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DUBLIN PORT COMPANY

Dublin Port Masterplan 2040
Reviewed 2018
Natura Impact Statement

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Natura Impact Statement

Dublin Port Masterplan 2040

Reviewed 2018

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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Review of the Dublin Port Masterplan 2012-2040

The Dublin Port Masterplan 2012 was prepared by Dublin Port Company (DPC) to guide the development of Dublin Port for the period from 2012 to 2040. It presents a vision for the future operations at the Port and critically examines how the existing land use at Dublin Port can be optimized for the merchandise trade purpose. The Dublin Port Masterplan was adopted in 2012 following an extensive public consultation, stakeholder engagement and environmental assessment process.

The almost 30 year time period covered by the Masterplan is long. Economic conditions have improved since the Dublin Port Masterplan was first published and along with economic recovery, the demand for port infrastructure is already greater than first envisaged in 2012. Accordingly, it was recognised that the Dublin Port Masterplan needed to be kept under review to ensure that it would remain relevant and achieve its central objective of providing a clear vision for the development of the Port into the future.

Since the Dublin Port Masterplan was published in 2012, there have been a number of significant developments which support its timely review. The Dublin Port Masterplan was originally produced in order to provide all of the Port's stakeholders with a clear view as to how the Port would be developed in the long-term. Now, more than five years on, there is more clarity as to how Dublin Port should be developed in order to meet the objectives set out in the Dublin Port Masterplan.

The Dublin Port Masterplan 2040 is intended to update and refine the infrastructure development options for Dublin Port and, in doing this, to ensure that the Masterplan continues to provide a fit for purpose framework for the future sustainable growth and development of Dublin Port through to 2040.

1.1.2 Screening for Appropriate Assessment

A Screening for Appropriate Assessment exercise was conducted on behalf of DPC in accordance with relevant European Commission and national guidelines. It sought to determine whether or not Likely Significant Effects (LSEs) on any European site could be discounted as a result of the proposals contained in the Masterplan 2040 Consultation Paper.

It should be noted that 'European sites' are 'Natura 2000 sites', as defined in transposing Directive 92/43/EEC into domestic legislation in Ireland [Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011)].

The possibility of LSEs upon 17 nr. European sites was considered under four impact themes – Water quality and habitat deterioration; Underwater noise and disturbance; Aerial noise and visual disturbance, and Habitat loss – using a source-pathway-receptor model.

In accordance with European Commission guidance '*Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'* (EC, 2001), the screening exercise had not taken into consideration mitigation measures designed to reduce the environmental impacts of those aspects of the Masterplan assessed.

Despite the trend of prevailing case law in domestic courts, and in the absence of a preliminary ruling by the Court of Justice of the European Union in case C-323/17 as to "*Whether, or in what circumstances, mitigation measures can be considered when carrying out screening for appropriate assessment under Article 6(3) of the Habitats Directive*?", EC (2001) provides authoritative guidance in this regard when it states at Section 2.6 that –

> *"[…] the screening assessment should be carried out in the absence of any consideration of mitigation measures that form part of a project or plan and are designed to avoid or reduce the impact of a project or plan on a Natura 2000 site."*

The possibility of LSEs upon European sites could not be discounted at the screening stage. Some development options contained in the Masterplan 2040 require the application of measures to avoid, prevent, reduce or if possible, offset significant effects in order to prevent adverse effects on European sites occurring.

Regulation 42(6) of S.I. No. 477/2011 requires that a public authority:

> *"shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site".*

Having regard to the relevant legislation and the methodology followed and conclusions of the screening stage exercise, it was concluded that a Natura Impact Statement (NIS) should be prepared to document an appropriate assessment of the implications of the Masterplan 2040 on European sites in view of their conservation objectives.

1.1.3 Objective of this Report

The objective of this report is to document an appropriate assessment of the implications of the Masterplan 2040 on European sites in view of their conservation objectives.

This NIS comprises a scientific examination and analysis conducted by RPS on behalf of DPC, to determine whether or not the Masterplan 2040 will adversely affect the integrity of any European site. This is the second test envisaged by Article 6(3) of the Habitats Directive 92/43/EEC, known as '*Appropriate Assessment*', and as set out in Section 1.2.1 of the allied Screening for Appropriate Assessment report which precedes this NIS.

This examination and analysis under Directive 92/43/EEC has been conducted in parallel with the preparation of an Environmental Report of an allied Strategic Environmental Assessment (SEA) procedure under Directive 2001/42/EC, as outlined in **Figure 1.1.**

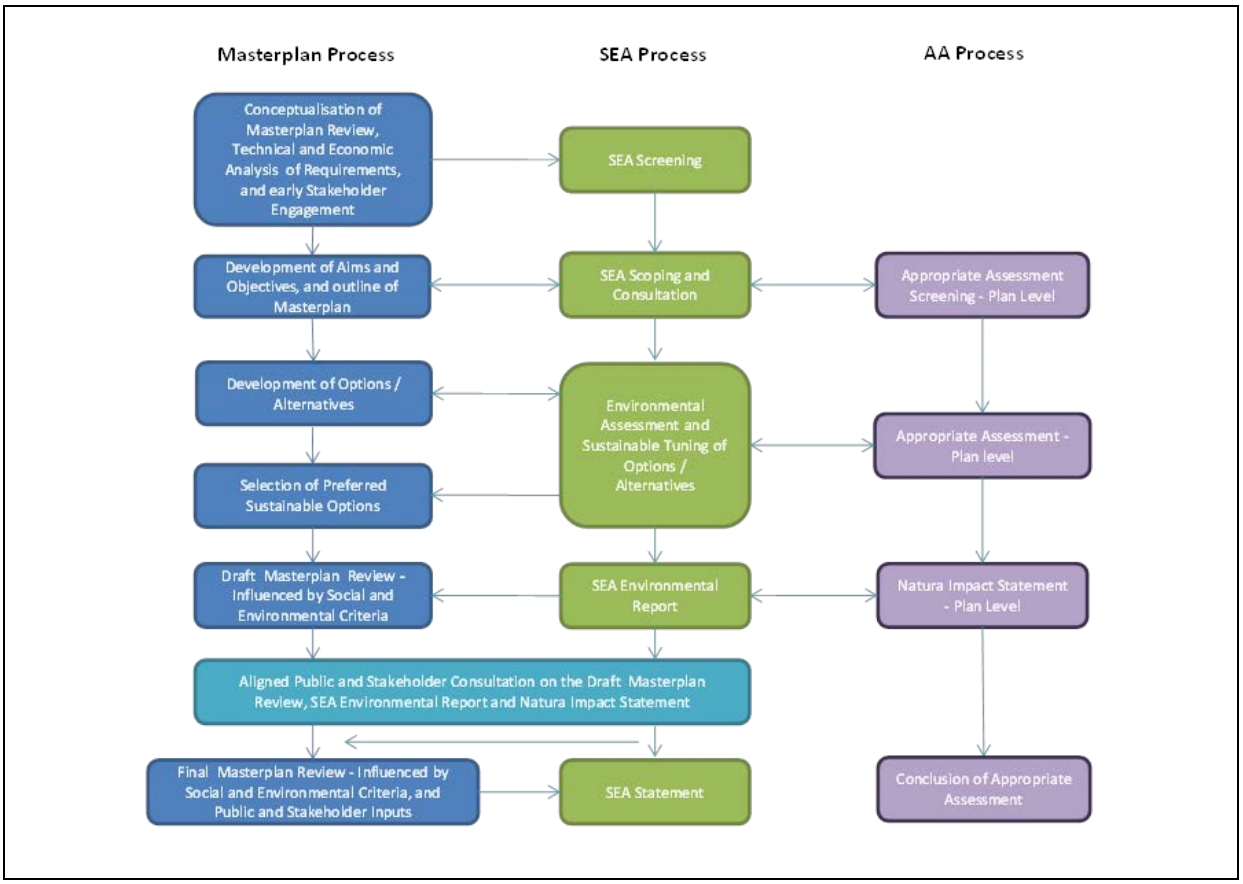

Figure 1.1 Inter-relationships between the Masterplan 2040, SEA and AA processes

The Dublin Port Masterplan 2012 and subsequent Masterplan 2040 is intended to guide the development of Dublin Port for the period from 2012 to 2040 by presenting a vision for future operations at the Port and examining how the existing land use at Dublin Port can be optimized for the commercial trade.

