busy shipping port in Scotland over a prolonged dredging campaign (Pirotta et al. 2013). Diederichs et al. (2010), through the use of acoustic monitoring with click detectors, showed that harbour porpoises temporarily avoided an area where sand extraction took place off the Island of Sylt, Germany. When the dredger was closer than 600m to the monitoring location, it took three times longer before a porpoise was detected again compared with times without sand extraction. However, a recent guidance document by the World Organisation of Dredging Associations (WODA 2013) suggested that sound produced from dredging has the potential to impact on aquatic life and it is assumed that most of these impacts would concern disruption of communication due to masking or alteration of behaviour patterns. However, cumulative and long-term exposure leading to Temporary Threshold Shift has to be considered for marine mammals (Kastelein et al. 2012), but Permanent Threshold Shift or other auditory injuries are unlikely.

The dredging and disposal operations for the MP2 Project will span at least four winter seasons, between 2024 and 2031, with no more than 272,000m^3 of spoil being disposed of in any given winter season. Dredging will be carried out by a Trailing Suction Hopper Dredger (TSHD).. Previous studies on sound production by Trailing Suction Hopper Dredger (TSHD) in silt/mud substrates have found that maximum source levels from the various activities associated with TSHD dredging (including the dredging process, transit to the disposal site, placement, pumping and rainbowing) to be very similar with dredging itself and not producing sounds louder than those produced by the dredger during transit (De Jong et al., 2010). This study was carried out on the sound production by seven TSHDs during construction of a 2,000 ha harbour extension of the Port of Rotterdam. More recently, Robinson et al. (2011), found that emitted sound levels from TSHDs at frequencies below 500 Hz were similar to a deep-draft draught cargo ship travelling at a moderate speed.

Noise measurements were taken during maintenance dredging in July 2016 to determine the acoustic noise generated during the dredging and dumping operations (RPS 2016). Underwater noise measurements were carried out using an underwater noise recorder, moored less than 300 m from the dredging activity and approximately 90 m from the dumping activity. Tonal components between 200 Hz and 2 kHz were attributed to the pump with dredging generating more higher-frequency noise than the dumping operation but both showed a significant drop in energy at frequencies above 2 kHz. The sound levels for the dredging operations at ranges of 213 and 268 m were below the disturbance threshold for harbour porpoise of 140 dB re 1 µPa. The sound level for the dumping operation at a range of 90m was very slightly above the disturbance threshold for harbour porpoise, but this level was still below the general behavioural threshold for marine mammals of 160 dB re 1 µPa SPLRMS adopted by NOAA. This study confirms that noise emitted from dredging operations does not significantly impact harbour porpoise at ranges of 213m, but the noise emitted from dumping operations may impact harbour porpoise at close ranges of less than 100 m. The likelihood of this is low and the impact negligible. Proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact further.

The sound levels for the dredging operations at ranges of 213m and 268m were below the disturbance threshold for seals at 160 dB re 1 µPa. The sound level for the dumping operation was below the general behavioural threshold for marine mammals of 160 dB re 1 µPa SPLRMS adopted by NOAA. This study confirms that noise emitted from dredging operations does not significantly impact marine mammals at ranges of 213m. The likelihood of this is low and the impact negligible. The proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact further.

Shipping traffic

Low frequency continuous sound such as that generated by shipping has been reported as the dominant source of anthropogenic sound in a broad-band range from 5 to 300 Hz (NRC 2003). The main cause of noise emitted from shipping is though propeller cavitation (Richardson et al., 1995). Characteristics of shipping noise including frequency and source level are roughly related to vessel size and speed although this relationship is further complicated by vessel design and advances in ship technology (Richardson et al. 1995). Generally it has been found that larger vessels emit lower frequency and louder noises (Richardson et al. 1995) with source levels from vessels in excess of 300m length, reported as approximately 190 dB re 1 µPa at 1m (Richardson et al. 1995).

Noise disturbance, through increased vessel traffic could cause a long-term effect, where the low frequency component overlaps with the vocalisations and estimated hearing range of marine mammals.

Baleen whales, which are more sensitive to low frequencies are thought to be more at risk than odontocetes. However, Wisniewska et al. (2016) suggested harbour porpoise can be sensitive to even modest exposures to anthropogenic sound due to their high metabolic life-style. Ambient noise in Dublin Bay has been estimated at around 113 db by Beck et al. (2013) and by McKeown (2014). This level is higher than that reported from Galway Bay and the Shannon Estuary and reflects the greater vessel traffic at this site.

The hearing range of harbour and grey seals extends over wide frequencies, including the ultrasonic spectrum. The area of best hearing is between 8 and 25 kHz, with acute hearing also at lower frequencies (Terhune and Turnbull, 1995), which is above the peak sound energy generated which was below 1 kHz. The waters surrounding haul-out sites are a critical habitat for feeding and/or for navigation to more offshore foraging areas. This may lead to chronic exposure to man-made noise, however, in areas with repeated exposure to human activity, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson et al. 1995).

Table 2.5 in Chapter 2 of the EIAR outlines indicative increase in Ro-Ro throughput in Dublin Port up to 2040. This shows that the average number of sailings per day will increase form 13 in 2018 to 18 in 2040. Similarly, Table 2.8 outlines indicative increase in Lo-Lo throughput in the same period, showing the average number of ships per week increasing from 8.3 in 2018 to 11.0 in 2040.

This modest anticipated increase in vessel numbers using the shipping channel in Dublin Bay and the approach to Dublin Port within the Bull walls will occur in an underwater noise environment which has been subject to significant shipping traffic for more than half a century as outlined above. Shipping is one of the dominant background noise sources in Dublin Bay and will continue to be throughout the Masterplan period. The shipbuilding industry is not however anticipated to construct noisier ships in the future. New IMO guidelines require quieter ships. The vessels entering Dublin Port are from modern designs and quieter. It is anticipated that this lowering of ship noise levels will continue.

Shipping traffic currently generates underwater noise in Dublin Bay and on approach to Dublin Port throughout the daytime and night time periods every day of the year. Shipping noise in the outer bay occurs as momentary/brief increases in underwater noise levels that revert to background once the vessel has passed. This localised noise event currently occurs throughout the year in the outer bay and the increase in shipping traffic will not result in a significant change in noise levels outside of the port berthing area. Noise levels in the berthing area will increase due to the increased berthing activity. The underwater noise level due to increased berthing activity will result in noise levels similar to those arising at present but occurring more frequently. The long term increase in berthing noise levels will be slight but momentary moderate increases could occur at busy periods. Whilst Tables 2.5 and 2.8 of the EIAR demonstrate modest increases in shipping frequency for Ro-Ro and Lo-Lo traffic as a result of the MP2 Project, this does not represent any meaningful intensification of use of the shipping channel when considered from the perspective of marine mammals. Shipping noise occurs 24/7, 365 days a year and will continue to do so. The magnitude of the shipping noise source is not anticipated to increase. Future shipping noise as a result of the operation of the MP2 Project will not result in a significant environmental effect on harbour porpoise or the seal populations of Dublin Bay.

7.4.5.3 Cumulative Impacts

The projects that will potentially have cumulative impacts on marine mammals in conjunction with the MP2 Project are as follows:

<u>ABR Project Capital Dredging Programme and DPC Maintenance Dredging</u>

Dredging activity for the MP2 Project has been programmed to ensure that there will be no overlap with either the ABR Project capital dredging programme or DPC maintenance dredging campaigns. Consequently there will be no cumulative impacts on marine mammals.

<u>The Howth Yacht Club - Marina Extension</u>

Howth Yacht Club (HYC) is proposing to extend the marina at Howth within the confines of the existing breakwater. A Dumping at Sea (DAS) Permit was granted in August 2011 (Reg No. S0010-01) for the disposal of 120,000 tonnes of dredged material at the licensed offshore disposal site located to the west of the Burford Bank, the same offshore site proposed for the dredge spoil for the MP2 Project.

A breakdown of the dredged material was provided in HYC's response to an RFI issued during the licensing period as follows:

- Rock: 95,000 tonnes (thinly bedded, highly fractured and weathered limestone)
- Sediment: 25,000 (un-compacted grey black sandy silt)

A bulk density of 1.65 tonnes/m^3 was used in HYC's calculations to convert the total volume of silt to tonnage. The total volume of silt is therefore 15,150m^3 which equates to 1.44% % of the total amount of dredge spoil. The estimated rate of dumping from HYC will be 1,200 tonnes per day.

The Dumping at Sea Permit issued to HYC allows for the dumping of 120,000 tonnes of dredged material over a period of one year from the commencement of works. At rate of 1,200 tonnes per day that would equate to around 100 days of dredging and disposal to complete the operation. Notification must be given to Dublin's Port Harbour Master in advance of the dumping taking place.

The potential cumulative effects are twofold: the potential impact of an increased suspended solids loading (dredge plume) during simultaneous disposal of silts; and the potential impact on the benthic communities of the disposal site due to sequential winter, summer, winter capital dredging campaigns. Deposition of circa 120,000 tonnes of mixed sediment (rock and sandy silt) from the HYC capital dredge works will result in an interruption of the recovery process which will be underway following disposal of sediments as part of the MP2 Project if disposal of sediment occurs within the predicted recovery period for the deposition of the MP2 Project sediments. The converse of this is also true if HYC spoil is disposed prior to MP2 Project sediments.

The volumes of sandy silt associated with the HYC dredging are relatively small in comparison the MP2 volumes.. The cumulative impact of the MP2 disposal is expected to be negligible considering the volumes of sandy silt to be disposed of from HYC. Overall, the potential cumulative effect as outlined above will not alter any of the conclusions in this EIAR with regard to the predicted residual significance of impacts described. There are no additional, additive, incremental, associated, or connected effects resulting in synergistic impacts above a magnitude already predicted in the EIAR.

7.4.6 Remedial and Mitigation Measures

7.4.6.1 Harbour Porpoise

The likelihood of impacts without mitigation are low and the effects also low. However, some mitigation is recommended, in line with best practice and long term acoustic monitoring. Proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact further.

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)

- A trained and experienced Marine Mammal Observer (MMO) will be put in place during piling, dredging, demolition and dumping operations. The 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 and demolition works and 1,000m for piling activities.
- 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.

- For piling activities, where the output peak sound pressure level (in water) exceeds 170 dB re: 1µPa @ 1m, a ramp-up procedure will be employed following the pre-start monitoring. Underwater acoustic energy output will commence from a lower energy start-up and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20-40 minutes.
- If there is a break in piling / 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.
- Once normal operations commence (including appropriate ramp-up procedures), 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 and demolition works, and 1,000m for piling activities.
- Any approach by marine mammals into the immediate (<50m) works area will be reported to the National Parks and Wildlife Service.
- 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.

7.4.6.2 Common and Grey Seals

Proposed mitigation, through the implementation of NPWS (2014) Guidelines and appropriate Mitigation Zone will reduce this potential impact further.

7.4.7 Monitoring Measures

7.4.7.1 Static Acoustic Monitoring

As an additional mitigation measure for harbour porpoises, it is proposed to maintain the static acoustic monitoring (SAM) programme established during the ABR Project for the duration of the MP2 Project. CPODs are self-contained click detectors which log the echolocation clicks of dolphins and porpoises. They can be deployed on a mooring for 4-6 months before recovery and downloading of data. These data can be analysed as detection positive minutes (DPM) to generate an acoustic index of activity. This technique provides large datasets to enable changes in activity to be identified at high resolutions. CPODs are spatially constrained having detection distances of around 250m for harbour porpoise and 800m for bottlenose dolphins (O'Brien et al. 2013). O'Brien et al. (2013) recommended a minimum of four units should be deployed in small inshore study areas to ensure that statistically robust data can be collected. The number of CPODs required should reflect the parameters or factors to be tested (e.g. fine scale diel or larger scales such as seasonal trends). Using an even number design for replication purposes can allow for parameters such as inshore and offshore trends to be explored in larger areas. The more units that can be deployed in an area, the more an informed evaluation of a site and successful monitoring indices will be generated. Hence we recommend four stations are established for SAM.

Four stations will be monitored, including three at the disposal site to the west of the Burford Bank and one control site within Dublin Bay. These stations will be monitored pre-construction, during construction and for a minimum of two years post-construction in line with best international practice.

7.4.7.2 Seal monitoring

Monthly counts of seals hauled out on Bull Island will be undertaken 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.

7.4.7.3 Underwater Noise Monitoring

Underwater noise surveys will be undertaken during the construction phase of the works. The underwater noise surveys will complement the existing underwater noise level measurements which have been recorded during the impact piling carried out inside Alexandra Basin West for the ABR Project. This will provide additional validation of the underwater noise modelling and to ensure the underwater noise levels are contained within the operations area of the port.

Underwater noise surveys will be undertaken during the construction period at a minimum of 2 locations upriver and two locations downstream of the works when being carried out in the navigation channel. Monitoring will be carried out at the commencement of the piling activity.

7.4.7.4 Noise associated with increased shipping traffic

As noted in Section 9.1.2.4 of Chapter 9 of the EIAR, as required by Marine Strategy Framework Directive (MSFD) obligations an Initial Assessment (constituting a comprehensive review of the physical, chemical and biological characteristics of the marine area, as well as the human pressures acting upon it) has been undertaken by Government (DEHLG 2013). A comprehensive set of environmental targets and associated indicators is under development. These will be used to demonstrate that GES has been achieved or is being maintained in accordance with the objectives of the MSFD.

A monitoring programme will be established by the Department of Housing, Planning and Local Government and the Marine Institute to identify measures which will need to be taken in order to achieve or maintain GES in marine waters and a draft management plan prepared. To date, the extent of achievement of GES has not been established for individual water bodies.

Monitoring noise during the operational phase will be undertaken by DPC. The Dublin Bay area is subject to commercial traffic from Dublin Port, Dun Laoghaire Port, Howth Port and leisure and commercial traffic from numerous marinas around the bay. In order to monitor Dublin Port traffic related noise it is proposed to install a hydrophone at the eastern end of the port linked to a vessel identification system. Monitoring will provide information on background (absence of shipping) and ambient (shipping noise included) noise levels along with linking noise events to specific vessels. This approach ensures that particularly noisy vessels can be identified and appropriate measures outlined in the IMO (2014) guidelines are taken to control noise emissions from those vessels.

7.4.8 Residual Impacts

There are no residual impacts predicted in circumstances where the mitigation measures outlined above are implemented effectively.

7.5 Avian Biodiversity

7.5.1 Introduction

This section assesses the potential impacts of the MP2 Project on birds and their habitats (avian biodiversity). The methodology for data collection is presented. The receiving environment of the MP2 Project for birds is described. Impacts are predicted and mitigation measures are presented.

7.5.2 Assessment Methodology

Non-breeding waterbird surveys

There is a long history of bird surveys in the area of the MP2 Project from the 1990s to 2019 and the results of all of these surveys have been reviewed for this project. The Irish Wetland Bird Survey (I-WeBS) has been carried out consistently between 1994/95 and 2018/19 covering the entire intertidal area of Dublin Bay (Crowe 2005, Boland & Crowe 2012). This is normally undertaken on a rising tide but is confined to the months of September to March each year. Additional surveys of this area have been undertaken at low tide during all months between July 2013 and March 2019 as part of the Dublin Bay Birds Project which is funded by Dublin Port Company. A series of surveys of all waterbirds in the Tolka Estuary was undertaken within two hours either side of low tide as part of the Dublin Bay Birds Project. Birds were counted and mapped in their foraging areas from a series of vantage points on the northern, eastern and southern shorelines of the estuary (Figure 7-21). During these Tolka Estuary counts there was no intertidal exposure in the area immediately to the north of the proposed Berth 53.

To ensure that the area north of Berth 53 was adequately assessed, additional surveys were undertaken on eight dates in 2018 and 2019. These dates were selected in advance as some intertidal substrate may be exposed in the area within 200m of Berth 53 when the tide falls below the 0.25m OD level. 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. However, atmospheric pressure and wind direction can affect the height of tide and there are a number of these dates when there is no intertidal exposure in the area of the proposed Berth 53. Some of the extreme low tides during winter occur in darkness or semi-darkness. For this reason, floodlighting was used to survey the birds foraging on the site on some of the dates.

Figure 7-21 Low tide survey area in the Tolka Estuary during the period 2013 to 2019

Breeding tern surveys

From 2013 to 2018 monitoring of Common Terns and Arctic Terns nesting within Dublin Port has been carried out by BirdWatch Ireland as part of the Dublin Bay Birds Project which is funded by Dublin Port Company. The author has been a member of the survey team for this period. The monitoring involved a census of Apparently Occupied Nests (AON) on each of these structures following the methods of Mitchell *et al.* (2004) andBirdWatch Ireland carried out additional studies on the tern colony including ringing and productivity estimates. On two separate dates each year, two surveyors undertook walked transects through each subsite of the colony recording the number of egg clutches of each species present. One clutch of eggs is treated as one Apparently Occupied Nest (AON). Monitoring was carried out under licence in compliance with the Wildlife Acts 1976 to 2012 (Sections 9 and 22(9)(d)). The survey each year was timed to coincide with the peak of incubation activity when the maximum number of nests and incubating adults were present for AON counts and when adult attendance is most stable. All visits to the nesting structures were made by means of a rigid inflatable boat. Visits were made only in fair weather, as disturbing the colony on cold or wet days would be harmful to chicks and eggs. Time spent on each colony was kept to an absolute minimum, to minimise disturbance and to ensure that eggs and small chicks were not chilled on cool days or overheated on warm days. Locations of the subsites are given in Table 7-21.

Breeding Black Guillemot surveys

The population of Black Guillemots nesting within Dublin Port has been censused consistently from 2013 to 2018 following the methods of Mitchell *et al.* (2004). Additional guidance was obtained from Greenwood (2015) and Walsh *et al.* (1995). Two census visits were made on in late April and early May each year in winds no stronger than Beaufort force 4 and in calm sea conditions. Each census was conducted from a boat which passed close to all quaysides and shipping berths within the working port area. The section of the River Liffey from East Link Bridge to Matt Talbot Bridge was censused from the land with viewing from both north and south quays (Figure 7-24). The count unit used was the number of adult Black Guillemots visible on land or on the sea within 300m of the shore. Any Apparently Occupied Sites (AOS) were mapped and Black Guillemots associated with such sites were recorded separately.