On this basis, the Dublin Port Masterplan or any subsequent review of the Plan, is not directly connected with or necessary to the management of any site as a European Site.

2 METHODOLOGY

This second test of appropriate assessment considers the impacts that the proposed plan will have on the integrity of European sites concerned.

European Commission guidance '*Managing Natura 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC'* (EC, 2000) advises that the integrity of a site involves its ecological functions and the decision as to whether it is adversely affected should focus on, and be limited to, the site's conservation objectives which relate to the qualifying interests of the sites.

2.1 APPROPRIATE ASSESSMENT GUIDANCE

Appropriate Assessment Guidelines for Planning Authorities have been published by the Department of the Environment Heritage and Local Government (DEHLG, 2010). In addition to the advice available from the Department, the European Commission has published a number of documents which provide a significant body of guidance on the requirements of Appropriate Assessment including EC (2000, 2001), which sets out the principles of how to approach decision making during the process. These principal national and European guidelines have been followed in the preparation this report. The following list identifies these and other pertinent guidance documents:

- Communication from the Commission on the Precautionary Principle., Office for Official Publications of the European Communities, Luxembourg (EC, 2000);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC, 2000b);
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; (EC, 2007);
- Estuaries and Coastal Zones within the Context of the Birds and Habitats Directives - Technical Supporting Document on their Dual Roles as Natura 2000 Sites and as Waterways and Locations for Ports. European Commission (EC, 2009);
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin (DEHLG, 2010a);
- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities (DEHLG, 2010b);
- Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging. European Commission (EC, 2011a);

- European Commission Staff Working Document 'Integrating biodiversity and nature protection into port development' (EC, 2011b);
- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012); and
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).

2.2 EUROPEAN SITES

Qualifying Interests of the European sites considered in this assessment are listed in **Table 2.1**. Special Areas of Conservation (SACs) described in **Table 2.1** are illustrated in **Figure 2.1**. Special Protection Areas (SPAs) described in **Table 2.1** are illustrated in **Figure 2.2**.

2.2.1 Conservation Objectives

The conservation objectives for each site are to 'maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing;
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- the conservation status of its typical species is favourable.

The favourable conservation status (or condition, at a site level) of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

2.2.2 Site-Specific Detailed Conservation Objectives

NPWS began preparing Site-Specific Detailed Conservation Objectives (SSCOs) for the Natura 2000 network of SACs and SPAs (European sites) in 2011. None of the European sites considered in this assessment had SSCOs published prior to the adoption of the Dublin Port Masterplan 2012 or its allied strategic NIS. SSCOs subsequently published for the sites listed in **Table 2.1** have been used in the preparation of this NIS. Their dates of publication are referenced in **Table 2.1**.

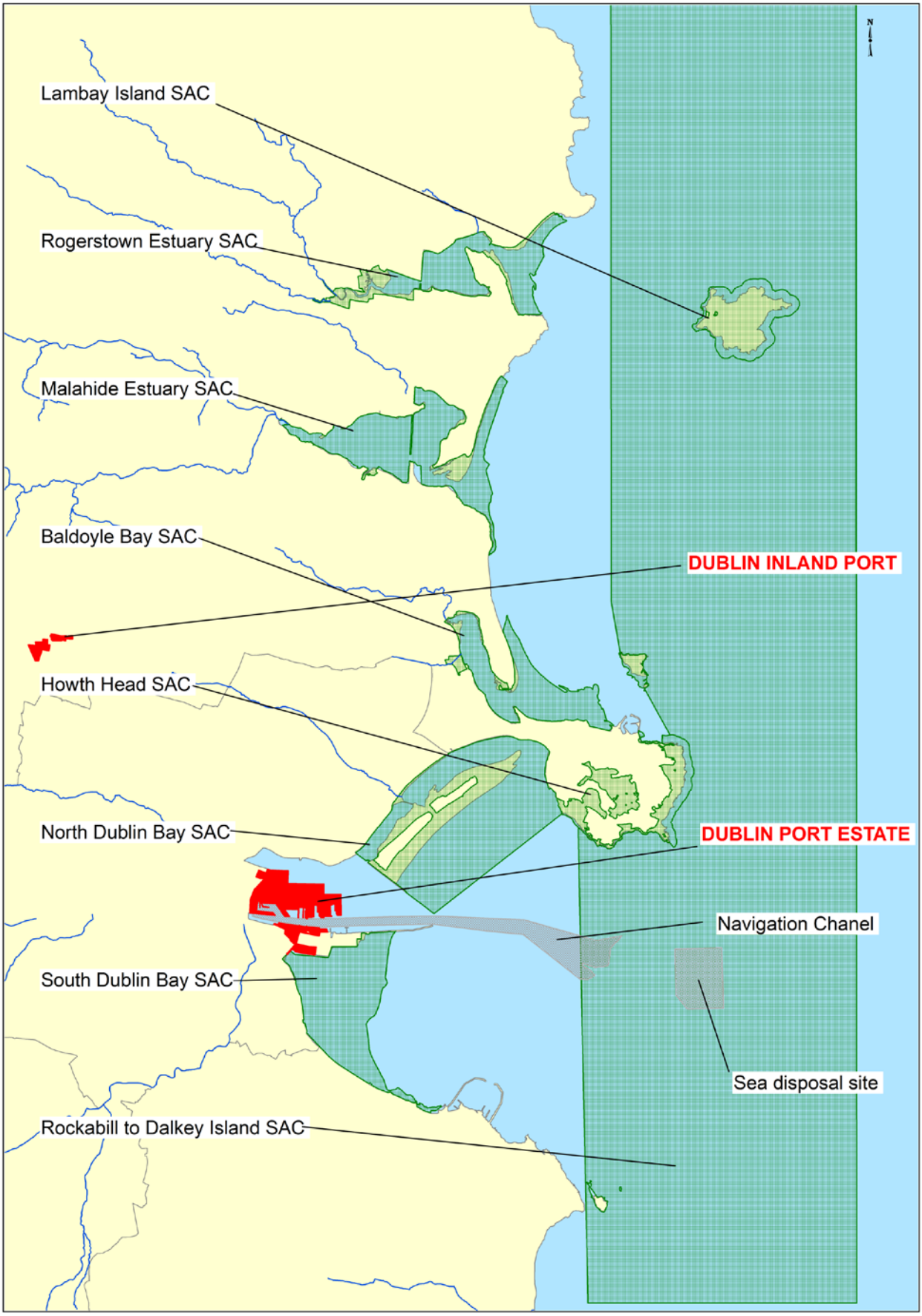

Figure 2.1 Special Areas of Conservation in proximity to Dublin Port

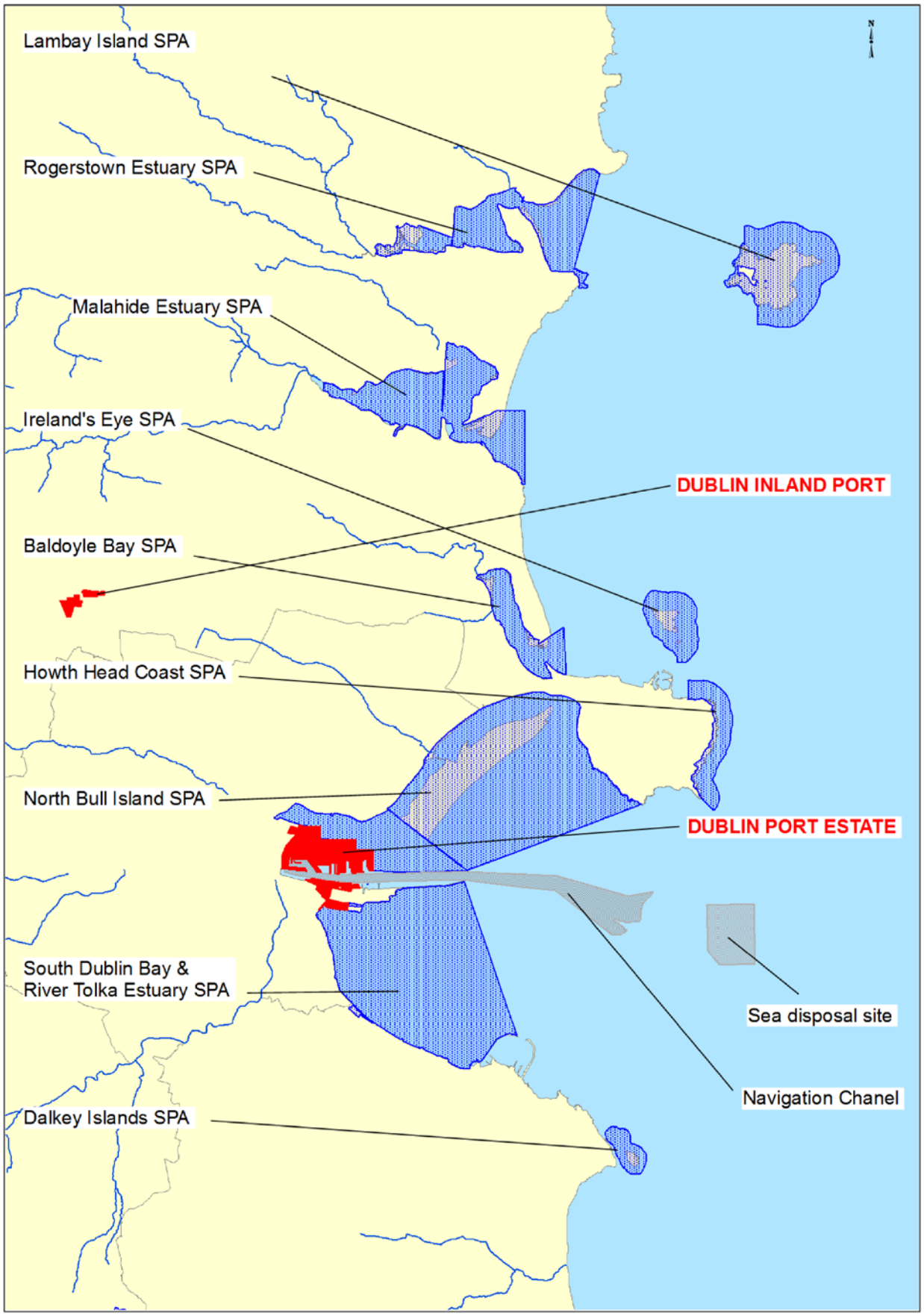

Figure 2.2 Special Protection Areas in proximity to Dublin Port

Table 2.1 Conservation objectives and Qualifying Interests of European sites considered

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
IE000204	Lambay Island SAC	**Conservation Objectives Specific Version 1.0 (22/07/13)** To maintain the favourable conservation condition of 2 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets; and of 2 no. Annex II species in the SAC, as defined by 5 no. attributes and targets. **Annex I Habitats** • Reefs [1170] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] **Annex II Species** • Grey seal (*Halichoerus grypus*) [1364] • Harbour seal (*Phoca vitulina*) [1365]	22km by sea
IE000208	Rogerstown Estuary SAC	**Conservation Objectives Specific Version 1.0 (14/08/13)** To maintain the favourable conservation condition of 7 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets. **Annex I Habitats** • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130]	24km by sea
IE000205	Malahide Estuary SAC	**Conservation Objectives Specific Version 1.0 (27/05/13)** To maintain the favourable conservation condition of 7 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets. **Annex I Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140] • *Salicornia* and other annuals colonizing mud and sand [1310] • *Spartina* swards (*Spartinion maritimae*) • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") [2120] • *Fixed coastal dunes with herbaceous vegetation ("grey dunes") [2130]	19km by sea

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
IE000199	Baldoyle Bay SAC	**Conservation Objectives Specific Version 1.0 (19/11/12)** To maintain the favourable conservation condition of 4 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets. **Annex I Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	14km by sea
IE000202	Howth Head SAC	**Conservation Objectives Specific Version 1.0 (06/12/16)** To maintain the favourable conservation condition of 2 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets. **Annex I Habitats** • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • European dry heaths [4030]	6.7km by sea
IE000206	North Dublin Bay SAC	**Conservation Objectives Specific Version 1.0 (06/11/13)** To maintain the favourable conservation condition of 9 no. Annex 1 habitat type in the SAC, as defined by a range of attributes and targets; and of 1 no. Annex II species in the SAC, as defined by 5 no. attributes and targets. **Annex I Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • *Petalophyllum ralfsii* [1395] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") [2120] • *Fixed coastal dunes with herbaceous vegetation ("grey dunes") [2130] • Humid dune slacks [2190]	2.5km by sea 11.9km downstream of Dublin Inland Port
IE000210	South Dublin Bay SAC	**Conservation Objectives Specific Version 1.0 (22/08/13)** To maintain the favourable conservation condition of 1 no. Annex 1 habitat type in the SAC, as defined by 4 no. attributes and targets. **Annex I Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140]	Site abuts Dublin Port estate

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
IE003000	Rockabill to Dalkey Island SAC	**Conservation Objectives Specific Version 1.0 (07/05/13)** To maintain the favourable conservation condition of 1 no. Annex 1 habitat type in the SAC, as defined by 3 no. attributes and targets; and of 1 no. Annex II species in the SAC, as defined by 2 no. attributes and targets. **Annex I Habitats** • Reefs [1170] **Annex II Species** • Harbour porpoise (*Phocoena phocaena*) [1351]	6.6km by sea
IE003015	Codling Fault Zone SAC	**Conservation Objectives Generic Version 5.0 (15/08/16)** Site specific COs have not been published. The generic CO is to maintain or restore the favourable conservation condition of the Annex I habitat Submarine structures made by leaking gases [1180]. Conservation attributes and targets have not been published.	33km seaward of Dublin Port
IE004024	South Dublin Bay & River Tolka Estuary SPA	**Conservation Objectives Specific Version 1.0 (09/03/15)** To maintain the favourable conservation condition of 13 no. Annex 1 species in the SPA, as defined by 2 no. attributes and targets; and of wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as measured by 1 no. attribute and target. **Special Conservation Interests** • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Grey Plover (*Pluvialis squatarola*) [A140] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Croicocephalus ridibundus*) [A179] • Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirundo*) [A193] • Arctic Tern (*Sterna paradisaea*) [A194]	Site abuts Dublin Port estate
IE004006	North Bull Island SPA	**Conservation Objectives Specific Version 1.0 (09/03/15)** To maintain the favourable conservation condition of 17 no. Annex 1 species in the SPA, as defined by 2 no. attributes and	1.2km by air