7.5.3 Receiving Environment

Protected areas

The location of the proposed Berth 53 is adjacent to the boundaries of the South Dublin Bay and River Tolka Estuary SPA and 1,150m southwest of the nearest boundary of the North Bull Island SPA (see Figure 7-22).

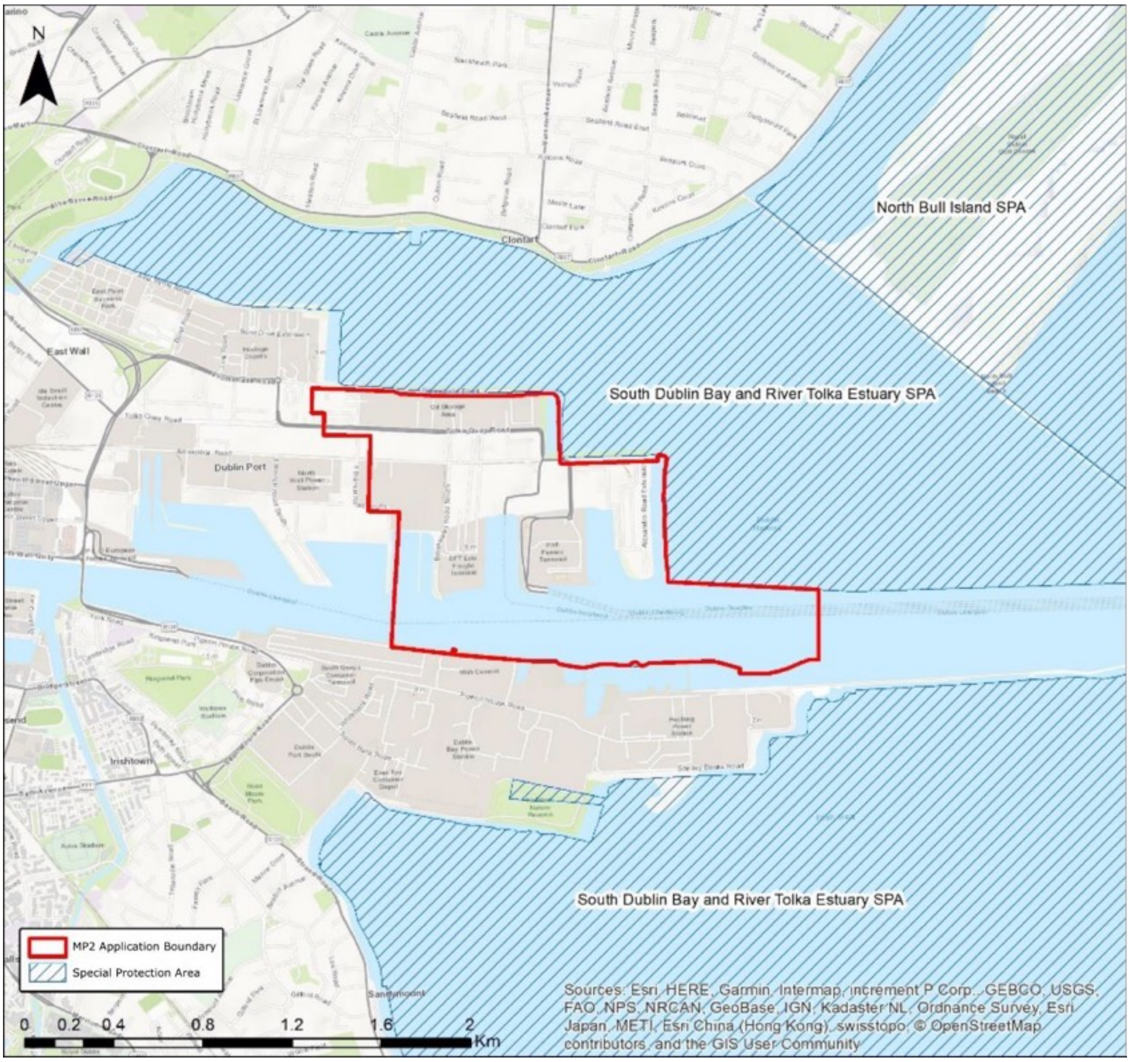

Figure 7-22 Location of MP2 Project in relation to Special Protection Areas

Breeding Black Guillemot population

Plate 7-3 Pair of Black Guillemots in nestbox 2017. (Photo: Richard Nairn)

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 are 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 (**Error! Reference source not found.**). The MP2 Project will involve redevelopment of quays and basins that hold some nest sites of this species. Temporary artificial nest sites have been installed in the Oil Jetty to replace any nest sites which are unavailable during the construction of the ABR Project (Plate 7-7).

Table 7-20 Estimated total number of individual Black Guillemots in Dublin Port in April-May 2013-2019

No	Port Sector	2013	2014	2015	2016	2017	2018	2019	Mean	Peak
1	Talbot Bridge to East Link Bridge	9	14	12	5	7	4	3	8	14
2	North Quay Extension	3	0	0	0	4	0	3	1	4
3	Alexandra Basin West	16	10	14	11	15	10	15	13	16
4	Alexandra Basin East	17	19	11	12	12	10	4	12	19
5	Oil Berths	4	1	3	0	2	0	7	2	7
6	Stena Berths 50A to 51A	6	0	11	0	4	0	2	3	11
7	Irish Ferries Berths 49 to 49A	0	1	0	2	0	0	0	0	2
8	Seatruck Berths 52 to 53	3	0	0	2	1	6	5	2	6
9	ESB Outfall to Sludge Jetty	12	9	16	16	13	11	2	11	16
10	Berths 41-47	11	8	11	8	7	6	6	8	11
11	Poolbeg Marina	1	0	0	0	0	0	1	0	1
	Total individual birds	**82**	**62**	**78**	**56**	**65**	**47**	**48**	63	

Areas directly affected by construction of the MP2 Project are shown in yellow. Areas within 500m of the construction site are indicated in blue.

The areas of the Port that will be directly affected by construction of the MP2 Project are sectors 5, 6, 7 and 8 (**Error! Reference source not found.**, Figure 7-23). The total number of breeding Black Guillemot in this area was estimated at 5 in 2018 (mean 9 over the period 2013-2018). In addition, indirect effects may occur during construction in the area within 500m of the project construction area.

The population of Black Guillemot in Dublin Port has declined over the period 2013-2018 (**Error! Reference source not found.**). 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.

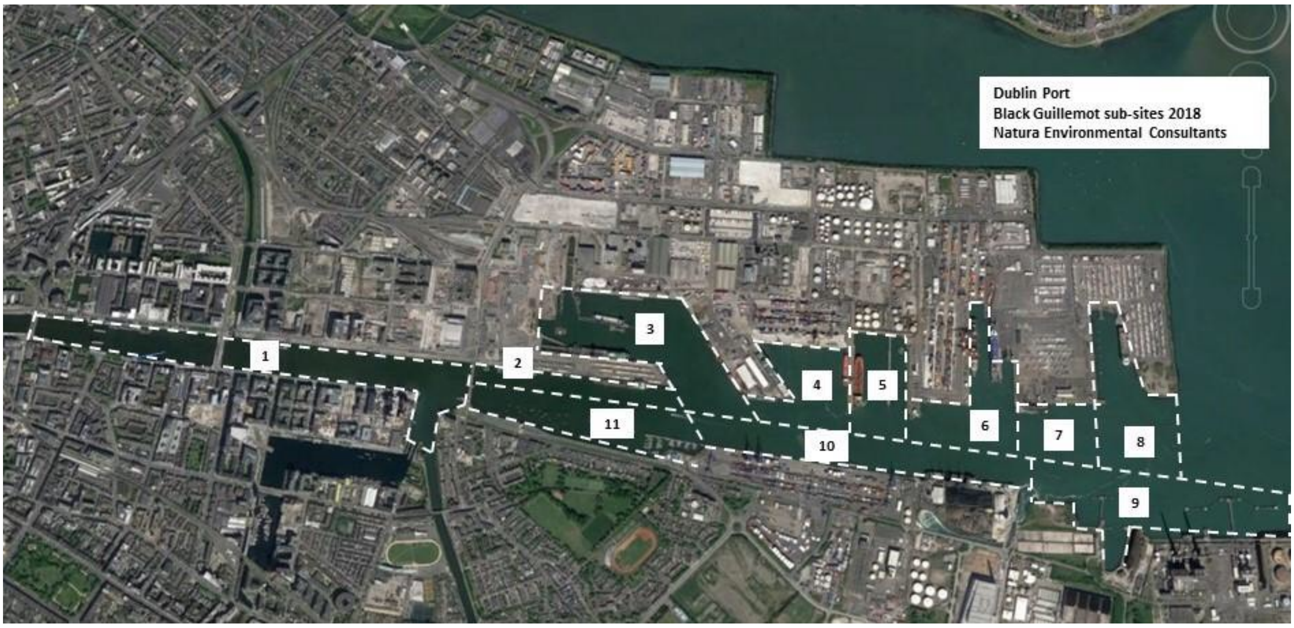

Figure 7-23 Subsites of the Port for the Black Guillemot census (see Table 7.5.2 for key to sub-sites). The numbers refer to individual birds censused in 2018.

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 (Figure 7-24). Total nesting populations on each of these structures in 2018 are given in Table 7-21.

Figure 7-24 Location of four subsites of Dublin Port tern colony in 2018

Table 7-21 The breeding tern colony in Dublin Port on four nesting structures in 2018[1]

Structure	Common Tern nests 2018	Arctic Tern nests 2018	Total nests 2018
CDL Dolphin	87	18	105
ESB Dolphin	150	2	152
Pontoon TP 1	131	1	132
Pontoon TP 2	201	2	203
Total colony	**569**	**23**	**592**

1. Data on breeding tern populations was collected by BirdWatch Ireland as part of the Dublin Bay Birds Project which is funded by Dublin Port Company. The nest census is carried out in May-June each year.

A comparison between total number of nests in each of the sub-sites over the six years 2013-2018 is given in Table 7-22.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.

Table 7-22 The total number of Common and Arctic Tern nests at each of the breeding structures in Dublin Port between 2013 and 2018[1].

Subsite	2013	2014	2015	2016	2017	2018
CDL Dolphin	25	76	58	0	24	105
ESB Dolphin[2]	418	427	416	382	n/a	152
Pontoon TP1[3]	1	38	73	7	84	132
Pontoon TP2[4]	-	-	1	114	305	203
Total colony	**444**	**541**	**548**	**503**	**(413)[2]**	**592**

1. Data on breeding tern populations was collected by BirdWatch Ireland as part of the Dublin Bay Birds Project which is funded by Dublin Port Company. 2. The total number of nests in the colony in 2017 is treated as an absolute minimum as no census was undertaken the ESB Dolphin in that year. 3. DPC Pontoon TP1 was deployed for the first time in 2013. 4. DPC Pontoon TP2 was deployed in 2015

Non-breeding waterbirds

The area immediately to the north of the proposed Berth 53 is covered by shallow water at most stages of the tidal cycle. However, intertidal substrate within the MP2 Project area is exposed 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 (Plate 7-4).

Plate 7-4 Oystercatchers feeding on gravel north of the proposed Berth site 19 March 2003 (0.15m+LAT) (Photograph: John Coveney).

The following is a summary of existing knowledge of the bird numbers within 200 metres of the proposed Berth 53 site between 2018 and 2019, based on the surveys described above. The most abundant and regular species here are Black-headed Gull and Herring Gull. Other species occur irregularly or in small numbers (Table 7-23). 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).

Table 7-23 Waterbirds recorded in the area within 200m of the proposed Berth 53 during extreme low tides on 8 dates in 2018 and 2019. Qualifying interests of the SPAs in Dublin Bay are indicated*).

Date	01/02/18	02/02/18	31/03/18	10/10/18	21/01/19	22/01/19	20/02/19	21/03/19	Peak number
Survey times	16:45-18:30	17:20-18:40	17:45-19:15	05:45-07:00	16:40-17:30	17:30-18:30	17:20-18:30	16:55-18:00	
Low tide time	17:45	18:30	18:15	06:30	17:17	17:57	17:42	17:25	
Low tide height (m)	0.20	0.20	0.23	0.25	0.20	0.24	0.05	0.01	
Black-headed Gull*	0	0	2	0	0	0	0	400	400
Black-tailed Godwit*	43	0	0	0	0	0	0	1	43
Common Gull	0	0	3	0	0	0	0	35	35
Cormorant	0	0	1	0	0	0	0	0	1
Curlew*	5	0	0	0	0	0	0	0	5
Great Black-backed Gull	0	0	19	0	0	0	5	10	19
Great Crested Grebe	0	0	1	0	0	0	0	0	1
Grey Heron	2	0	0	0	0	0	0	0	2
Herring Gull	260	0	68	0	70	0	81	290	290
Oystercatcher*	15	0	4	0	0	0	1	0	15
Pale-bellied Brent Goose*	0	0	0	0	0	0	2	2	2
Redshank*	0	0	0	0	0	0	0	1	1
Total	325	0	98	0	70	0	89	739	739

* *Qualifying Interests for the Special Protection Areas: South Dublin Bay and River Tolka Estuary; North Bull Island*

How birds use the proposed development site

The only bird species breeding in the construction area of the MP2 Project is Black Guillemot (**Error! Reference source not found.**). These breed in old drainage pipes in the quay walls and in some of the Ro-Ro ramps. The average breeding population in the area directly affected by the MP2 Project was 7 birds over the period 2013-2018 with 5 birds recorded in 2018 breeding season. The birds are generally present around the nest sites in the port infrastructure from March to August. Outside the breeding season they disperse to forage in wider areas of the Irish Sea and are largely absent from the Port.

Both Common Tern and Arctic Terns nest on several artificial structures within the port (Table 7-21 and Table 7-22). The nearest of these structures is approximately 250m from the proposed construction area (Figure 7-24). During the breeding season (May to August) the birds nest in dense colonies on these structures. Their main foraging areas are in the wider area of Dublin Bay but occasionally the birds forage in the wake of ships moving through the port where prey items are brought to the surface by the movement of the ships.

Non-breeding waterbirds use the site north of the proposed Berth 53 in several different ways. This depends largely on the time of year and tidal level, although factors such as weather conditions and disturbance are undoubtedly important. At some low spring tides, when some intertidal sediment is exposed for short periods, flocks of waders and gulls select this area for feeding (Plate 7-5 and Plate 7-6). The visits by waterbird flocks are generally short and infrequent due to the limited period of exposure (usually a maximum of 1-2 hours per day). Most of the extreme low tide periods in winter months occur in darkness or poor light. Waterbirds do not use the site at other parts of the tidal cycle (median or high tides) or on other dates when spring tides do not occur. There are no high tide roosts on or close to the site.

Plate 7-5 Birds feeding on intertidal exposure north of proposed Berth 53 (Tide level 0.23m OD) 31 March 2018 (Photo: John Fox).

Plate 7-6 Birds feeding on intertidal exposure north of proposed Berth 53 (Tide level 0.01m OD) 21 March 2019 (Photo: Richard Nairn).

Plate 7-7 Common terns and black-headed gulls feeding at the site of proposed Berth 53 (Tide level 0.25m+LAT), 24 July 2001 (Photo: John Coveney)

At low spring tides in the months from May to September, terns occasionally use the area north of the proposed Berth 53 site for feeding by plunge-diving into the shallow water around exposed mudflats (

Plate 7-7). As this exposure only occurs on a few dates each month and for short periods in daylight, the occurrence of tern feeding at the site is rare. The terns involved are almost certainly those which nest on the nearby mooring dolphins and pontoons on the south side of the River Liffey and in the Tolka Estuary (see Table 7-22). The terns do not nest or roost within the MP2 Project site. Terns feed mostly on small fish and they follow the fish shoals wherever they occur. They are not confined to particular areas for feeding.

7.5.4 Likelihood of Significant Impacts on Birds

7.5.4.1 Direct impacts

The likelihood of direct impacts on breeding Black Guillemots on the MP2 Project site is high given that all quays and ramps will be reconstructed. However, there will be no direct impacts on the breeding tern colony as the nearest subsite is approximately 250m from the nearest part of the MP2 Project. There is no likelihood of direct impacts on the habitats of non-breeding waterbirds within the SPAs of Dublin Bay.

7.5.4.2 Indirect impacts

There is a potential for moderate indirect disturbance from construction noise and dredging activity in the river channel. The likelihood of indirect impacts of construction noise on the breeding tern colony is low. Both tern species are qualifying interests of the SPA. The likelihood of indirect impacts on non-breeding waterbirds within the SPA from movement of construction workers and operation of the proposed Berth 53 and heritage installations including the Marker, Sea Organ and Aeolian Harp is moderate without mitigation measures. It should be noted that the likely impacts on qualifying interests of the SPA are addressed in the Natura Impact Statement submitted with the application for consent, however, for the sake of completeness, the species that are qualifying interests of the SPAs in Dublin Bay are indicated in Table 7-23.

7.5.5 Description of Predicted Impacts

7.5.5.1 Potential impacts on Black Guillemots

The main impact of the MP2 Project on Black Guillemots will be the removal of several nest sites in the quay walls and Ro-Ro ramps within Oil Berth 3, Oil Berth 4, Berth 50A and Berth 52/53. This will directly affect approximately 9 birds (mean of the period 2013-2018) which is possibly equivalent to 5 pairs. This equates to approximately 14% of the total Black Guillemot population breeding in Dublin Port (mean 35 pairs in period 2013-2018). As set out in section 7.5., mitigation measures will be introduced to offset this impact.

There will be no indirect impacts on breeding Black Guillemots elsewhere in the port due to disturbance as the birds are already habituated to construction noise in the Port. For example, they continue to breed in close proximity to construction activity (including piling) for the ABR project in Alexandra Basin west during 2017 and 2018. A study of breeding success in Black Guillemots in relation to human disturbance on islands in the Gulf of St Laurence, Canada found that, despite the depression in success rates associated with observer interference, maximum weights attained by fledglings were considerably higher in the heavily disturbed area than in the lightly disturbed area. Those birds which succeeded in hatching their eggs in the face of daily disturbance may have been more attentive or more experienced as parents than the average successful nester in the lightly disturbed area (Cairns 2008).

7.5.5.2 Predicted impacts on breeding terns

No direct impacts are predicted on terns as there are none of these species nesting in the immediate area of the MP2 Project. The nearest tern nesting sites to the MP2 Project are on the south side of the River Liffey (at the CDL and ESB Dolphins) approximately 250m from the nearest part of the application boundary (Figure 7-24). There are two potential indirect impacts on these tern colonies – noise disturbance during construction and effects of dredging on foraging areas in the River Liffey.

Noise disturbance during construction

The sounds that birds hear can be divided into threatening and non-threatening sounds. Examples of non-threatening sounds are wave noise on a beach or constant traffic noise from a road. Threatening sounds include impulsive sounds such as gunfire, explosion or barking of a dog. The sound of construction is not impulsive (sudden, loud or shocking) but tends to be continuous and low frequency noise such as that made by machinery and vehicular traffic. On average, birds hear less well than many mammals, including humans. Acoustic deterrents or gas banger devices are not generally effective because birds habituate to them and eventually ignore them completely. Devices that purport to use sound frequencies outside the hearing range of humans are most certainly inaudible to birds as well because birds have a narrower range of hearing than humans do (Birkhead 2012).

Dooling (2002) reviewed the literature on how well birds can hear in noisy (windy) conditions and suggested that birds cannot hear certain mechanical noises as well as humans can in these conditions. Results of a trial for a colony of a different species, the Crested Tern *(Sterna bergii)* in Australia, found that the maximum responses observed, preparing to fly or flying off, were restricted to exposures to simulated aircraft noise levels of greater than 85 dB(A). A scanning behaviour involving bead-turning was the minimum response, and this, or a more intense response, was observed in nearly all birds at all levels of exposure. However, an intermediate response, an alert behaviour, demonstrated a strong positive relationship with increasing exposure. It was suggested that visual stimulus is likely to be an important component of aircraft noise disturbance (Brown 1990). The MP2 Project will not be visible from the tern colony.

Continuous monitoring of noise levels during 2017 and 2018 at Poolbeg Marina indicates that daily average noise levels from the Alexandra Basin Redevelopment (ABR) Project being implemented by Dublin Port Company (at 575m distance) do not exceed 65 dB(A). The absolute maximum hourly LAeq recorded was 72.8dB(a) and 95% of all hourly LAeq results were less than 62.9 dBA (see Figure 7-25). This noise monitoring site is in close proximity to the MP2 Project. Worst-case predicted construction noise levels from the MP2 Project will be less than 63dB(A) at the tern colony on the CDL Dolphin. This is substantially below the 85 dB(A) level cited above as likely to result in disturbance.

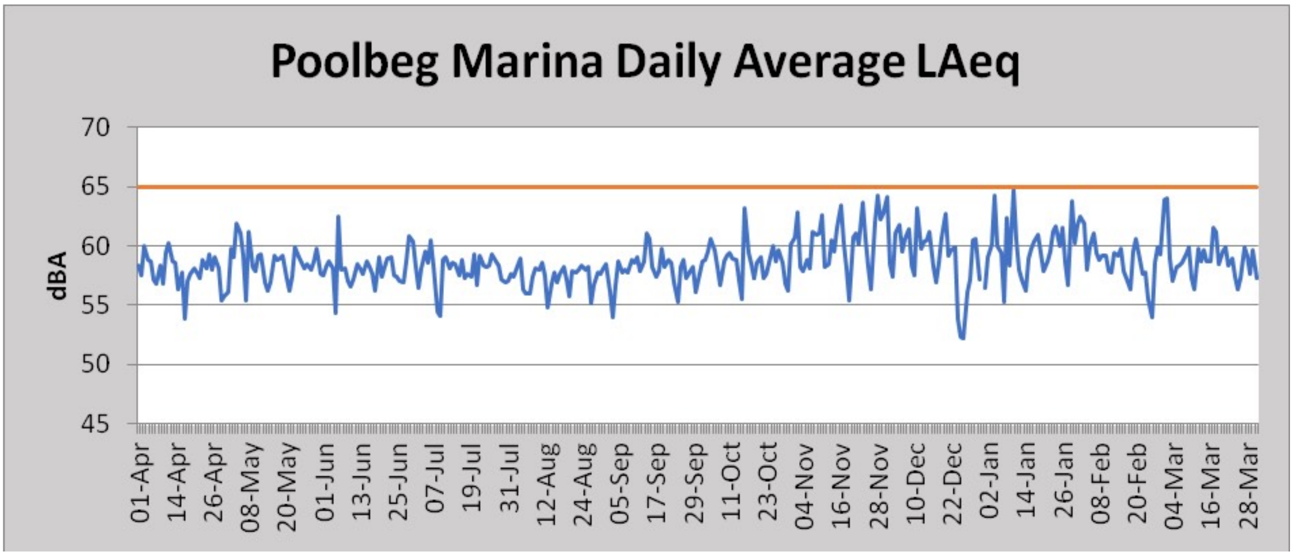

Figure 7-25 The Log Average value of individual hourly LAeq values at Poolbeg Marina on each day during the monitoring interval coincident with the construction activity for the Alexandra Basin Redevelopment (ABR) Project. The red line shows the 65 dBA value.

A tern colony itself generates noise up to 70 to 80 dB(A) in the breeding season through the continuous calling of the terns (trial measurements carried out by Richard Nairn and Eugene McKeown within Dublin Port, 9th June 2015). This would far exceed the audible construction noise from the construction site at 250 metres distance. The level of operational noise arising at this location would therefore be significantly below the level of noise generated by the terns themselves, even without which the construction noise levels, as predicted, are not predicted to cause any disturbance or other negative effects on the birds.

It is therefore concluded that construction noise from the proposed MP2 Project and associated and heritage installations will not be threatening to these tern species which breed within Dublin Port. There will therefore be no significant impacts on these species.

Disturbance to foraging areas during dredging and construction

Dredging will take place in the River Liffey channel during construction of the MP2 Project as shown in Figure 7-26.

Terns have continued to forage in the River Liffey channel over the duration of Dublin Port's regular maintenance dredging operations over the period 2012 – 2018 (Dumping at Sea permit S0024-01). Their breeding populations in Dublin Port have been increasing during this period (Table 7-22). Their principal foraging areas are in the wider Dublin Bay and birds can be seen commuting to and from these areas throughout the breeding season. There is no evidence that the dredging operations affect the small shoaling fish (principally sandeels and sprat) that are their prey.

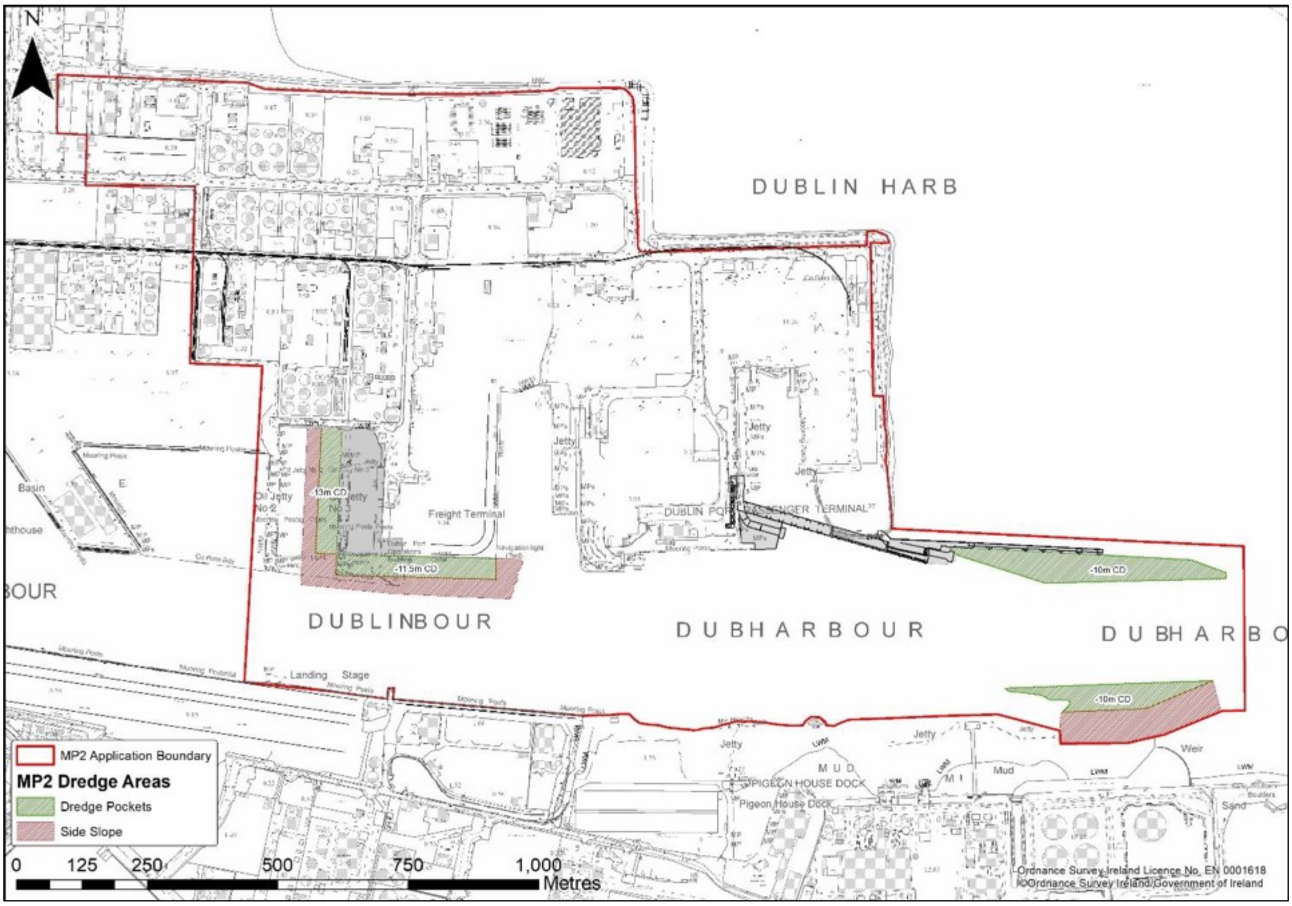

Figure 7-26 Location of capital dredging activity associated with the MP2 Project

7.5.5.3 Predicted impacts on non-breeding waterbirds

Direct impacts

The proposed project is confined to terrestrial areas of the Port and construction of new shipping berths on the north side of the Liffey channel. These areas are not used by non-breeding waterbirds and there will be no direct impacts on non-breeding waterbirds or their habitats.

Indirect impacts

There is some potential for indirect impacts on non-breeding waterbirds within 200 metres of the proposed Berth 53 site and heritage installations during construction and operation of the proposed berth.

<u>During construction</u>

For very short periods each month during extreme low tides there is some exposure of intertidal sediment to the north of the proposed Berth 53 jetty. During these periods a number of non-breeding waterbird species forage here on sand and gravel and while wading in shallow water (Table 7-23, Plate 7-6 &

Plate 7-7). Many of these events occur in darkness, especially during the winter months. Of the species recorded here in 2018 and 2019, six are qualifying interests of South Dublin Bay and River Tolka Estuary SPA. The movement of personnel and machinery during construction of Berth 53 and the heritage installations has the potential to cause disturbance during these short periods. Mitigation measures are proposed to avoid such disturbance (see section 7.5.6).

Cayford (1993) has defined disturbance as 'any discrete event in time that disrupts ecosystems, communities or populations, where disruption refers to a change in behaviour, physiology, numbers or survival'. Smit and Visser (1993) define disturbance as 'any situation in which a bird behaves differently from its preferred behaviour'. There are many published studies on the effects of human disturbance to waterbirds (see for example Davidson & Rothwell 1993) including those species that are recorded from the area immediately to the north of the proposed Berth 53. However, quantifying the effects of disturbance on populations can be problematic because of the difficulty in isolating key variables. One method used is to take a behavioural measure such as feeding rate (which is highly correlated with the dependent measure being sought) and make the assumption that a reduction in feeding opportunity might reduce feeding rates, thus affecting body condition and consequently survival or productivity.

Anthropogenic noise can cause disturbance to birds in a variety of ways although some noises produce no reaction in birds, even at close range and some species are more sensitive than others to loud noises (Ortega 2012). There are two recognised levels of response to disturbance: effects and impacts (Robinson and Pollitt, 2002).

- Effects can be seen as observed responses (behavioural and/or distributional) by a bird to a given disturbance. Examples of this include birds changing their feeding behaviour, taking flight or being more vigilant. In these circumstances, although technically disturbed, birds may be able to use the same or alternative sites without any major negative effects on their energy budget, and ultimately on the survival of individuals (Gill *et al*. 2001).
- Impacts in this context imply a reduction in body condition, productivity or survival and are therefore of primary conservation concern as they may result in an adverse effect at the population level, if enough individuals are affected. Whether disturbance results in an impact depends largely on the availability of alternative sites and the energetic costs of displacement (Goss-Custard *et al*. 1995).

The effects of noise from construction activity such as pile-driving may affect birds by two different pathways:

1. Aerial noise may be heard by birds such as geese, ducks, waders, seabirds, grebes and herons and some gulls, while they are foraging, roosting, swimming or flying close to the construction site.
2. Underwater noise may be heard by certain bird species that forage by diving or plunge-diving. This includes cormorants, shags, grebes, mergansers, auks, gannets, terns and any other species that feed on fish or shellfish near the seabed.

<u>Effects of pile-driving noise</u>

The sounds that birds hear can be divided into (1) non-threatening sounds, to which birds may be habituated and (2) threatening sounds. Examples of non-threatening sounds are wave noise on a beach or constant traffic noise. Threatening sounds include impulsive sounds such as an explosion or gunfire. Pile-driving is impulsive but it is a repetitive noise that is not threatening to birds and to which they are likely to habituate rapidly. An example is the frequent habituation of birds to gas bangers which are designed to prevent birds landing on crops or airport runways.

A study was undertaken on the effects of piling noise and vibration disturbance in birds within the Humber Estuary SPA, Eastern England (RPS 2014). Despite consistent periods of double hydraulic piling activity on the landward side of the seawall on the Humber, birds appeared to be largely unaffected by the noise of piling. On some occasions, birds were recorded arriving to feed during periods of piling activity. It was considered that the screening of the mudflats by the seawall was effective in minimising disturbance effects. The study results suggest that any disturbance caused by piling activity may also have been due to the increased presence of people.

Wright *et al.* (2010) investigated the effects of impulsive noise on water birds and reported that disturbance at levels above 65.5dB (A) are more likely to result in behavioural response of some kind rather than no response. At above 72.25dB (A) flight with abandonment of the site became the most likely outcome of the disturbance.

Cutts *et al*. (2009) considered impacts to birds utilising the Humber Estuary and summarised the general thresholds due to the potential effects of construction disturbance on birds. Noise up to 50dB (A) is found to have no effect whereas noise between 50dB (A) and 85dB (A) causes head turning, scanning behaviour, reduced feeding and movement to nearby areas. Above 85dB (A), response includes preparing to fly away, flying away and possibly leaving the area (Figure 7.5.9). The authors recommend that ambient construction noise levels should be restricted to below 70dB (A). Birds will habituate to regular noise below this level. Where possible, sudden irregular noise above 50dB (A) should be avoided as this causes maximum disturbance to birds (Cutts *et al*. 2009).

IECS (2007) showed that birds were found in general, to accept a wide range of steady state noise level from 55dB(A), up to 85dB(A), therefore complete exclusion within up to 250 m was considered very unlikely. Evidence presented by Cutts *et al*. (2009) from repair work to a pipeline in the Humber Estuary has shown that disturbed birds (within 100m) are likely to return within a short time frame once disturbance ceases, potentially within 30 minutes, and with no evidence of effects on numbers during surveys the following week, emphasising the short-term nature of any impacts.

Waders using Mutton Island in Galway Bay were studied over a period of 5 years, during and after the construction, including pile-driving, of a major sewage treatment plant which was situated between 150m and 200m from the main high tide roost. The waders became more concentrated on the undeveloped part of the island but otherwise showed no negative effects of disturbance. Numbers of birds using the roost were higher towards the end of the period as human disturbance decreased due to controls on access to the island and because of a high wall around the construction site which screened construction workers from the birds (Nairn 2005).

Impacts of pile-driving noise on birds in Dublin Bay

In consultation with the acoustics consultants, worst-case predicted noise levels in the Tolka Estuary were predicted to better understand the likelihood of aerial noise induced effects. The highest worst-case predicted noise level of 63 dB(A) occurs immediately to the north of Berth 53. This is close to but importantly below the noise threshold of 65.5 dB(A) cited in Wright *et al.* (2010) as being the value above which impulsive construction noise is more likely to result in a behavioural response of some kind.

At other locations predicted worst-case noise levels range from 45-49 dB(A) which is below the value of 50dB(A) cited in Cutts *et al*. (2009) as being a noise threshold below which no effect of construction disturbance on birds was observed to occur, providing certainty beyond reasonable scientific doubt.

The entire site of pile-driving is screened from the Tolka Estuary on eastern and northern sides of the Berths by the elevated embankment of the seawall. This will significantly attenuate any aerial noise arising from the piling operations. Given this attenuation, the noise perceived by the birds from this source will be well below the 'safe' 55 dB(A) threshold prescribed by Cutts *et al.* (2009). Birds in all parts of the SPA, are expected to rapidly habituate to noise from pile-driving operations and there will be no adverse impacts.