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
		targets; and of wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as measured by 1 no. attribute and target **Special Conservation Interests** • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Black-headed Gull (*Croicocephalus ridibundus*) [A179]	2.6km by sea 11.9km downstream of Dublin Inland Port 10km by air from Dublin Inland Port
IE004016	Baldoyle Bay SPA	**Conservation Objectives Specific Version 1.0 (27/02/13)** To maintain the favourable conservation condition of 6 no. Annex 1 species in the SPA, as defined by a series of attributes and targets; and of wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as measured by 1 no. attribute and target **Special Conservation Interests** • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Bar-tailed Godwit (*Limosa lapponica*) [A157]	14km by sea 6.7km by air from Dublin Port 9.8km by air from Dublin Inland Port
IE004113	Howth Head Coast SPA	**Conservation Objectives Generic Version 5.0 (15/08/16)** To maintain the favourable conservation condition of the Annex 1 species in the SPA, as defined by a series of attributes and targets	9.3km by sea 9.1km by air

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
		Special Conservation Interests • Kittiwake *(Rissa tridactyla)* [A188]	
IE004117	Ireland's Eye SPA	**Conservation Objectives Generic Version 5.0 (15/08/16)** To maintain the favourable conservation condition of the 5 no. Annex 1 species in the SPA, as defined by a series of attributes and targets **Special Conservation Interests** • Cormorant (*Phalacrocorax carbo)* [A017] • Herring Gull (*Larus argentatus*) [A184] • Kittiwake (*Rissa tridactyla*) [A188] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200]	14km by sea 9.8km by air
IE004172	Dalkey Islands SPA	**Conservation Objectives Generic Version 5.0 (15/08/16)** To maintain the favourable conservation condition of the 3 no. Annex 1 species in the SPA, as defined by a series of attributes and targets **Special Conservation Interests** • Roseate Tern (Sterna dougallii) [A192] • Common Tern (Sterna hirundo) [A193] • Arctic Tern (Sterna paradisaea) [A194]	9.3km by sea 9.1km by air
IE004025	Malahide Estuary SPA	**Conservation Objectives Specific Version 1.0 (16/08/13)** To maintain the favourable conservation condition of 14 no. Annex 1 species in the SPA, as defined by a series of attributes and targets; and of wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as measured by 1 no. attribute and target **Special Conservation Interests** • Great Crested Grebe (*Podiceps cristatus*) [A005] • Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Pintail (*Anas acuta*) [A054] • Goldeneye (*Bucephala clangula*) [A067] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (Pluvialis squatarola) [A141]	21km by sea 8.7km by air from Dublin Inland Port

Site Code	Site Name	Conservation Objectives & Qualifying Interests	Distance from Dublin Port
		• Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina alpine*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162]	
IE004015	Rogerstown Estuary SPA	**Conservation Objectives Specific Version 1.0 (20/05/13)** To maintain the favourable conservation condition of 11 no. Annex 1 species in the SPA, as defined by a series of attributes and targets; and of wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as measured by 1 no. attribute and target **Special Conservation Interests** • Greylag Goose (*Anser anser*) [A043] • Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Grey Plover (Pluvialis squatarola) [A141] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina alpine*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Redshank (*Tringa totanus*) [A162]	24km by sea 11.7km by air from Dublin Inland Port
IE004069	Lambay Island SPA	**Conservation Objectives Generic Version 5.0 (15/08/16)** To maintain the favourable conservation condition of the 10 no. Annex 1 species in the SPA, as defined by a series of attributes and targets **Special Conservation Interests** • Fulmar (*Fulmarus glacialis*) [A009] • Cormorant (*Phalacrocorax carbo)* [A017] • Shag (*Phalacrocorax aristotelis*) [A018] • Greylag Goose (*Anser anser*) [A043] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Herring Gull (*Larus argentatus*) [A184] • Kittiwake *(Rissa tridactyla)* [A188] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200] • Puffin (*Fratercula arctica*) [A204]	22km by sea 19.2km by air from Dublin Inland Port

3 THE DUBLIN PORT MASTERPLAN

3.1 BACKGROUND

Dublin Port is the largest port on the island of Ireland and is an essential link for the country's international trade and transport requirements. The Port is owned and operated by DPC, a State-owned commercial company responsible for facilitating the movement of goods and people in an efficient and cost effective manner. Dublin Port is unique in Ireland as all cargo handling activities are provided by private sector companies in competition with each other. This blend of public ownership and private operation ensures that the competing requirements of economic necessity and environmental sustainability are managed to the benefit of the city and its citizens.

The type of goods and the manner in which they are transported fall into the following main categories:

- Roll-on Roll-off (Ro-Ro): Shipping services and activities where vehicles are driven on and off ferries or other specialised ships. Dublin Port handles 86% of Ireland's Ro-Ro freight traffic. Some services are freight only; others carry a combination of freight and passengers.

- Lift-on Lift-off (Lo-Lo): Containers carrying all types of goods. These are short sea vessels that link Ireland with ports mainly in northern Europe (including Rotterdam and Antwerp) but also ports in the UK, and the Mediterranean.

- Bulk Liquid: Dublin Port handles many different bulk liquid products including petrol, diesel and kerosene, but also non-petroleum liquids such as molasses. The liquid petroleum products are discharged from tanker ships at four dedicated berths in the north port area of the Port and then pumped through a pipeline system, to their storage tanks within the Port..

- Bulk Solid: Refers to the materials that are handled in bulk (such as grain, animal feeds, fertilizer, peat moss, cement, petroleum coke, furnace slag and scrap metals). Such commodities are handled on both the north and south sides of the Port. The materials are mostly loaded and discharged by grabs operated by dock mobile cranes.

- Trade Vehicle Imports: Refers to new and pre-owned cars, trucks and other vehicles. These vehicles are transported both on specifically designed large Ro-Ro ships and (increasingly) on Ro-Ro freight ferries alongside other freight (such as trailers and containers).

- Project Cargoes: This has included the structural components for the Aviva Stadium and mainline and suburban rail carriages.

As well as being the country's largest cargo port, Dublin is also the largest passenger port with a large passenger ferry and cruise business. As a passenger gateway, for example, Dublin Port is larger than Shannon Airport.

3.2 MASTERPLAN 2012 - 2040

The Dublin Port Masterplan was prepared to guide the development of Dublin Port for the period from 2012 to 2040. It presents a vision for the future operations at the Port and critically examines how the existing land use at Dublin Port can be optimized for the merchandise trade purpose. The Dublin Port Masterplan was adopted on 26th January 2012 following an extensive public consultation, stakeholder engagement and environmental assessment process.

The Masterplan was prepared by DPC in order to:

- Plan for future sustainable growth and changes in facilitating seaborne trade in goods and passenger movements to and from Ireland and the Dublin Region in particular.
- Provide an overall context for future investment options.
- Reflect and provide for current national and regional policies, local guidelines and initiatives.
- Ensure there is harmony and synergy between the plans for the Port and those for the Dublin Docklands Area, Dublin City and neighboring counties within the Dublin Region.
- Give some certainty to customers of DPC about how the Port will develop in the future to meet their requirements.

Since its introduction, the Masterplan has played a significant role in providing guidance and strategic context on the future of the Port not only to DPC but also to National and Local Government, statutory agencies and planning and development agencies. The Masterplan has informed the National Ports Policy, Transport Policy and guided the Planning and Permitting Authorities in determining policies and specific proposals concerning Dublin Port.

3.3 MASTERPLAN 2040

The 30 year time period covered by the Masterplan is long and therefore requires periodic review. Economic conditions have improved since the Dublin Port Masterplan was first published and with the economic recovery the demand for port infrastructure is already greater than first envisaged in 2012. Accordingly, it was recognised that the Dublin Port Masterplan needed to be kept under review to ensure that it would remain relevant and achieve its central objective of providing a clear vision for the development of the Port into the future.

Since the Dublin Port Masterplan was published in 2012, there have been a number of significant developments which support its timely review, including:

- Economic recovery leading to a return to annual compounding growth in port volumes.

- Commencement of the Alexandra Basin Redevelopment (ABR) Project which, in itself, includes about one-third of the infrastructure development options originally identified in the Masterplan.

- Recovering control over 11.2 ha of Port lands making them available for redevelopment.

- Completion of a number of site redevelopments in Dublin Port to provide an additional 16.1 ha of accessible port lands.

- Redevelopment of 720 m of quay walls.

- Purchase by DPC of a 44 ha site adjacent to Dublin Airport for the development of a new Dublin Inland Port facility.

- Publication of the National Ports Policy, March 2013.

- Publication by the Competition Authority of its report Competition in the Irish Ports Sector, November 2013.

- Publication of DPC's Franchise Policy, May 2014.

- Publication by the National Transport Authority (NTA) of its Transport Strategy for the Greater Dublin Area, 2016 to 2035.

- Creation of the Dublin Bay Biosphere in June 2015 as a joint initiative by:

  - DPC
  - Dublin City Council (DCC)
  - Fingal County Council
  - Dun Laoghaire Rathdown County Council
  - DCHG
  - Fáilte Ireland

- Creation of the Poolbeg West Strategic Development Zone (SDZ), May 2016.

- Publication by DCC of the Dublin City Development Plan 2016 to 2021.

- Changes in the international trading environment, including Brexit.

Changes in the demand levels for port infrastructure were recognised as the key element impacting on the timing of a review of the Dublin Port Masterplan. Since 2012 it has become clear that the level of demand for port infrastructure will likely be greater than initially anticipated due to a higher than originally envisaged level of growth in cargo volumes for the period to 2040. The Dublin Port Masterplan originally estimated that annual growth in cargo volumes would average 2.5% from 2010

to 2040 leading to a doubling to 60m gross tonnes by 2040. However on the basis of trade levels to date, DPC currently believes that volumes will double by 2032 and that by 2040 will have grown to 77 million tonnes, equating to a revised annual average growth rate of 3.3%. In addition, it is expected that passenger volumes will continue to grow to 2040, both from ferry passenger traffic and cruise vessels.

The Dublin Port Masterplan was originally produced in order to provide all of the Port's stakeholders with a clear view as to how the Port would be developed in the long-term. Now, five years on, there is more clarity as to how Dublin Port should be developed in order to meet the objectives set out in the Dublin Port Masterplan.

Masterplan 2040 intended to update and refine the infrastructure development options for Dublin Port and, in doing this, to ensure that the Dublin Port Masterplan continues to provide the best solution for the future sustainable development of Dublin Port through to 2040.

The land areas covered in this review are shown in **Figure 3.1** and comprise:

- The core Dublin Port Estate in Dublin City (includes Northern Port Lands on the north side of the River Liffey and Southern Port Lands on the Poolbeg Peninsula).

- Recently acquired lands adjacent to Dublin Airport to be developed as Dublin Inland Port.

- The road connections linking these three separate land areas, including the Dublin Port Tunnel and the last mile connection between it and the south port area, to be developed as part of the NTA's Transport Strategy for the Greater Dublin Area 2016-2035, that is, the South Port Access Road (SPAR).

The core Dublin Port Estate and the Dublin Inland Port will collectively be referred to as the Dublin Port Estate or Dublin Port. The core Dublin Port Estate is located within the DCC administrative area and the Dublin Inland Port is located in the Fingal County Council administrative area.

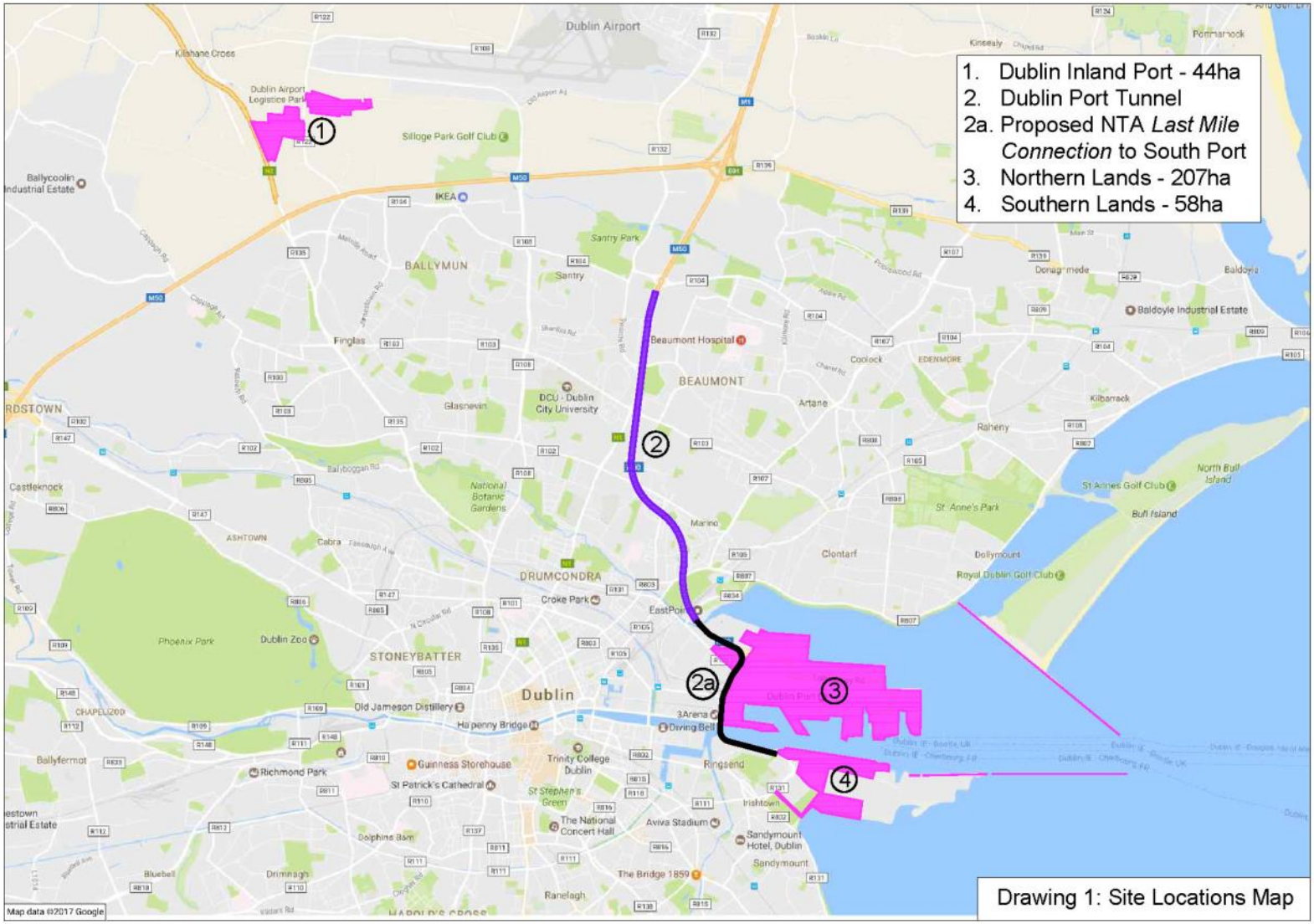

Figure 3.1 Land areas covered in Masterplan 2040

3.4 ASPECTS OF THE PLAN TO BE ASSESSED

Aspects of Masterplan 2040 setting out proposals for infrastructure, transport and inland connectivity concerning the operation of Dublin Port were considered in this assessment. Other parts of the published Plan were not subject to assessment, such as economic growth and trade forecasts, and societal integration of Dublin Port with Dublin City and its people. This approach is aligned to the allied SEA process. **Table 3.1** sets out the aspects of Masterplan 2040 and identifies those to be assessed as part of this assessment, and why.