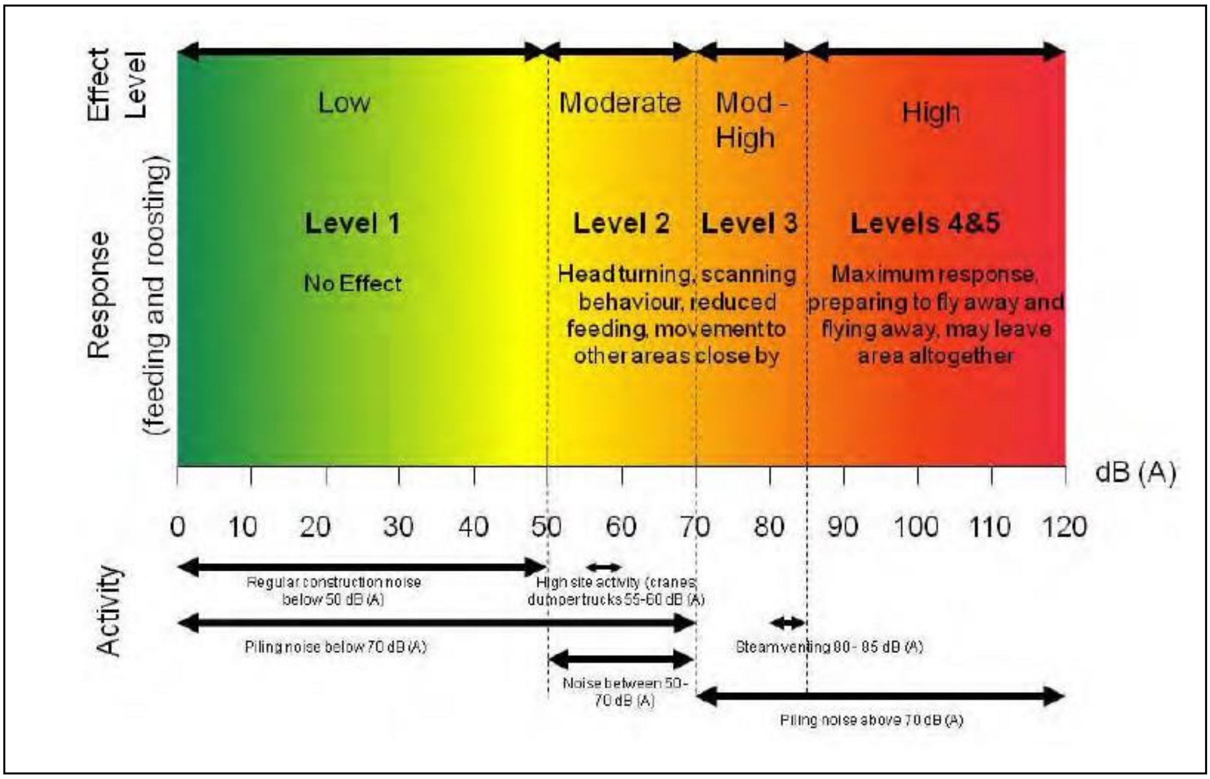

Figure 7-27 Waterbird response to construction disturbance (from Cutts et al. 2009).

Lighting

Lighting of the construction area also in darkness has the potential to cause overspill of artificial light onto the intertidal areas. Mitigation measures will be introduced to avoid such disturbance (see section 7.5.6). A study in Portugal evaluated the effects of artificial illumination on the nocturnal habitat selection and foraging behaviour of six wader species with different feeding strategies: three visual foragers, two species that alternate visual and tactile strategies (mixed foragers), and one tactile forager. Four of these species occur regularly in Dublin Bay. They quantified the number of birds and their foraging behaviour at sites affected and not affected by streetlights, and also before and after illuminating experimental sites. Areas illuminated by streetlights were used more during the night by visual foragers, and to a lesser extent by mixed foragers, than non-illuminated areas. Visual foragers increased their foraging effort in illuminated areas, and mixed foragers changed to more efficient visual foraging strategies. These behavioural shifts improved prey intake rate by an average of 83% in visual and mixed foragers (Santos *et al.* 2010).

Another study recorded nocturnal, marine feeding behaviour in the Brown-hooded Gull *(Larus maculipennis)*. The gulls assembled at night at the end of a long pier, running 800 m offshore into the Golfo Nuevo, Argentina. Powerful lights predictably lighted the water around the end of the pier and attracted many small prey animals to the surface. Several hundreds of gulls, presumed to be local breeders, came every night to feed on this food resource, using various feeding techniques and taking several prey species and sizes. The gulls caught small prey items while swimming, by rapid surface pecking, while they hunted the larger prey species by flying low over the water and performing shallow, vertical plunge-dives. During daylight, only few gulls ventured from land into the bay, indicating that they took advantage of the nocturnal feeding opportunity, facilitated by artificial lighting (Leopold *et al.* 2010).

<u>During operation</u>

Potential exists for changes in sedimentation and bed levels in the area to the north of the proposed Berth 53.

The coastal processes assessment at Chapter 12 of the EIAR contains at Section 12.5 an analysis of potential changes to the sediment transport regime to determine if operating Berth 53 would disrupt the circulation patterns and sediment transport processes that may impact upon foraging areas within the Tolka Estuary during low tide, due to the changes in bathymetry and construction of the Berth 53.

To assess the potential operational phase impact of ship movements in the area of Berth 53, propeller and thruster jet scour calculations were undertaken for representative ship manoeuvres from navigational simulation studies, as described in Section 12.5.2.3 of Chapter 12. This assessment found that, under normal conditions the piled deck structure of Berth 53 results in a small localised change to the sea bed within the Tolka Estuary but that this principally occurs in the subtidal and as such would have a very limited effect on intertidal bird feeding areas. Simulations also found that when ship bow thrusters operated at 100%, the resultant peak axial velocity will be c. 4.3m/s and that this velocity would likely result in scour of the neighbouring Tolka Estuary. This was considered potentially significant as it could impact the long term stability of the dredged side slope at Berth 53 and thus, in the longer term, potentially affect bed levels and modify the position of the lowest astronomical tide across the foraging areas for non-breeding waterbirds during very short periods at low spring tides. Such an effect could result in changes in use of the area by overwintering birds. Mitigation measures will be introduced to avoid such morphological changes (see section 7.5.6)

During operation of the proposed development, the movement of amenity users of the Greenway and heritage installations, and pedestrians and ships' crews using Berth 53 have the potential to cause some indirect impacts on non-breeding waterbird species that forage here during very short periods at low spring tides. Mitigation measures will be introduced to avoid such disturbance (see section 7.5.6)

Lighting of the proposed jetty during operation has the potential to affect foraging waterbirds during the brief periods (many in darkness) when there is intertidal exposure of foraging areas. The study in Portugal of six wader species, quoted above, found that this had a beneficial effect on the majority of birds present (Santos *et al.* 2010).

7.5.6 Remedial and Mitigation Measures

A Bird Management Plan will be implemented for the duration of the proposed construction works. A draft Bird Management Plan is presented in Section 3.5.7 of the draft Construction stage Environmental Management Plan (CEMP).

Gates will be used at the site of the Greenway to control the movement of people during periods of greatest low spring tides, again, to avoid disturbance at feeding grounds within the Tolka Estuary.

7.5.6.1 Black Guillemots

Black Guillemots nest readily in artificial structures throughout Dublin Port. Prior to construction, a number of custom-made nestboxes will be provided in adjacent areas of the Port in which any displaced birds will be able to nest in future. This will mitigate any negative impacts of the proposed development on this species. The nestboxes will be installed on quay walls or jetties elsewhere in the port. Sixteen such boxes were installed on the Oil Jetties in 2016 and several of these have since been used for nesting by Black Guillemots (see Table 7-20).

7.5.6.2 Breeding terns

Capital dredging works associated with this project will be confined to the winter months (October–March), when Common Terns and Arctic Terns are absent from Ireland. This will avoid any indirect impacts of the proposed development on these species. No additional mitigation measures are required.

7.5.6.3 Non-breeding waterbirds

Construction of Berth 53 and heritage installations will temporarily cease during periods of greatest low spring tides to avoid disturbance at exposed feeding grounds within the Tolka Estuary. These periods can be predicted for the full period of construction based on tide tables. This will avoid any indirect effects of human disturbance on the birds.

At operational phase, gates will be used at the site of the Greenway to control the movement of people during periods of greatest low spring tides, again, to avoid disturbance at feeding grounds within the Tolka Estuary. This will avoid any indirect impacts on waterbirds during operation of the proposed berth as personnel using the facility will not be visible to the birds on the intertidal area.

To mitigate the potential propeller and thruster jet scour effect on the Tolka Estuary, a wash protection structure has been designed to reduce scouring associated with manoeuvring vessels within the Berth 53 area. The design and performance of this wash protection structure was assessed and quantified through an extensive numerical modelling programme.

7.5.7 Residual Impacts

In circumstances where the mitigation measures outlined in section 7.5.5 are fully implemented, there are no residual impacts predicted.

7.5.8 Monitoring

The current Dublin Bay Birds Project, which is funded by Dublin Port Company, will be continued for the full period of construction and for a specified period thereafter. This project involves long-term monitoring of all waterbirds on a monthly basis throughout the year and includes monitoring of breeding terns within the Port.

7.6 Designated areas

7.6.1 Receiving Environment

There is a significant aggregation of designated sites in and around Dublin Bay, including European sites (cSACs and SPAs), proposed Natural Heritage Areas (NHAs) and Nature Reserves. It is a coastal wetland complex of considerable nature conservation value in a European and international context and the UNESCO designated Dublin Bay Biosphere extends to over 300km^2, containing or overlapping with 14 European sites. However, the likely effects on European sites are considered exclusively in the Habitats Directive appraisals containing a screening appraisal and a Natura Impact Statement submitted under separate cover with the application for development consent. Potential effects on other designated sites are considered in this section of the EIAR.

The MP2 Project has been assessed for its potential to affect designated sites for which a pathway of effect can be reasonably established between a receptor and the source of effect. The designated sites considered are illustrated in Figure 7.28. The information contained in these tables is based on publicly available data, sourced from NPWS, Dublin City Council and the Dublin Bay Biosphere website in October 2018.

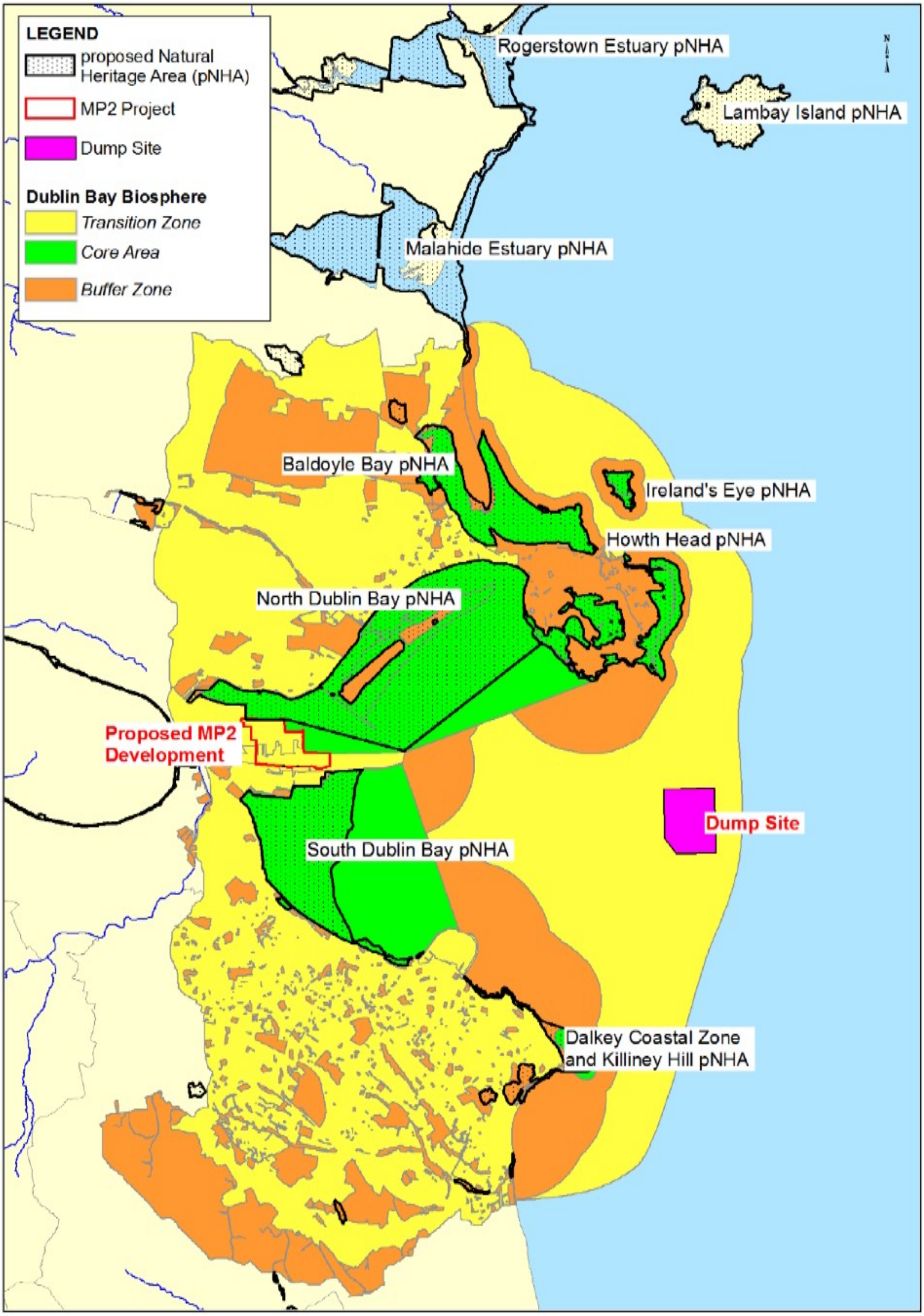

Figure 7-28 Designated Sites (other than European sites) surrounding MP2 Project

7.6.1.1 Proposed Natural Heritage Areas

Natural Heritage Areas (NHAs) are designated under the Wildlife Acts as they are considered important habitats which support animals or vegetation of importance. There are no NHAs within 1km of the MP2 Project. However there are three proposed Natural Heritage Areas (pNHAs), namely North Dublin Bay, South Dublin Bay and Dolphins, Dublin Docks, which could potentially be affected by the construction or operation of the MP2 Project. These were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. The pNHAs are subject to limited statutory protection, but are recognised for their ecological value by planning and licensing authorities.

North Dublin Bay pNHA overlaps with North Dublin Bay SAC and parts of North Bull Island SPA and South Dublin Bay & River Tolka Estuary SPA.

South Dublin Bay pNHA overlaps with South Dublin Bay SAC and parts of South Dublin Bay & River Tolka Estuary SPA.

Dolphins, Dublin Docks comprises two structures comprising colonies of Common, Roseate and Arctic Terns. They are the CDL Dolphin and the ESB Dolphin and both are located near the south bank of the River Liffey. The ESB Dolphin is also contained within South Dublin Bay & River Tolka Estuary SPA.

7.6.1.2 North Bull Island Ramsar site

North Bull Island is unique in Ireland because it supports well developed saltmarsh and dune systems displaying all stages of development from the earliest phase of colonization to full maturity. The site supports five protected or threatened plant species and nationally important populations of three insect species. The area is important for nesting Little Tern (80 pairs, or about 30% of the Irish population) and for numerous species of wintering waterbirds. Human activities include bait digging.

7.6.1.3 Sandymount Strand / Tolka Estuary Ramsar site

This Ramsar site is an intertidal system supporting a large bed of eelgrass (Zostera noltii) with extensive areas of sandflats. The site is important for various species of waterbirds, supporting internationally important numbers of Brent Geese and large numbers of roosting gulls and terns. Various species of annalids, bivalves and small gastropods occur. Bait-digging is a regular activity on the sandy flats.

7.6.1.4 Dublin Bay Biosphere

The Dublin Bay UNESCO Biosphere Reserve extends to 300km^2 and comprises three zones: – a core area, a buffer zone and a transitional area. It is approximately 12.5km wide, stretching from Dublin Airport in the west to its seaward termination. The MP2 Project is located within the marine and terrestrial transition zones of the Biosphere, and the proposed Berth 53 is immediately adjacent to that part of the core area of the Biosphere overlapping with South Dublin Bay & River Tolka Estuary SPA. The landside elements of the MP2 Project are located in proximity to the terrestrial buffer zone between the core area and the terrestrial transition zone. The proposed disposal site is located within the marine transition zones of the Biosphere.

7.6.2 Likelihood of Impacts

In this EIAR, assessment of the MP2 Project comprise an assessment of those pNHAs and Ramsar sites that overlap with the European sites (however, the conservation objectives of the European sites and the likely significant effects on those objectives arising from the MP2 Project are analysed separately in the NIS submitted with the application for development consent); and also the protected habitats and wildlife of the protected ecosystems of the core zone of Dublin Bay Biosphere which are managed for the conservation of biological diversity.

7.6.2.1 Water Quality and Habitat Deterioration

As described in Chapter 3 of the EIAR, it is proposed to construct a new Ro-Ro jetty structure of approximately 406m in length as a new river berth (Berth 53) outside of but adjacent to South Dublin Bay and River Tolka SPA. This berth will be used predominantly for the berthing of Ro-Ro ferries and will accommodate the bow-to and stern-to berthing of a wide range of ferries up to 220m in length. It will require dredging of a berthing pocket to -10.0m CD and installation of concrete mattresses (or similar) to provide slope stabilisation and scour protection to the dredged berthing pocket.

In addition, Berth 50A will require dredging of a berthing pocket to -11.5m CD; Oil Berth 03 will require dredging of a berthing pocket to -13.0m CD; and dredging of a manoeuvring area is required to a maintained depth of -10.0m CD.