Table 3.1 Proposed Elements of Masterplan 2040 to be assessed

Dublin Port Masterplan 2040 Section		To be assessed in the NIS
1	Foreword of the Masterplan detailing the role of DPC, the background of the Dublin Port Masterplan and relevant stakeholders.	**No** – This provides factual background information on DPC, the Port Masterplan and stakeholders.
2	An executive summary of the Masterplan.	**No** – This provides a summary of the key points discussed in the later sections of the Masterplan 2040 relating to Dublin Port, the Dublin Port Masterplan, environmental assessment, and future projects. Although these projects will be assessed, this will be in a later section.
3	The rationale for the Masterplan.	**Yes –** This provides a discussion about the purpose, consultation, status, objectives, SEA and AA, policy context, and a background to the development option detailed in a later section.
4	Details the economic forecasts relevant to DPC.	**No** – This provides forecasted and projected information about the outlook for the Irish economy and how it links into anticipating future economic growth, trade and requirements of Dublin Port.
5	Sets out the infrastructure development options.	**Yes** –Future infrastructure development options to increase efficiencies at the Port and to provide additional throughput capacity through the Plan period will be assessed in the NIS, in order to test the compatibility of Port Plan objectives with the requirements of the .
6	Describes the port lands in terms of its value, nature of the development on the land, intensification of land use and safeguarding of the lands.	**Yes** – This is a description of how the land areas included within the Dublin Port Masterplan 2040 are used and will be used by DPC. This will be assessed in the NIS, in order to test the compatibility of Port Plan objectives with the requirements of the .
7	Details the transport and inland connectivity concerning the operation of Dublin Port.	**Yes** – The option related to transport within the Port will be assessed in the NIS in order to test the compatibility of Port Plan objectives with the requirements of the .
8	Outlines the social community and economic impacts of Dublin Port	**No** – This section describes the societal integration of the Port with Dublin City and its people, and the economic impact of the Port. Although there is a summary of potential methods allowing for an increase in the access

Dublin Port Masterplan 2040 Section		To be assessed in the NIS
		of the Port to the public, the infrastructure option is considered in Section 5.
9	Sets out the safety and security in place at Dublin Port	**No** – This describes safety and security procedures at Dublin Port
10	Describes the environmental assessments undertaken to ensure that the Dublin Port Masterplan 2040 complies with relevant environmental legislation and to inform the process of identifying the suitable strategies that will, where possible, enhance the environment.	**No** – This is a statement about the environmental assessments undertaken for the Masterplan 2040. This should however include guarantees that the Masterplan 2040 will comply with recommendations from the environmental assessments.
11	Outlines the necessary steps in the implementation of the Masterplan	**No** – This provides an outline of what is needed to be done in order to implement the Masterplan in a successful manner.
12	Outlines how the implementation of the Masterplan will be monitored and reported, and then reviewed and updated at regular intervals	**No** – This is a statement about future monitoring, data collection and reporting for the Masterplan 2040. This should include mitigation and monitoring recommendations from the environmental assessments.

3.4.1 Development Options

Development options presented in the draft Dublin Port Masterplan 2040 are not a prescriptive menu of developments that will be carried out in Dublin Port. Rather, they are a list of possible infrastructure proposals for future development dependent on demand, capacity and the securing of necessary permitting consents, including environmental assessment. The provision of adequate and appropriate road access, wastewater treatment, water supply, surface and storm water drainage and waste management will be provided to support the future development of any of the individual development options but further detail is simply not available at this Plan level.

3.4.1.1 Transport and Inland Connectivity

The core objective of the Dublin Port Masterplan is to explore how the Port can manage 77m tonnes of throughput by 2040. In assessing how this can be achieved it is important to focus on the transport and travel issues concerning the operation of the Port – in particular how Dublin Port connects with inland transport networks outside the Port estate. It is also important to examine travel within the Port estate to ensure that more sustainable modes of transport are facilitated and encouraged over the Masterplan period.

The National Transport Authority has included proposals in its Transport Strategy for the Greater Dublin Area to improve connectivity between Dublin Port Tunnel and the South Port area. This will open up the possibility of significant additional port capacity on the Poolbeg Peninsula.

DPC maintains and has developed the main rail infrastructure within the Port and is committed to the provision of rail connections and sidings within the Port to support the potential for rail freight to grow over the period of the Masterplan.

The Transport Strategy for the Greater Dublin Area 2016 – 2035 deals specifically with land transport, outlines an explicit hierarchy of transport users and sets out how transport will be developed across the region with specific reference to roads, freight and demand management. In particular, the hierarchy in the Strategy places an onus on DPC to ensure that the needs of other transport users are adequately catered for in the Masterplan.

Policy objectives at EU and national level will guide DPC and shape developments or initiatives brought forward during the Masterplan period to support and facilitate:

- pedestrians and cyclists within and in the vicinity of the Port both for recreational and for access purposes
- enhanced public transport links within the Port
- where achievable, to facilitate initiatives throughout the supply chains of Port operations

DPC has prepared a Travel Plan for Dublin Port to help promote more sustainable modes of transport in and around Dublin Port which outlines specific proposals to secure the policy objectives together with an implementation and review process. It includes measures such as:

- The provision of a dedicated public transport route
- Suitable pedestrian and cyclist access to the Port
- The provision of dedicated pedestrian and cycle routes within the Port
- Measures to encourage car sharing for people working within the Port
- Car parking management measures

Dublin Port Company has acquired 44 hectares of lands near Dublin Airport and the M50, located 14km from Dublin Port, to provide facilities for non-core but port related activities. The lands are located within the administrative area of Fingal County Council and are zoned to explicitly include the activities envisaged by DPC, including a road transport depot and for transport logistics. This future development is currently called ‘Dublin Inland Port’.

3.4.2 Implementation of the Masterplan

The Dublin Port Masterplan 2040 is the first revision of the Dublin Port Masterplan which was published in 2012. Since this publication, development projects arising from the Masterplan have taken place. The main development that has taken place in this period of time has included:

- Development of a 4.3 ha site for the transit of trade cars.
- Removal of buildings and incorporation of vacant land north of Alexandra Road into Ocean Pier and Alexandra Quay for additional transit storage.
- Reconfiguration of an area of land facing onto East Wall Road.

This development has shaped and will influence any future development at Dublin Port, and provides the baseline of the Port at this juncture.

With the implementation of the Dublin Port Masterplan 2040 the development projects outlined in the Dublin Port Masterplan 2040 will take place in the same timescales as in the *Do Nothing* Option. The development projects within the timescales are described below with a map of the area to be developed illustrated in **Figure 3.2** and **Figure 3.3**. Port operations will be ongoing in tandem with proposed developments throughout the life of the Masterplan.

3.4.2.1 Short Term: 2017-2021

Development within the short term timescale of the Dublin Port Masterplan 2040 will be concentrated within the Northern Port Lands, with the exception of development of the Dublin Inland Port. Construction of the ABR Project will continue throughout the short term. In summary the main proposed developments are:

- 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 depth of -10 mCD 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.

3.4.2.2 Medium Term: 2021-2031

Development within the first five years (2021-2026) of the medium term will be concentrated within the Northern Port Lands. Development within the last five years (2026-2031) of the medium term will 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 will allow for growth to be accommodated. In summary the main proposed developments are:

- 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 and neighbouring container terminal including demolition and reclamation of berths, construction of a new jetty requiring land reclamation, demolition and construction of buildings, and creation of a 400m manoeuvring space at the eastern entrance to the Port's working quays.

- 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.

- Creation of a 400 m turning basin at the eastern entrance to the Port's working quays.

- 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.

3.4.2.3 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. Otherwise the focus during this latter 10 year period will be on the provision of projects to provide capacity post-2040. The infrastructure in place at this juncture will allow for the throughput of 77 million gross tonnes per annum, equating to a growth rate of 3.3% per year.

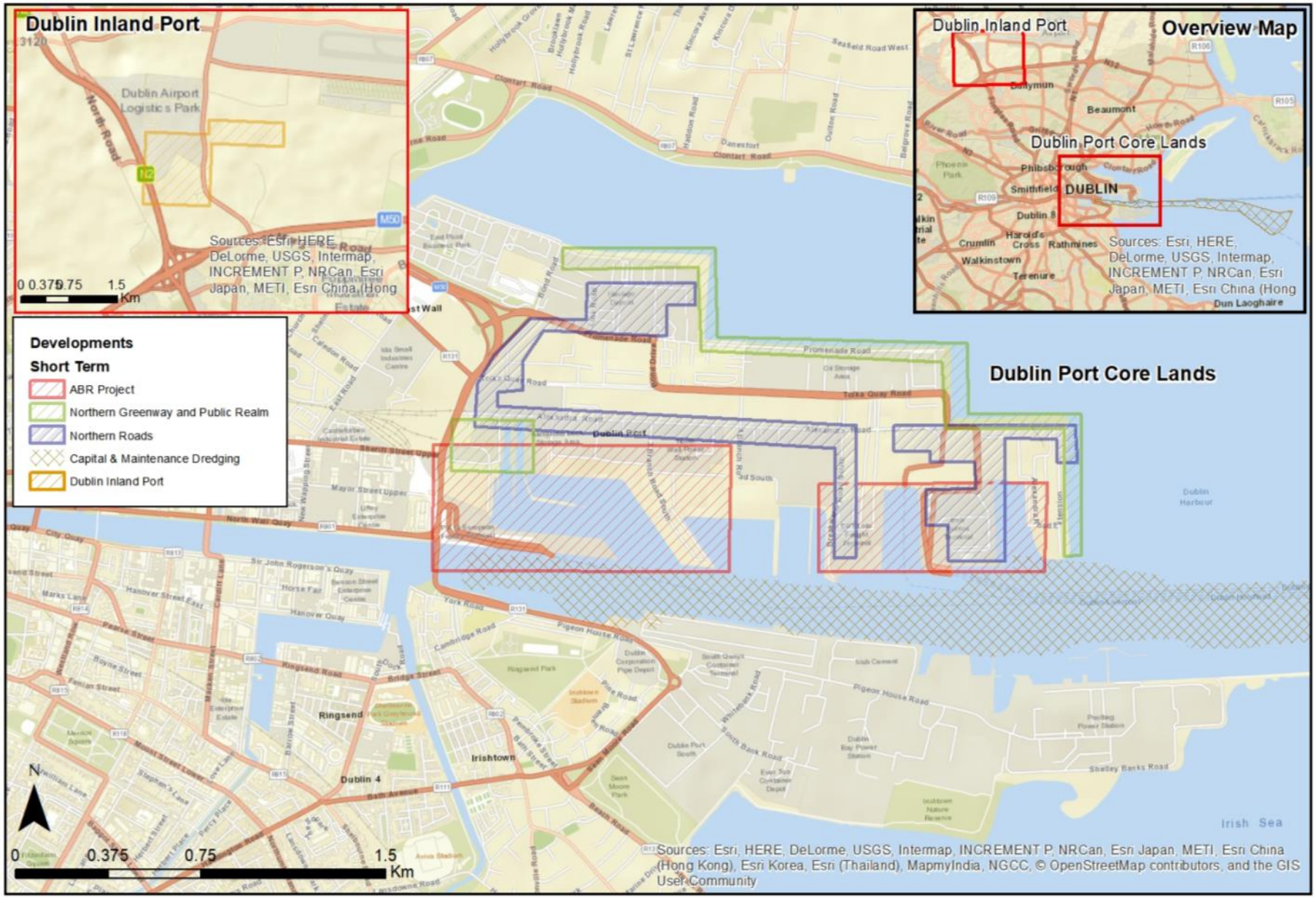

Figure 3.2 Areas of Development within the Short Term

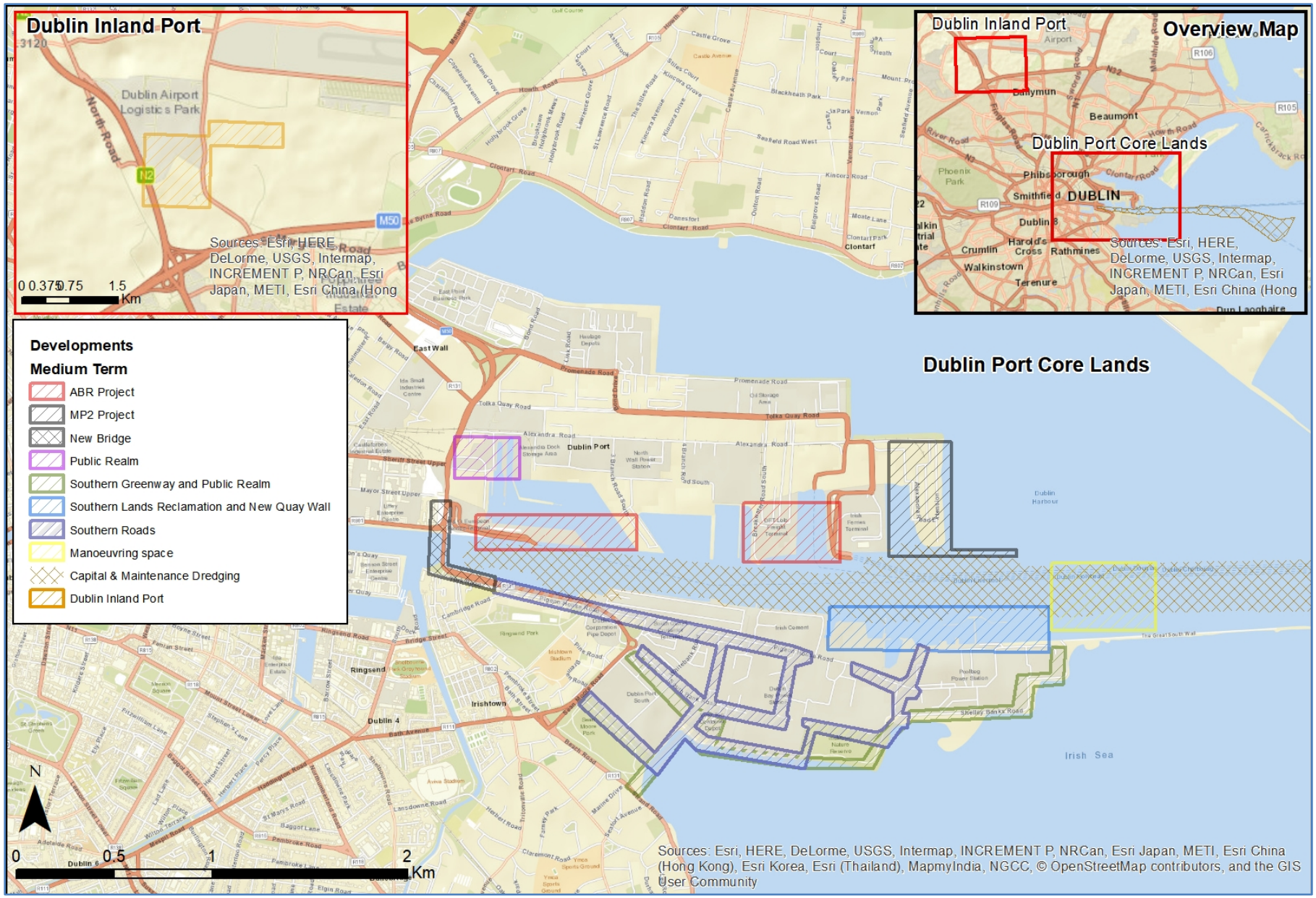

Figure 3.3 Areas of Development within the Medium Term

4 APPROPRIATE ASSESSMENT

This scientific examination and analysis of the implications of the Dublin Port Masterplan 2040 on European sites in view of their conservation objectives considers Likely Significant Effects (LSEs) not previously screened out on sites designated under European Council Directives 92/43/EEC and 2009/147/EC.

The most up-to-date Conservation Objectives for the European sites being considered and details in relation to the Qualifying Interests and Special Conservation Interests of these European sites are provided in **Table 2.1**. The information contained in these tables is based on publicly available data on these European Sites, sourced from NPWS in February 2018. SACs described in **Table 2.1** are illustrated in **Figure 2.1**. SPAs described in Table **2.1** are illustrated in Figure **2.2**.

4.1 IMPACT PATHWAYS

The possibility of LSEs upon 17 nr. European sites was considered in the allied Screening for appropriate assessment report under four impact themes:

- Water quality and habitat deterioration
- Underwater noise and disturbance
- Aerial noise and visual disturbance
- Habitat loss

The possibility of Adverse Effects on the Integrity of a Site (AEIS) is considered in this report using a source-pathway-receptor model, where ‘Source’ is defined as the individual elements of the proposed Masterplan Review that have the potential to affect the identified ecological receptors; ‘Pathway’ is defined as the means or route by which a source can affect the ecological receptor; and ‘Ecological receptor’ is defined as the Special Conservation Interests (for SPAs) or Qualifying Interests (of SACs) for which conservation objectives have been set for the European sites.

4.2 POSSIBLE ADVERSE EFFECTS

4.2.1 Water Quality and Habitat Deterioration

The Screening for appropriate assessment report concluded that LSEs as a consequence of suspended sediments and/or contaminants escaping into the marine environment during marine engineering construction works could not be discounted for all 17 no European sites considered.

All of the SACs considered in the screening assessment are hydrologically linked to the marine waters of Dublin Port where marine engineering construction works might occur. Some of those

SACs are also designated SPAs for their intertidal wetlands. Other SPAs are designated for breeding seabird colonies which rely upon these marine waters to obtain their prey.

As a hydrological pathway of effect exists, these risks cannot be discounted. It therefore follows that the risk of suspended sediments and / or contaminants escaping into the marine environment leading to a deterioration of wetland, marine and coastal habitats with respect to their water quality and favourable conservation status (which are listed as QIs or SCIs for European sites) cannot be discounted.