As well as the possibility of mobilised suspended sediments due to dredging or dumping, cement release through general construction activities or spillages of polluting substances are also a potential source of pollution to the marine environment at construction phase, as a result of:

- Demolition of buildings & structures;
- Berth Construction including the construction of waterside berths, quay walls, jetties, open piled structures
- Landside ancillary works to serve the marine operations including the construction of ramps and deck structures to access linkspans, services and drainage installation, and installation of jetty furniture and fender systems
- Accidental release of highly alkaline contaminants from concrete and cement during the demolition of buildings and structures and the construction of hardstand areas, waterside berths, quay walls, jetties, bridging structures
- General water quality impacts associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals

Operational phase impacts associated with the MP2 Project (buildings/structures, berths and associated marine berthing and manoeuvring areas and landside works) represents an increase in use of the land over the current normal day-to-day port activities. These associated impacts are currently well understood and managed within the Port's operational and maintenance procedures. The principal potential sources of water quality impact are:

- Increased suspended sediment levels due to port operations including the ongoing maintenance dredging of the proposed new berths;

- General water quality impacts associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals and releases associated with the operation and maintenance of surface water drainage systems;
- Discharges from vessels using the berths of the operational MP2 Project (ballast water, wastewater, oil spillages, fuel bunkering);
- Discharges from cargo handling (leakages from containers, bulk material spillages, losses from conveyor systems);
- Discharges from cargo storage areas and onward transportation (losses from hoppers, flat bulk stores and HGVs).

In the absence of mitigation, temporary adverse water quality and marine habitat deterioration effects could occur in coastal zones of North Dublin Bay pNHA and South Dublin Bay pNHA or core areas of the Dublin Bay Biosphere. Such effects would result in a significant impact, and in accordance with the methodology outlined in Section 7.2.1.4, mitigation is required.

Operational phase traffic can also impact directly on local air quality and any sensitive receptors that are located in proximity to the road network, such as wetland habitats of European sites. Emissions from vehicles and shipping vessels may increase in the future, leading to greater levels of deposition of gaseous pollutants on wetland habitats of North Dublin Bay pNHA and South Dublin Bay pNHA or core areas of the Dublin Bay Biosphere.

The Institute of Air Quality Management (IAQM) has produced guidance for the assessment of the air quality impacts of development on designated nature conservation sites (IAQM, 2019). Gaseous pollutants, critical levels below which significant harmful effects are not thought to occur have been adopted by, amongst others, the European Union and the United Nations Economic Commission for Europe (UNECE) and are used as regulatory standards. These are summarised in Table 2.1 of IAQM (2019), and the Critical Load for Nitrous Oxides is 30 µg/m^3. An Air Quality assessment in Chapter 10 of the EIAR and has predicted increases in gaseous pollutants as a result of traffic on the road network during the operation stage of MP2 Project in line with the increased throughput of cargo and passengers as predicted under the Masterplan. Table 10.19 makes predictions of average annual nitrous oxide levels in four locations (at Santry, East Wall Road, Sherriff Street Upper and Pigeon House Road). Predicted increases are as follows:

- *R1 (Royal Oak Housing (Santry)*

  Increase of 1.19 µg/m^3 by 2040 to 25.89 µg/m^3 from a 2018 baseline of 24.70 µg/m^3
- *R2 (Residential Housing on East Wall Road)*

  Increase of 0.77 µg/m^3 by 2040 to 24.03 µg/m^3 from a 2018 baseline of 23.26 µg/m^3
- *R3 (Apartments on Sheriff Street Upper)*

  Increase of 1.48 µg/m^3 by 2040 to 23.24 µg/m^3 from a 2018 baseline of 21.76 µg/m^3
- *R4 (Residential Houses on Pigeon House Road)*

  Increase of 1.02 µg/m^3 by 2040 to 25.82 µg/m^3 from a 2018 baseline of 24.80 µg/m^3

This analysis makes clear that the average annual Average NO2 levels predicted with MP2 Project in place are below the critical load for NOx. IAQM (2019) advises that in circumstances where these predicted concentrations exceed 1% of the critical level/load either alone or in-combination, they should be passed onto the Ecologist. The values range between 2.5% - 5% of the critical load for NOx, but more importantly, the critical load is not exceeded as a result of MP2 Project and the highest predicted concentrations do not exceed 90% of critical load. Mitigation is not required.

7.6.2.2 Noise and Disturbance

As described in Chapter 3, some aspects of the MP2 Project will require activities in the marine environment and new marine infrastructure to be constructed and operated. Marine engineering construction includes many activities producing underwater noise, including:

- Ground investigation works to assess the nature of the bedrock and overburden materials. The works will be carried out by cable percussion boring, rotary coring, and penetration testing
- Demolition of buildings and maritime infrastructure close to the Liffey channel
- Piling during installation of structures
- Dredging of 424,644m^3 of mixed sediment to create a localised channel widening area to a maintained depth of -10.0m CD and various berthing pockets
- Dispose of the dredged material at the proposed disposal site
- Increased vessel traffic following construction and operation of new port facilities

These activities carry an inherent risk of noise induced effects upon some marine species as a result of underwater acoustic energy being released into the marine environment.

At low tide, waders and gulls are distributed throughout the Tolka Estuary - on the mudflats in the inner estuary and the sandflats in the outer estuary. Most of the wildfowl are distributed in the inner, muddier parts of the site. However, as the tide rises, the amount of intertidal foraging area is dramatically reduced, and ultimately disappears and the majority of waterbirds leave this part of the estuary. Those that remain during the high tide period include gulls, Black Guillemots, Red-breasted Mergansers, Great Crested Grebes and Cormorants.

Waterbird use of the Tolka Estuary is strongly constrained by tidal conditions, and as mentioned above all non-swimming birds, or those that forage in shallow water, are typically forced to leave this part of the estuary as the tide rises. However, the area was found to be very important for foraging when the sand and mudflats were exposed at low tide. The area of intertidal mud available to waterbirds increases in size during low spring tides, when a larger portion of the sand and mudflats are exposed.

In the absence of mitigation, temporary disturbance or displacement effects could occur to waterbird populations of North Dublin Bay pNHA and South Dublin Bay pNHA. Such effects would result in a significant impact, and in accordance with the methodology outlined in Section 7.2.1.4, mitigation is required.

7.6.3 Remedial and Mitigation Measures

Mitigation measures to avoid pollution at construction stage and operational stage derive from Section 9.1.5 of Chapter 9 of the EIAR and are set out in Table 19.1 of Chapter 19 '*Summary of Mitigation Measures and Conclusions'* of the EIAR. Monitoring measures are set out in Section 9.1.8 of Chapter 9.

Mitigation measures to avoid disturbance to individuals of harbour porpoise, grey seal and harbour seal at construction stage derive from Section 7.4.6 of this chapter and are set out in Table 19.1 of Chapter 19. Monitoring measures for marine mammals are set out in Section 7.4.7 of this chapter.

Mitigation measures to avoid waterbird disturbance at construction stage and operational stage derive from Section 7.5.6 of this chapter and are also set out in Table 19.1 of Chapter 19. Monitoring measures for waterbirds are set out in Section7.5.8 of this chapter.

7.6.4 Residual Impacts

No further or additional likely significant effects were predicted upon any proposed NHA site, Ramsar site or the Dublin Bay Biosphere.

As a result there is no residual impacts predicted upon any proposed NHA site, Ramsar site or the Dublin Bay Biosphere as a result of the construction and operation of the MP2 Project.

7.7 Conclusion

This chapter of the EIAR identifies, describes and assesses in an appropriate manner, the direct and indirect significant effects of the proposed development on biodiversity. It contains a description of the terrestrial, marine and avian biodiversity features and designated sites (other than European sites) within and surrounding the site of proposed development, followed by an assessment of the potential and likely significant effects of the proposed development alone and cumulatively with other consented projects on terrestrial, marine and avian biodiversity features and designated sites.

The assessment of *terrestrial biodiversity* features concludes that there are no significant environmental impacts predicted upon terrestrial biodiversity features as a result of the construction and operation of the proposed MP2 Project. Mitigation is not required.

The assessment of *benthic biodiversity and fisheries* features concludes that significant environmental impacts are predicted upon benthic habitat features as a result of habitat loss or deterioration and fisheries features as a result of underwater noise arising from the construction of the proposed MP2 Project and in the absence of mitigation. Mitigation has been proposed where necessary and there is no significant residual environmental impact upon *benthic biodiversity and fisheries* features with effective implementation of the proposed mitigation measures.

The assessment of *marine mammal* features concludes that significant environmental impacts are predicted upon individuals but not populations of marine mammals as a result of underwater noise as a result of the construction of the proposed MP2 Project and in the absence of mitigation. Mitigation has been proposed where necessary and there is no significant residual environmental impact upon marine mammal features with effective implementation of the proposed mitigation measures.

The assessment of *avian* features concludes that significant environmental effects are predicted upon breeding and non-breeding avifauna as a result of disturbance and displacement as a result of the construction of the proposed MP2 Project and in the absence of mitigation. Mitigation has been proposed where necessary and there is no significant residual environmental impact upon avian features with mitigation in place.

The assessment of *designated sites* (other than European sites) concludes that significant environmental effects are predicted upon water quality and marine habitats in coastal zones of North Dublin Bay pNHA and South Dublin Bay pNHA or core areas of the Dublin Bay Biosphere; and that disturbance or displacement effects could occur to waterbird populations of North Dublin Bay pNHA and South Dublin Bay pNHA. Mitigation has been proposed where necessary and there is no significant residual environmental effect upon these designated sites with effective implementation of the proposed mitigation measures.

A Natura Impact Statement (NIS) has been prepared on behalf of Dublin Port Company (DPC) in respect of the applications for development consent in relation to the MP2 Project to document Habitats Directive stage 1 and stage 2 appraisals in relation to European sites. The NIS has been submitted under separate cover so as to enable the competent authorities to carry out the assessments required under the Habitats Directive and Irish law distinct from the assessment required under the EIA Directive.

8 SOILS, GEOLOGY & HYDROGEOLOGY

8.1 Introduction

This chapter comprises an appraisal of the existing ground conditions at the MP2 Project development site and addresses the potential effects of the MP2 Project on the soils, geology and hydrogeology of the site and surrounding areas. The assessment is based on the development as described in Chapter 3 of the EIAR. Where potential adverse impacts are identified, the assessment identifies mitigation measures that will be implemented to prevent, reduce or offset potential adverse effects, or enhance potential beneficial effects where possible.

A Preliminary Risk Assessment (PRA) and Generic Quantitative Risk Assessment (GQRA) have been prepared to support this assessment. The PRA and GQRA reports are contained within Appendix 8-1 and 8-2 of the EIAR.

8.2 Assessment Methodology

This section describes the methodology which has been used in the assessment of soils, geology and hydrogeology which may impact, or be impacted by, the MP2 Project.

8.2.1 Guidance

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

- 'Geology in Environmental Impact Statements', published by The Institute of Geologists of Ireland in September 2002, has been consulted. This document outlines the main geological issues that should be considered when undertaking an EIA.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency, Draft, August 2017.
- The National Roads Authority's guidelines; 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes', published in 2008. These guidelines aim to provide guidance on the assessment of geological, hydrological and hydrogeological impacts through the EIA process.

The Preliminary Risk Assessment was prepared using guidance provided by the UK Environment Agency (EA). The UK technical guidance for assessing and managing risks from contaminated land is detailed in 'Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11', published by DEFRA and the EA in 2004 and this guidance is accepted by the EPA (in the absence of Republic of Ireland Government guidance).

Underpinning the guidance within CLR11 is a source-pathway-receptor methodology, which is used to identify Significant Pollutant Linkages (SPLs).

The following definitions apply:-

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

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

8.2.2 Human Health Risk Assessment

In the absence of Irish guidance on contaminated land risk assessment, current guidance provided by the UK Environment Agency (EA) has been utilised to form the basis of this assessment.

The Environment Agency has published guidance in relation to assessing the potential risk from contaminated land to human health. Science Report SR2 ‘Human Health Toxicological Assessment of Contaminants in Soil’ and Science Report SR3 ‘Updated Technical Background to the CLEA Model’, together with CLR 11 ‘Model Procedures for the Management of Land Contamination’ provide the most up to date framework for human health risk assessment within the UK.

In order to assess the human health and environmental risks posed by potential contaminants within the underlying soils, RPS undertook an initial screening of the laboratory results using the 2015 LQM/CIEH (Land Quality Management/Chartered Institute of Environmental Health) Suitable 4 Use Levels (S4ULs) (Copyright Land Quality management Limited reproduced with permission; Publication Number S4UL3474, all Rights Reserved) as trigger values. These LQM/CIEH S4ULs replace the second edition of the LQM/CIEH Generic Assessment Criteria (GAC) published in 2009. Differences in modelling assumptions and added land uses and substances create the difference between these S4ULs and the previous GAC. These values are provided for 6 land use classifications:

- Residential with homegrown produce
- Residential without homegrown produce
- Allotments
- Commercial
- Public open space near residential housing
- Public park

For pollutants with no relevant S4ULs, assessment criteria were provided by Soil Guideline Values (SGVs) and CL:AIRE's (Contaminated Land: Applications in Real Environments) GAC. In light of the publication of SR2 and SR3 the Environment Agency published SGVs for a number of contaminants for the following standard land use scenarios assuming a Sandy Loam soil and Soil Organic Matter (SOM) content of 6%:

- Residential
- Allotments
- Commercial

CL:AIRE in association with The Environmental Industries Commission (EIC) and Association of Geotechnical and Geo-environmental Specialists (AGS) published a set of GAC in 2009 for previously unpublished contaminants which are intended to complement the SGVs derived by the Environment Agency. The GACs have been derived predominantly for VOCs and SVOCs using CLEA v1.06 for a number of different Soil Organic Matter contents (1%, 2.5% and 6%).

Commercial screening values have been used in this assessment as they are most pertinent to the MP2 Project.

8.2.3 European Union Legislation

European legislation is a significant consideration in assessing the effects of a scheme on the geological and hydrogeological attributes of a site, and is outlined below.

The Water Framework Directive (2000/60/EC) establishes a framework for community action in the field of water policy. The main objective of the Directive is for all groundwater, surface water and coastal water bodies to achieve 'good' status by 2015. The Directive introduced new broader ecological objectives as well as aims to prevent deterioration of all water bodies. The Directive must be considered in any scheme that has the potential to impact on any part of the water environment. The Water Framework Directive has been transposed into Irish law by means of a number of statutory instruments. The European Communities (Environmental Liability) Regulations 2008 (S.I. 547 of 2008) came into force in Ireland in April 2009. EU Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage is transposed into Irish law via these regulations. Their purpose is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.

8.2.4 Sources of Information

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

- Environmental Protection Agency Map viewer - http://gis.epa.ie/Envision/;
- Geological Survey of Ireland Spatial Resources;
- http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228;
- Environmental Protection Agency Radon Map - http://www.epa.ie/radiation/radonmap;
- Model Procedures for the Management of Land Contamination, Contaminated Land Report 11, Defra and Environment Agency, September 2004;

- Irish Aquifer Properties – A Reference Manual and Guide, Environmental Protection Agency and Geological Survey Ireland, March 2015;
- Geology in Environmental Impact Statements, The Institute of Geologists in Ireland, 2002
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, National Roads Authority, 2008;
- Internet based aerial photography.

8.2.5 Assessment of Significance

8.2.5.1 Sensitivity of Receptor

Effects of the development on soils, geology and hydrogeology receptors have been assessed taking into account sensitivity of the receptor and magnitude of the effect. The sensitivity of the receptors is determined according to the methodology shown in Table 8-1.

Table 8-1 Sensitivity of receptor (Amended from 'NRA Guidelines on procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

Sensitivity	Criteria	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale.	• Geology: World Heritage Sites; sites protected under EU wildlife legislation (SAC, SPA, SSSI, Ramsar site) or • Geological features that are rare on a regional or national scale. • Surface waters; River, wetland or surface water body ecosystem protected by EU legislation.
High	Attribute has a high quality and rarity on Local scale.	• Geology: Regional important geological sites. • Soils; Well drained and/or high fertility soils. • Surface water; Ecosystem protected by national legislation. • Groundwater; Regionally important potable water source supplying >2500 homes, groundwater vulnerability is classified as high; principal aquifer providing a regionally or locally important resource or supporting site protected under wildlife legislation.
Medium	Attribute has a medium quality and rarity on local scale.	• Soils: Moderately drained and/or moderate fertility soils. • Groundwater: Local potable water source supplying >50 homes, moderate classification of groundwater vulnerability; secondary aquifer providing water for agricultural or industrial use with limited connection to surface water.
Low	Attribute has a low quality and rarity on local scale	• Soils: Poorly drained and/or low fertility soils. • Groundwater: Local potable water source supplying <50 homes, deep secondary aquifer with poor water quality not providing baseflow to rivers.
Neutral	Very low importance and rarity on local scale.	• Geology: No rock exposures. • Soils: Urban classified soils. • Groundwater: Non-aquifer/Unproductive Strata .

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

Regionally Important (R) Aquifers:

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

Locally Important (L) Aquifers:

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

Poor (P) Aquifers:

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

8.2.6 Impact Assessment

The magnitude of a potential effect is independent of the sensitivity of the feature. The magnitude considers the scale of the predicted change to the baseline condition taking into account its duration (i.e. the magnitude may be moderated by the effects being temporary rather than permanent, short term rather than long term) and whether the effect is direct or indirect. Definitions for impact magnitude are described in Table 8-2.

Table 8-2 Criteria to determine the magnitude of effect (Amended from 'NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

Magnitude	Criteria	Typical Examples
Major Adverse	Total loss or major alteration to key features of the baseline conditions such that post development character / composition of baseline condition will be fundamentally changed.	• Irreversible loss of high proportion of local high fertility soils. • Changes to aquifer or unsaturated zone **resulting** in extensive change to existing water supply springs and wells, river baseflow or ecosystems. • Loss of, or extensive change, to nationally important geological features.
Moderate Adverse	Loss or alteration to one or more key features of the baseline conditions such that post development character / composition of baseline condition will be materially changed.	• Irreversible loss of moderate proportion of local high fertility soils. • Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. • Permanent loss of, regionally important geological features, or substantial changes to nationally important geological features.
Minor Adverse	Results in some measurable change in attributes quality or vulnerability compared to baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character / composition of baseline condition will be similar to the pre-development situation.	• Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils • Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. • Loss of, or extensive change, to locally important geological features.
Neutral	Very little change from baseline conditions. Change is barely distinguishable approximately to a "no change" situation.	• No measurable impact upon surface waters or groundwater. • No measurable impact on geological features. • No measurable impact on soils.
Beneficial	Benefit to, or addition of, key characteristics, features or elements compared to baseline conditions.	• Improvement to geological features.

8.2.7 Significance Criteria

The significance of a specific potential effect is derived from both the sensitivity of the feature and the magnitude of the effect, and can be then determined using the matrix presented in Table 8-3 (has been amended from 'NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'). Effects can be beneficial, adverse or neutral and their significance Very Large, Large, Moderate, Slight or Neutral or an intermediary designation as cases dictate based on professional judgement. The significance of an impact should also be qualified based on the likelihood of an effect occurring (using a scale of certain, likely or unlikely) and the confidence in the accuracy of the assessment.

Professional judgement can be used to vary the category where specific circumstances dictate, for example due to the vulnerability or condition of the receptor.

Table 8-3 Assessment of Significance Matrix (Amended from 'NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes')

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

8.2.8 Significance of Residual Effects

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

8.3 Consultation

Significant consultation regarding the overall Dublin Port Masterplan 2040, reviewed 2018, and the MP2 Project has been completed with the local community, An Bord Pleanála, Dublin City Council and various other Statutory Bodies (see Chapter 5 Scoping and Consultation). No concerns with regard to contaminated land were raised.

8.4 Receiving environment

8.4.1 Solid Geology

The bedrock geology anticipated in the vicinity of the site is shown on Figure 8-1. The entire Dublin area is underlain by the Lucan Formation. The formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are also rare, dark, coarser grained, calcarenitic limestones, which are sometimes graded, present. The formation ranges from 300m to 800m in thickness and is Carboniferous.

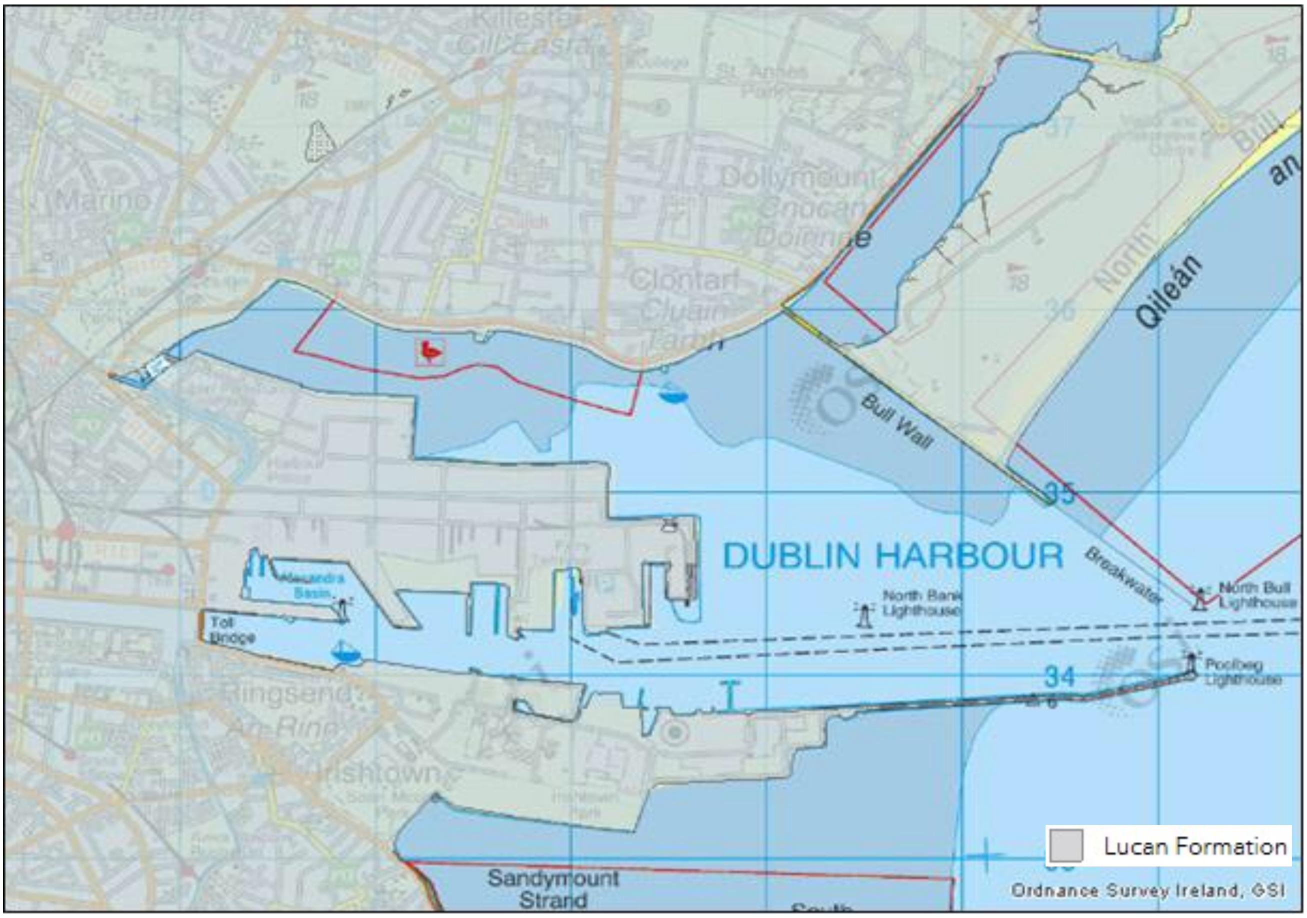

Figure 8-1 Solid geology (taken from GSI's Spatial Resources portal)

8.4.2 Drift Geology and Recent Deposits

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

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

As shown on Figure 8-2, the site is anticipated to be underlain by made ground. Dublin Port is located entirely on made ground (fill deposits).

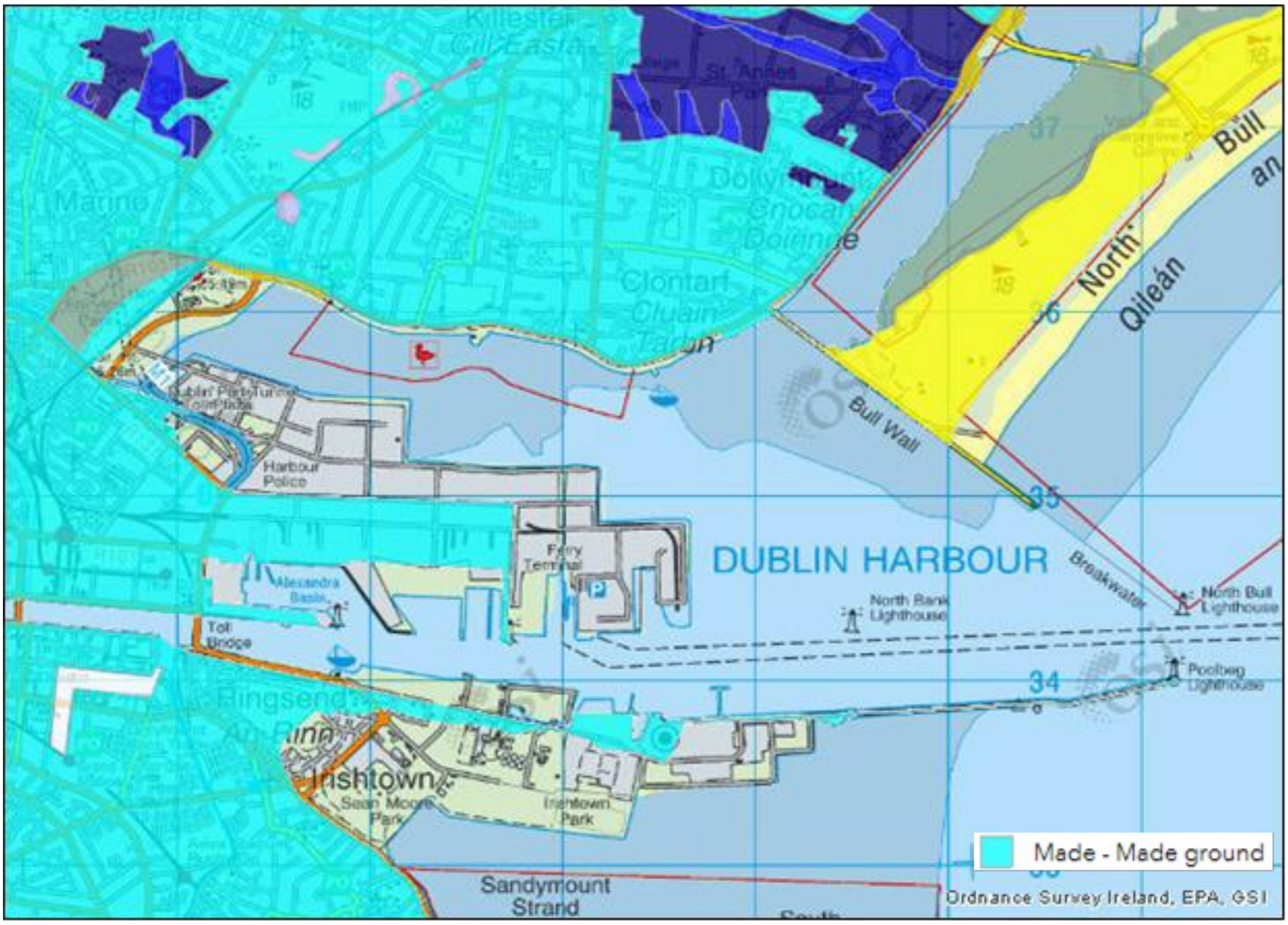

Figure 8-2 Drift geology (taken from GSI's Spatial Resources portal)

8.4.3 Hydrogeology

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

The Lower Carboniferous rocks that underlie the region have been classified by the Geological Survey of Ireland as "Locally Important Aquifer, bedrock which is moderately productive only in local zones" (Figure 8-3). These locally productive zones are due to the presence of more permeable strata that are encountered in different parts of the outcrop area due to substantial faults, fractures or fissures. The limited groundwater movement within the rock tends to be restricted to the weathered horizons or to non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and low potential yield.

The Quaternary drift is considered the principal medium for groundwater movement in the area. The infiltration capacity of the clay deposits would be limited due to their low permeability and hence groundwater movement is likely to be confined to the fluvio-glacial sand and gravel deposits that overlie the clays. The potential importance of the Quaternary drift deposits as a groundwater resource is a function of their permeability, thickness and extent. The low permeable fine grained glacial clays represent aquitards that limit infiltration and restrict recharge to bedrock aquifers when sufficiently thick. The overlying fluvio-glacial sand and gravel deposits represent material with a significantly higher permeability. Consequently these deposits have a high potential recharge and storage capacity.

It is generally expected that groundwater levels beneath the site will remain close to sea level and may exhibit tidal variation. Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply.

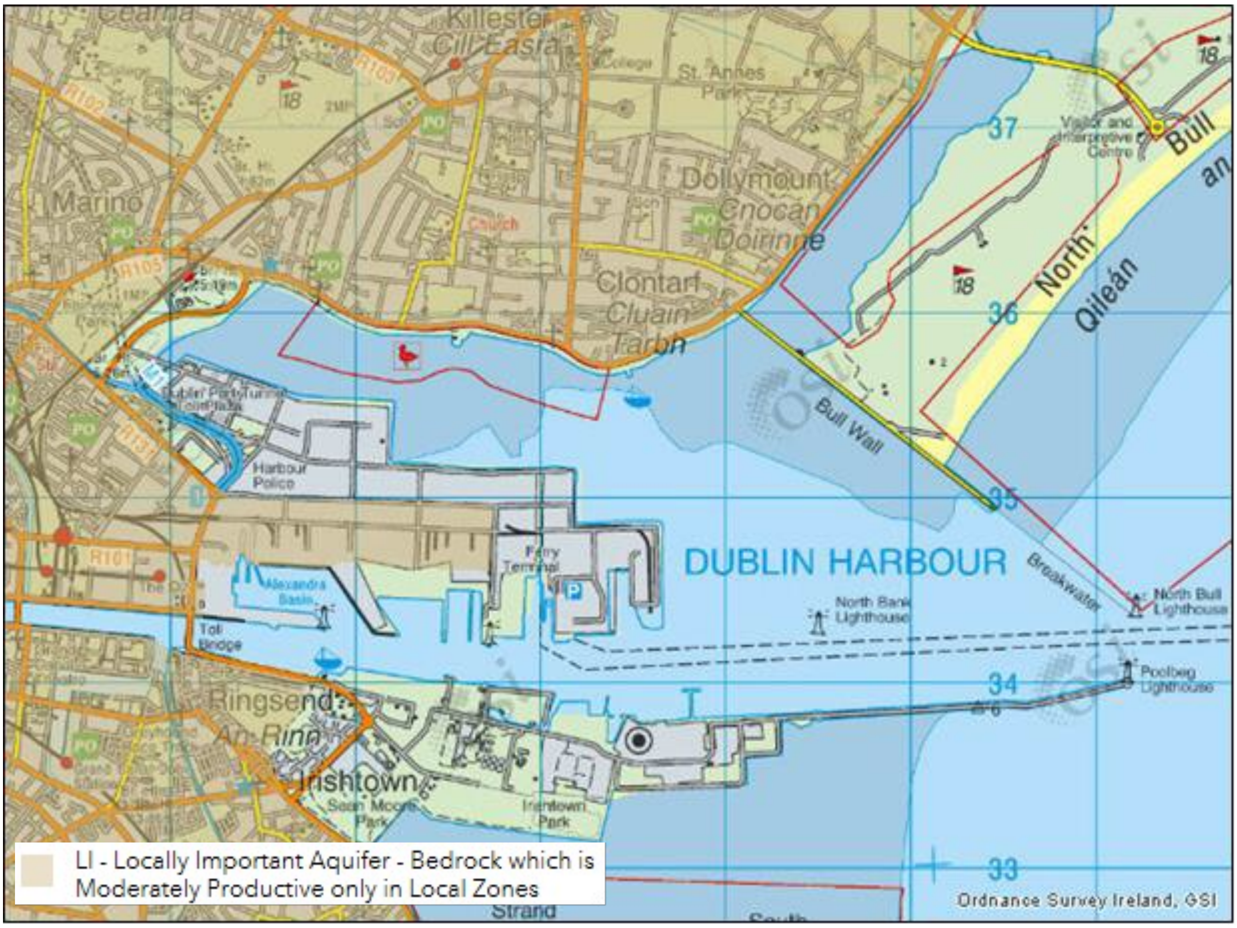

Figure 8-3 Groundwater aquifer (taken from GSI's Spatial Resources portal)

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

The site falls within an area of low groundwater vulnerability. A groundwater borehole of unknown use is present to the north west of the site.

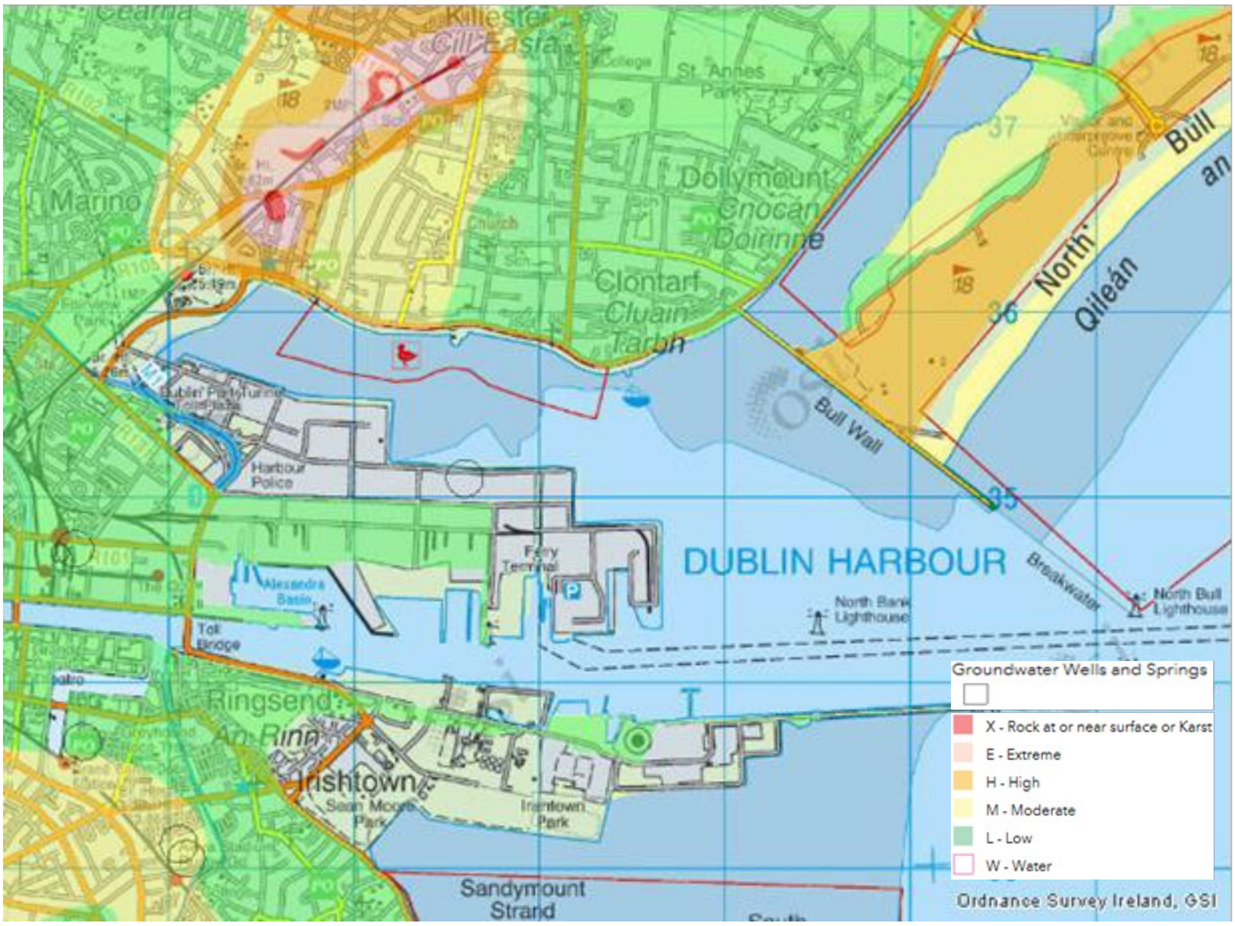

Figure 8-4 Groundwater vulnerability (taken from GSI's Spatial Resources portal)

Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply.

The South Dublin Bay and River Tolka Estuary SPA is present directly north and west of the site. The River Liffey is present directly south of the site. The Dodder River flows into the River Liffey just west of Tom Clarke Bridge.

The Tolka Estuary and Liffey Estuary Lower are noted to be 'of risk' and of moderate status on the EPA map viewer. The Liffey Estuary Lower is noted to be unpolluted for the 2010-2012 reporting period, while the Tolka Estuary is noted to be potentially eutrophic for the same period. The Dublin groundwater body is noted to be 'not at risk' and of good status.

Tolka Estuary and the Liffey Estuary are classified as nutrient sensitive estuaries under the Urban Waste Water Treatment Directive Sensitive Area. North Dublin Bay and South Dublin Bay are proposed Natural Heritage Areas.

8.4.4 Geological Heritage Areas

The South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present directly north and west of the site. Tolka Estuary and the Liffey Estuary are classified as nutrient sensitive estuaries under the Urban Waste Water Treatment Directive Sensitive Area. North Dublin Bay and South Dublin Bay are proposed Natural Heritage Areas.

8.4.5 Licenses and Permits

Dublin Port Company has obtained an Industrial Emission licence (IEL) (licence number P1022-01) in respect of the existing Sea Truck terminal site. The existing Seatruck terminal area is also identified as an Integrated Pollution Prevention and Control facility. In addition, Indaver Ireland Limited has a licensed hazardous waste facility (ref. W0036-02) to the north of Tolka Quay Road (just north west of its junction with Breakwater Road South).

8.4.6 Site Investigation

As discussed within the GQRA Report (Appendix 8-2), a site investigation was undertaken by Causeway Geotech Ltd during August 2018 under the supervision of RPS personnel. The locations of the exploratoryholes are presented in Figure 8-5.

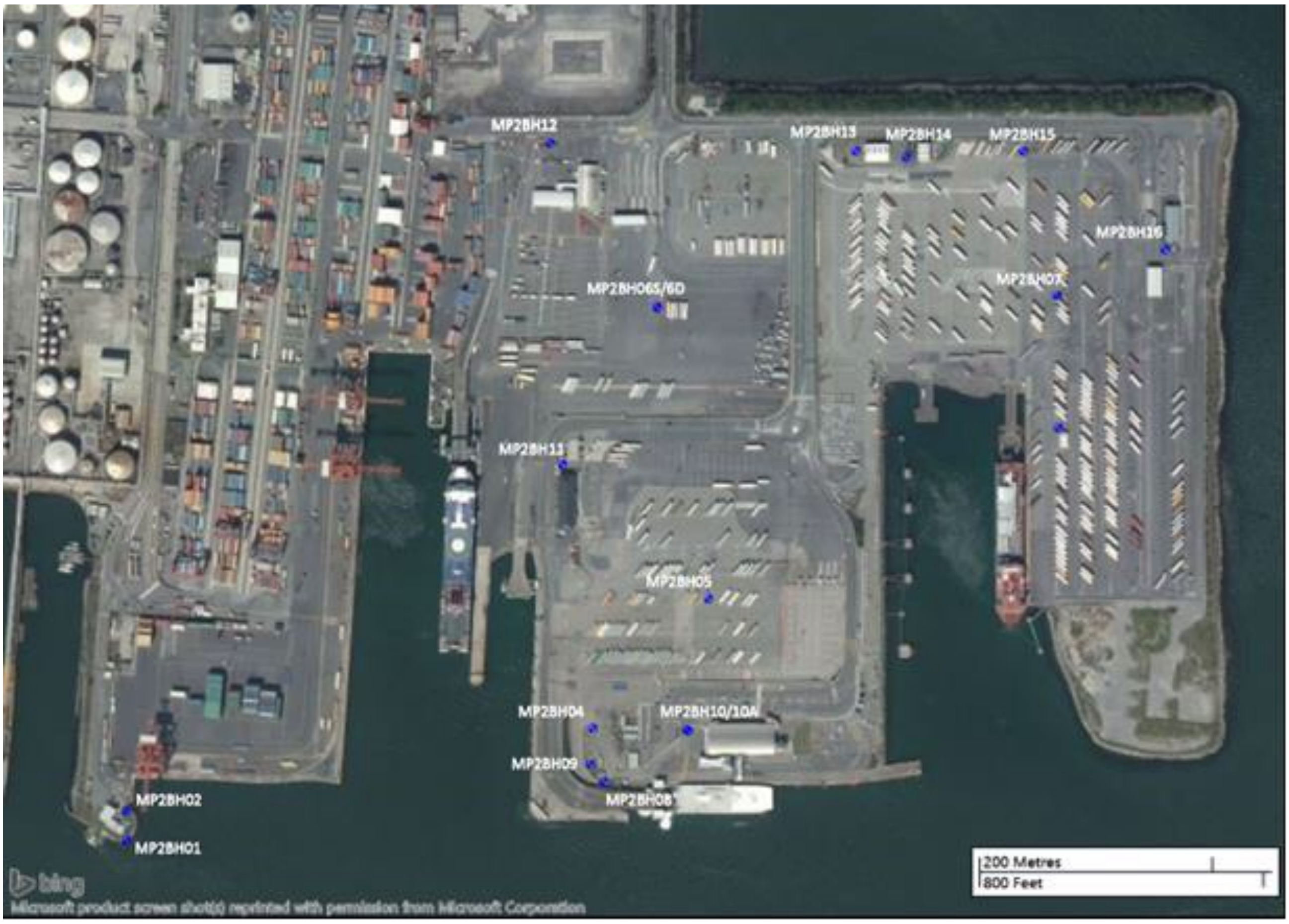

Figure 8-5 Site investigation locations (taken from Causeway Geotech Report 18-0795)

The boreholes were used to provide information on ground conditions and soil and groundwater quality. They were positioned for the following reasons:

- BH01-BH02 – boreholes taken to 8.8m below ground level (bgl) and 4.8m bgl respectively which provides information on the ground conditions and soil and groundwater quality within the area surrounding Dublin Port VTS. This area is to be removed as part of the MP2 Project.
- BH04 – deep borehole to 12m bgl which provides information on ground conditions and soil and groundwater quality (dual installation) in proximity to the existing fuel storage area within the Irish Ferries terminal.
- BH05 – borehole complete at 0.3m bgl due to presence of thick concrete.
- BH06D – deep borehole to 12m bgl which provides information on ground conditions and soil and groundwater quality (dual installation) in the general site area.
- BH06S – borehole taken to 1.8m bgl which provide information on ground conditions and soil quality
- BH06SA – redrill of BH06S taken to 1.4m bgl.
- BH07 – borehole taken to 2m bgl which provides information on ground conditions and soil and groundwater quality adjacent to an existing substation within the Seatruck terminal.
- BH08 - borehole taken to 5m bgl which provides information on ground conditions and soil and groundwater quality adjacent to an existing substation within the Irish Ferries terminal.
- BH09 – borehole taken to 1m bgl which provides information on ground conditions and soil and groundwater quality adjacent to existing fuel storage within the Irish Ferries terminal.
- BH10 – terminated at 0.5m bgl on a concrete obstruction.
- BH10A – terminated at 0.5m bgl on a concrete obstruction.
- BH11 - borehole taken to 2.1m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage adjacent to the Irish Ferries passenger terminal.
- BH12 - borehole taken to 6.0m bgl which provides information on ground conditions and soil and groundwater quality adjacent to existing fuel storage adjacent to the Stenaline passenger terminal.
- BH13 – borehole taken to 6.0m bgl which provides information on ground conditions and soil and groundwater quality in proximity to the garage located on the Seatruck terminal.
- BH14 – borehole taken to 4.75m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage located on the Seatruck terminal.
- BH15 – borehole taken to 5.2m bgl which provides information on ground conditions and soil and groundwater quality in proximity to an existing substation located within the Seatruck terminal.
- BH16 – borehole taken to 5.0m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage adjacent to the Seatruck main office building.
- BH17 – terminated at 1.1m bgl on a concrete obstruction.

8.4.7 Site Specific Soils and Geology

The ground conditions indicated by the exploratory investigations are described in the exploratory hole logs presented in Appendix 8-2 and are briefly summarised below.

The site investigation logs indicate that the site is underlain by the following general sequence:

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

8.4.7.1 Made Ground

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

8.4.7.2 Gravel

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

8.4.7.3 Sand

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

8.4.7.4 Clay

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

8.4.7.5 Gravel

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

8.4.7.6 Groundwater

Groundwater strikes were recorded during the site investigation; the measurements are presented in Table 8-4Table 8-4 Groundwater Strikes during Site Investigation

Table 8-4 Groundwater Strikes during Site Investigation

Exploratory Hole	Depth of Water Strikes (m bgl)	Summary of Ground Conditions
BH04	Strike at 4.2m bgl	MADE GROUND: Black slightly silty subangular to subrounded fine to coarse GRAVEL with fragments of brick and concrete
BH06D	Strike at 3.2m bgl	MADE GROUND: Dense brownish black sandy silty subangular to subrounded fine to coarse GRAVEL with fragments of red brick and concrete. Sand is fine to coarse.
BH08	Strike at 3.8m bgl, rose to 3.4m after 20 minutes	MADE GROUND: Very soft grey sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular
	Strike at 4.8m bgl, rose to 4.6m after 20 minutes	MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of concrete and low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular
BH12	Strike at 4.0m bgl, rose to 3.6m after 20 minutes	MADE GROUND: Dark grey gravelly fine to medium SAND with low cobble content. Sand is fine to medium. Gravel is subangular fine. Cobbles are subrounded
	Strike at 5.3m bgl, rose to 5.0m after 20 minutes	MADE GROUND: Grey gravelly fine to coarse SAND with low cobble content. Gravel is subrounded fine to medium. Cobbles are subrounded.
BH13	Strike at 3.0m bgl, rose to 2.9m after 20 minutes	MADE GROUND: Very soft brownish grey sandy slightly gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subangular fine to medium. Cobbles are subrounded.
	Strike at 5.0m bgl, rose to 4.3m after 20 minutes	MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of timber with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium.
BH14	Strike at 4.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Brownish blue sandy slightly silty subangular fine to medium GRAVEL with low cobble content and fragments of timber. Sand is fine to coarse.
	Strike at 5.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Brownish blue sandy slightly silty subangular fine to medium GRAVEL with low cobble content and fragments of timber. Sand is fine to coarse.
BH15	Strike at 4.4m bgl	MADE GROUND: Firm to stiff brownish blue slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to medium.
BH16	Strike at 4.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Blueish brown sandy silty angular fine to medium GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.
	Strike at 5.0m bgl, rose to 4.6m after 20 minutes	MADE GROUND: Blueish brown sandy silty angular fine to medium GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.

A single 50mm HDPE groundwater monitoring standpipe was installed in boreholes MP2BH01, MP2BH02, MP2BH07, MP2BH09 and MP2BH11-MP2BH17. Dual installations; one targeting the shallow groundwater body and other the deeper groundwater body, were installed in boreholes MP2BH04 and MP2BH06D. Details of the installations, including the depth range of the response zone, are provided in the GQRA Report (Appendix 8-2).

The groundwater level measurements were recorded on one instance; the results are presented in Table 8-5. Groundwater is likely to be tidally influenced in proximity to the River Liffey.

Table 8-5 Groundwater Monitoring Levels

Exploratory Hole	Ground Level (m OD)	22.08.2018 – 23.08.2018	
		Water Depth (m bgl)	Water Level (m CD)
BH01	3.52	2.77	0.75
BH02	3.47	3.23	0.24
BH04S	3.11	2.85	0.26
BH04D	3.11	1.77	1.34
BH06S	3.68	3.10	0.58
BH06D	3.68	3.35	0.33
BH07	3.29	Dry	Dry
BH08	3.24	2.35	0.89
BH09	3.17	Dry	Dry
BH11	3.65	No access	No access
BH12	3.56	3.15	0.41
BH13	3.60	2.82	0.78
BH14	3.45	2.90	0.55
BH15	3.65	2.10	1.55
BH16	3.35	3.15	0.20

8.4.8 Sub Soil Contamination

Environmental soil samples were taken at regular intervals throughout the length of the excavation of each test location across the site. The protocol observed during the recovery of samples followed the guidance set out in BS 10175:2011 the Code of Practice for the Investigation of Potentially Contaminated Sites. The borehole logs are contained within the GQRA Report (Appendix 8-2) and the test locations are highlighted within Figure 8-5

8.4.8.1 Laboratory Analysis

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

Seven soil samples were also analysed via leachate analysis. As per the EA Remedial Targets Methodology, the Level 1 screen examines the potential for contaminants to leach from soil to soil pore water. The compliance point utilised is the soil pore space and as such, is the most conservative compliance point as it does not take into account attenuation and dilution within the aquifer.

Speciated TPH analysis was undertaken to provide a better understanding of the ‘make up’ of the hydrocarbon contamination in relation to the specific carbon banding, as suggested within the ‘Total Petroleum Hydrocarbon Criteria Working Group’ (TPH-CWG) literature and recommended by the Environment Agency document P5-080/TR3 ‘The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbon in Soil’.

8.4.8.2 Human Health Risk Assessment

As per the methodology outlined within Section 8.1.2, a human health risk assessment was undertaken on the risk posed by potential ground contamination to future site users. Due to the nature of the MP2 Project development proposals all the soil samples have been screened against generic values derived for a commercial end use.

8.4.8.3 Soil Contamination

All contaminants returned concentrations below their respective screening values for a commercial end use.

Although no screening value is currently available for Lead, elevated concentrations of 1,100 mg/kg and 1,600 mg/kg were identified at BH16 (1m bgl) and BH01 (2m bgl) respectively. In addition, asbestos was identified in 2 soil samples, as demonstrated in Table 8-6.

Table 8-6 Presence of asbestos in soil samples

Exploratory Hole	Depth(m bgl)	Asbestos Type	ACM type
BH04D	1.0	Amosite Chrysotile	Fibres/clumps
BH16	1.00	Chrysotile	Fibres/clumps

8.4.9 Groundwater contamination

Upon completion of the intrusive site investigation, groundwater samples were taken from BH01, BH02, BH04S, BH04D, BH06S, BH06D, BH08, BH12, BH13, BH14, BH15 and BH16. Surface water samples were taken from SW1, SW2 and SW3. All water samples were taken in August 2018 and were analysed for a range of potential contaminants including: Metals, Phenols, TPH-CWG, PAHs (16 USEPA Speciated), PCBs, SVOCs and VOCs.

As shown in Table 8-7 the samples show some exceedances of the screening values

Table 8-7 Groundwater contaminant concentrations exceeding screening values

Contaminant	Screening Value	Exceeding Concentrations	Exceeding Concentrations
Nitrate as N	0.375 mg/l (Groundwater Regs 2016)	2.1 mg/l	BH12
Orthophosphate as PO4	0.03 mg/l (EPA IGV 2003)	0.071-3.8 mg/l	All locations
Arsenic	7.5 µg/l (Groundwater Regs 2016)	9.6-55 µg/l	BH01, BH02, BH04S, BH04D, BH06S, BH06D, BH08, BH13, BH15, BH16, SW1, SW2, SW3
Barium	100 µg/l (EPA IGV 2003)	160-340 µg/l	BH04D, BH06S, BH06D, BH13, BH14
Boron	1000 µg/l (EPA IGV 2003)	1700-2000 µg/l	BH06S, BH06D
	2400 µg/l (WHO 2011)	2500-3500 µg/l	BH01, BH02, BH04S, BH04D, BH08, BH15, BH16, SW1, SW2, SW3
Copper	30 µg/l (EPA IGV 2003)	37-510 µg/l	BH01, BH02, BH04S, BH04D, BH06S, BH06D, BH08, BH15, BH16, SW1, SW2, SW3
Chromium (total)	37.5 µg/l (Groundwater Regs 2016)	42-150 µg/l	BH01, BH02, BH04S, BH08, BH16, SW1, SW2, SW3
Iron	200 µg/l (EPA IGV 2003)	210-1500 µg/l	All locations
Lead	1.3 µg/l (Surface water Regs 2016)	6 µg/l	BH06D, BH15
Manganese	50 µg/l (EPA IGV 2003)	150-1500 µg/l	BH04D, BH06S, BH06D, BH12, BH13, BH14, BH15
Nickel	8.6 µg/l (Surface water Regs 2016)	12-15 µg/l	BH04D, BH06S, BH15
Selenium	40 µg/l (WHO 2011)	75-160 µg/l	BH04S, BH04D, BH06S, BH06D, BH08, BH15, SW2, SW3
Zinc	75 µg/l (Groundwater Regs 2016)	80-210 µg/l	BH04S, BH04D, BH08, BH15, SW2
Drinking Water Standards	Groundwater/surface water Regulations		EPA Interim Guideline Values (2003)

The EPA Interim Guideline Values were produced in 2003 and are guideline values only. The interim guideline value chosen was the GSI Trigger Value (background concentration) where it applied, and where it did not apply the most stringent value of the:

- The Drinking Water Standard
- The EQS for the Aquatic Environment/ Dangerous Substances, where appropriate

In many cases these IGVs are therefore potentially outdated or based on Drinking Water Standards. It is therefore considered that exceedances of the groundwater or surface water regulations are more pertinent to this assessment. The exceedances of the IGVs for Orthophosphate as PO4, Barium, Boron, Copper, Iron and Manganese are therefore not considered in any more detail in this assessment as the IGVs are superseded by the Groundwater and Surface water regulations.

Exceedances of the Drinking Water Standards are not considered relevant as groundwater in the vicinity of the site is not used as a potable water supply. No risk to human health exists from Boron or Selenium and as such they are not considered in any more detail in this assessment.

Exceedances of the groundwater/surface water regulations were recorded for Nitrate as N, Arsenic, Chromium (total), Lead, Nickel and Zinc.

8.4.10 Sediment Chemistry

Capital dredging is required to create the following elements of the MP2 Project, described previously in Chapter 3.2. The estimated volume of marine sediments to be dredged is circa 424,644m^3.

- Channel widening to -10.0m CD;
- An approach channel and berthing pocket at Berth 53 dredged to -10.0m CD;
- A berthing pocket at Berth 50A dredged to -11.0m CD;
- A berthing pocket at Oil Berth 3 dredged to -13.0m CD.

In order to determine the suitability of the marine sediments for disposal at sea, the Marine Institute prepared a Sampling and Analysis Plan (SAP) specifying the sample locations, depths and contaminants to be tested. A total of 30 samples were required to be tested at locations presented in Figure 8-6.

In August 2018, an intrusive marine ground investigation was undertaken by Fugro Geoservices Ltd to collect the sediment samples for laboratory analysis in accordance with the SAP. The sediment samples were sent to National Laboratory Services (NLS) in the UK for sediment chemistry analysis.

The marine sediments can be described as a sandy CLAY with pockets of gravel. No rock is required to be dredged to achieve the design depths of the channel widening and berthing pockets.

The marine sediments were classified by comparing the sediment chemistry results against the upper and lower action limits set in the *Marine Institute Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters (2006)* - Refer to Table 8-8 and

Table 8-9. The lower action levels for Arsenic and Nickel have recently been changed by the Marine Institute to take account of the natural background concentrations of these elements in Irish marine sediments. The most up to date lower action limits have been used in the analysis.

Table 8-8 Sediment Quality Classification (Marine Institute 2006)

Class	Description
Class 1	• Contaminant concentration less than the Level 1 Lower Level Values • Uncontaminated: no biological effects likely
Class 2	• Contaminant concentrations between Level 1 and Level 2 Values • Marginally contaminated; • Further sampling & analysis necessary to delineate problem area, if possible
Class 3	• Heavily contaminated; • Very likely to cause biological effects / toxicity to marine organisms. • Alternative management options to be considered

Table 8-9 Parameters and proposed guidance values for sediment quality (Marine Institute 2006)

Parameter	Units (Dry Wt)	Action Level 1 (Lower Level Value)	Action Level 2 (Upper Level Value)
Arsenic	mg kg^{-1}	20*****	70
Cadmium	mg kg^{-1}	0.7	4.2
Chromium	mg kg^{-1}	120	370
Copper	mg kg^{-1}	40	110
Lead	mg kg^{-1}	60	218
Mercury	mg kg^{-1}	0.2	0.7
Nickel	mg kg^{-1}	40*****	60
Zinc	mg kg^{-1}	160	410
Σ (TBT + DBT)	mg kg-1	0.1	0.5
g-HCH (Lindane)	µg kg^{-1}	0.3	1
PCB (individual congenerof ICES 7)	µg kg^{-1}	1	180
Σ (7 PCBs)	µg kg^{-1}	7	1260
Hexachlorobenzine	µg kg^{-1}	0.3	1
Σ (16 PAH)	µg kg^{-1}	4000	-
Total Extractable Hydrocarbons (TEH)	g kg^{-1}	1	

Note: * Revised Lower limits for Arsenic and Nickel
Class 1 Sediments – Contaminant concentrations below the Level 1 Lower Level Values
Class 2 Sediments – Contaminant concentrations between the Lower and Upper Level Values
Class 3 Sediments – Contaminant concentrations above the Level 2 Upper Level Values

A summary of the sediment chemistry results is provided below. The sediment chemistry results and comparison tables for all sampling stations is presented in Appendix 8-3.

Channel widening

Six samples were taken within the area to be dredged (S12, S14, S15, S17, S19 and S25).

- Samples 15 and 19 returned contaminant concentrations below Action Level 1 for all contaminants
- Sample 12 returned a TEH and PCB 028 concentration marginally above the Lower Action Level
- Samples 14 and 25 returned a TEH concentration marginally above the Lower Action Level
- Sample 17 returned Lead (63.3mg/kg) and TEH concentrations marginally above the Lower Action Level
- None of the seven samples returned concentrations above the Upper Action Level.

Approach channel and berthing pocket at Berth 53

Five samples were taken in the vicinity of the approach channel and berthing pocket at Berth 53 (S18, S21, S27, S29 and S30).

- Samples 18, 21 and 27 returned contaminant concentrations below Action Level 1 for all contaminants
- Sample 29 returned a TEH concentration returned a TEH concentration marginally above the Lower Action Level
- Sample 30 returned a Nickel concentration of 61.8mg/kg which is above the Upper Action Level of 60mg/kg and a TEH concentration marginally above the Lower Action Level

Note: The sediment chemistry at Sample Location S30 has a high level of Nickel (Class 3) making it unsuitable for disposal at sea. The likely cause of the contamination is historic disposal of cables at this location. The MP2 Project has been engineered to avoid the requirement for capital dredging at this location.

Oil Berth 3 & Berth 50A

Seven samples were taken in the vicinity of Oil Berth 3 & Berth 50A (S31, S32, S33, S34, S35, S36, and S37).

- Samples 31 and 35 returned contaminant concentrations below the Lower Action Level for all contaminants
- Samples 32 and 33 returned TEH concentrations marginally above the Lower Action Level
- Samples 36 and 37 returned Cadmium concentrations (0.8mg/kg) marginally above the Lower Action Level
- Sample 34 returned a slightly higher Cadmium concentration (1.9mg/kg) above the Lower Action Level
- None of the seven samples returned concentrations above the Upper Action Level.

Marine Institutes interpretation of sediment chemistry results

The full results of the sediment chemistry sampling and analysis were provided to the Marine Institute who examined the results in detail in combination with other relevant data held by the Marine Institute. The Marine Institute confirmed that they would have no objection to the disposal of this sediment at the licensed offshore disposal site located at the approaches to Dublin Bay west of the Burford Bank. The marine sediments can therefore be classified as Class 1 (Uncontaminated: no biological effects likely).

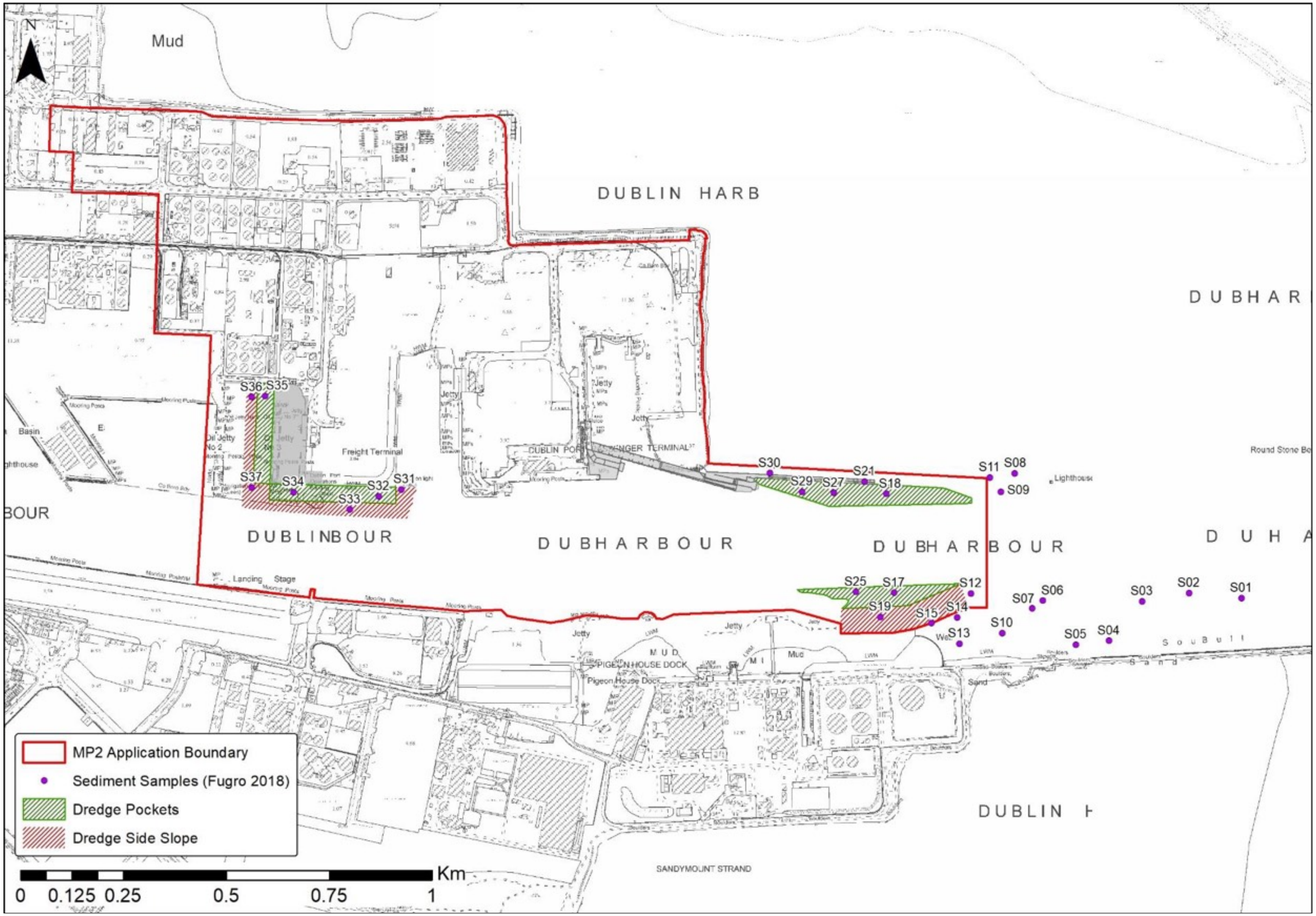

Figure 8-6 Marine Sediment Sampling locations

8.5 Construction Impacts

As outlined in Chapter 3 Project Description, the development will be phased over a number of years and will comprise both landside and marine works.

8.5.1 Soils and Geology

8.5.1.1 Demolition Works

Demolition of the following will be undertaken as part of the MP2 Project; Terminal 2 Building, Terminal 5 Building, Terminal 5 Check in, Terminal 5 Sheds (3 no.) and Terminal 1 Car Check in booths. No significant land based earthworks will be required for these demolitions. As part of these demolition works, fuel storage tanks located at Terminal 2 and 5 and Terminal 5 sheds will be removed. This will remove potential sources of contamination from these areas.

The construction and demolition waste (CDW) from the demolition of these buildings may be re-used as backfill in Oil Berth 4. This is discussed further in Chapter 17- Waste.

The demolition and removal of the Calor gas offices and maintenance shed, the warehouse building in the north of the site and the Irish Ferries freight check in building are subject to a separate application as described in Chapter 3 Project Description.

The existing Port Operations Centre and the tip of land at the end of Breakwater Road South will be demolished and removed. The removed material will be disposed off-site at an appropriately licensed landfill facility.

The impact to soils and geology from demolition work is considered to be **Neutral**.

8.5.1.2 Infill of Oil Berth 4

Oil Berth 4 will be infilled with imported engineering fill material. The impact to soils and geology from the infilling is considered to be **Neutral.**

8.5.1.3 Piling

Piling will be required for the construction of Berths 52 and 53 and for the construction of combi piled walls. The impact to soils and geology from the piling is considered to be **Neutral.**

8.5.1.4 Dredging

Dredging will be required for the MP2 Project as described in Chapter 3 Project Description. The impact to soils and geology from dredging works is considered to be **Neutral.**

8.5.2 Hydrogeology

8.5.2.1 Demolition Works

As part of the demolition works, fuel storage tanks located at Terminal 2 and 5 and Terminal 5 sheds will be removed. This will remove potential sources of hydrocarbon contamination from these areas and remove the potential for hydrocarbon contamination to impact upon groundwater quality. The ground investigation and assessment indicated that groundwater beneath the site has not been impacted by hydrocarbon contamination.

The impact to hydrogeology from demolition work is considered to be **Neutral.**

8.5.2.2 Piling

Piling will be required for the construction of the Berths 52, 53, 50A and Oil Berth 3. Given that the piling will predominantly be undertaken in the marine environment, the potential for creating preferential pathways for contamination to migrate to deeper groundwater is minimal. In addition, no significant soil sources of contamination were identified within the GQRA (See Appendix 8-2).

The impact to hydrogeology from the piling is considered to be **Neutral.**

8.5.2.3 Dredging

Dredging will occur in the marine environment and therefore the impact to hydrogeology is **Neutral.**

8.6 Operational Impacts

8.6.1 Soils and Geology

As part of the contamination assessment (Appendix 8-2), the Conceptual Site Model (CSM) developed for the site did not identify any soil source-pathway-receptors linkages in relation to human health and therefore the risk to human health (future site workers and site users) from sub-soil contamination is considered to be negligible. In addition, the site will be covered in concrete hardstanding which acts as a barrier to subsoils.

The demolition and removal of a number of potential sources of contamination including fuel storage tanks will reduce the potential for hydrocarbon contamination to impact upon the quality of subsoils beneath the site.

The operational impact to soils and geology is considered to be **Neutral.**

8.6.2 Hydrogeology

The groundwater beneath the site has been impacted predominantly by metal contamination. However it is noted that surface water samples identified similar contamination indicating that the monitoring results are indicative of the baseline groundwater and surface water quality across the Dublin Port area. No significant hydrocarbon or Polycyclic Aromatic Hydrocarbon (PAHs) contamination was noted within the samples.

The operational phase of the development will not introduce significant new sources of potential groundwater contamination. As stated in Section 8.6.1 above, the removal of a number of potential contamination sources will reduce the potential for hydrocarbon contamination to impact upon the quality of groundwater beneath the site.

The overall hydrogeology impact from operation of the development is considered to be **Neutral.**

8.7 Remedial and Mitigation Measures

8.7.1 Construction Phase Mitigation Measures

The potential risk to construction workers from contaminants during the earthworks is low.

Fill material will be imported to infill Oil Berth 4. The material will be sourced from authorised quarries and will have minimal potential to introduce contamination onto the site.

Mitigation measures are outlined in Chapter 9 with respect to surface water quality.

8.7.2 Operational Phase Mitigation Measures

No specific operational phase mitigation measures with regard to soils, geology and hydrogeology are required.

Mitigation measures are identified in Chapter 9 with respect to surface water quality.

8.8 Residual Impacts

No residual impacts are predicted for either the construction or operational phase.

8.9 Cumulative Impacts

As described in Chapter 3 Project Description, there are a number of developments within the surrounding area which may interact with the MP2 Project.

8.9.1 Alexandra Basin Redevelopment (ABR) - ABP Reg. Ref. PL29N.PA0034

DPC was granted planning permission subject to conditions, on 8th July 2015, under Section 37E of the Planning and Development Act 2000 (as amended), for the redevelopment of Alexandra Basin, Berths 52 and 53 and dredging of the channel of the River Liffey together with associated works in Dublin Port.

A significant component of the ABR Project is the infilling of Berth 52/53 basin with treated sediment material dredged from Alexandra Basin West. The treatment process is subject to an Industrial Emissions (IE) License which was granted by the Environmental Protection Agency (EPA) in November 2016. Industrial Emissions License P1022-01 sets out in detail the conditions under which the treatment of dredged sediment will be managed. The license also includes details on the control of emissions to water and the monitoring required.

Given that the process is subject to an IE license and incorporates significant monitoring and control measures stipulated by the EPA, the cumulative impact on soils, geology and hydrogeology is considered to be **Neutral.**

8.9.2 Demolition of Calor Offices and Provision of Yard - Reg. Ref. 3540/18

DPC was granted planning permission on 18th October 2018 for the demolition of a single storey office buildings (785m^2); demolition of a maintenance shed building (840 m^2); demolition of reinforced concrete bund and steel tank (42m^2); demolition of boiler room building (25m^2); demolition of sections of northern boundary wall, and all associated general site clearance. The Calor office and maintenance shed building is noted to be located within the the MP2 Project application boundary but is subject to a separate application for consent. The maintenance shed and boiler room with associated fuel storage are potential sources of soil and groundwater contamination from any spillages or leaks of hydrocarbons. The removal of this infrastructure will remove this potential contamination source. The cumulative impact on soils, geology and hydrogeology is therefore considered to be **Neutral to Beneficial.**

8.9.3 Former Calor Yard and Ferry Terminals 1 and 2 – Reg. Ref. 3638/18

DPC was granted planning permission on 15th January 2019 for the upgrade of Terminal 1 and 2 facilities including consolidated vehicle check-in facilities and revised stacking and circulation arrangements. The proposed development also includes the provision of State Services facility for control and inspections of passengers and freight. The MP2 Project will not involve significant earthworks and therefore the cumulative impact on soils, geology and hydrogeology is considered to be **Neutral.**

8.10 Monitoring

No monitoring is required.

8.11 Conclusions

The assessment of 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. The investigation identified that the site is underlain by made ground, sands, gravels and clay.

Hydrogeology is the study of groundwater, including its origin, occurrence, movement and quality. The site falls within an area of low groundwater vulnerability. Groundwater was encountered within the made ground deposits and at greater depth within the sand and gravel deposits. The conceptual site model developed in the assessment has not identified any potential significant relevant pollutant linkages (RPLs) for the site.

The proposed development will not have any substantial, negative impacts on the soils, geology and hydrogeology of the area.

Sediment chemistry sampling and analysis of marine sediments to be dredged were provided to the Marine Institute who examined the results in detail in combination with other relevant data held by the Marine Institute. The Marine Institute confirmed that they would have no objection to the disposal of this sediment at the licensed offshore disposal site located at the approaches to Dublin Bay west of the Burford Bank. The marine sediments can therefore be classified as Class 1 (Uncontaminated: no biological effects likely).