In assessing the risk at this second (appropriate assessment) stage, further evaluation and analysis must be undertaken to characterise the impacts that may occur, and to apply measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects to determine whether or not Adverse Effects on the Integrity of a Site (AEIS) will occur.

4.2.1.1 Development Options

Short term development options in the Masterplan 2040 with significant marine engineering construction works include continued construction of the ABR Project, infilling of Berths 52/53, development of a new river berth and the development of Alexandra Basin West.

Medium term development options in the Masterplan 2040 with significant marine engineering construction works include 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 (construction and operation of Unified Ferry Terminal and neighbouring container terminal including demolition and reclamation of berths, construction of a new jetty requiring land reclamation), creation of a 400m manoeuvring space at the eastern entrance to the Port's working quays, 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), reclaiming and redevelopment of 13.8ha for deepwater Lo-Lo and multi-purpose berths.

There are no planned **long term** development options in the Masterplan 2040 with significant marine engineering construction works envisaged.

4.2.1.2 South Dublin Bay SAC

Looking firstly at the closest of the SACs, **Figure 2.1** shows that the South Dublin Bay SAC is separated by the Great South Wall from the marine waters of Dublin Port. It is designated for 'Mudflats and sandflats not covered by seawater at low tide [1140]' as described in **Table 2.1**.

4.2.1.2.1 Mudflats and sandflats not covered by seawater at low tide [1140]

The CO for this Annex I habitat type is to "maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC", as defined by 4 no SSCO attributes and targets:

Habitat Area:	The permanent habitat area is stable or increasing, subject to natural processes
Community Extent:	The extent of the *Zostera* dominated community is maintained, subject to natural processes
Community Structure:	The high quality of the *Zostera* dominated community is conserved, subject to natural processes
Community Distribution:	The 'Fine sands with *Angulus tenuis'* community complex is conserved in a natural condition

The short term and medium term development options described in Section 3.4 and above which are envisaged to include significant marine engineering construction works are all proposed at a distance from this habitat within the SAC. The targets for SSCO attributes 'Habitat Area', 'Community Extent' and 'Community Distribution' are measured in hectares. The target for 'Community Structure' is *Zostera* density, measured in shoots/m^2. Highly turbid water is reported by Dennison (1987) to inhibit *Zostera* growth by reducing the amount of light available for photosynthesis.

Highly turbid water arising from elevated suspended sediments during marine works could occur. It is likely that the duration of any such events would be short, within a tidal cycle, but that such events could continue to occur for the duration of marine works. It is possible that attaining these attribute targets shall be compromised, albeit temporarily as a result of bringing forward development options at the Port which result in elevated suspended solids at construction stage.

The question which must be answered is whether or not significantly elevated levels of suspended sediments shall be dispersed from the port to the *Zostera* communities of the South Dublin Bay SAC. The Alexandra Basin Redevelopment (ABR) project is particularly instructive here, and helps answer the question.

4.2.1.2.2 Alexandra Basin Redevelopment

The ABR project has been consented under the planning, foreshore, dumping at sea and industrial emissions licensing regimes, and a comprehensive body of scientific analysis has been prepared to document environmental impacts associated with that Strategic Infrastructure Development project. The ABR project involves significant engineering interventions in marine waters of the Port, including:

- Dredging of Alexandra Basin and berths to -10 mCD, and the Liffey Channel to -10 mCD from Dublin Bay Buoy to East Link Bridge over a six year period
- Refurbishment or construction of over 1.3km of quay walls
- Construction of a surge protection/retaining wall at Poolbeg Marina

- Quay wall refurbishment/construction (designed to accommodate future dredging to a level of -15m CD)

- Ro-Ro jetty construction (300m) and Installation of Ro-Ro ramps

- Infilling of existing Berth 52/53

This consented project is by any measure, a significant marine intervention, involving the dredging of 6,370,000m^3 of seabed material.

4.2.1.2.3 Elevated Suspended Sediments

Coastal processes modelling was undertaken and is reported in the EIS and NIS prepared for that project. It included modelling to determine:

- the impact of the proposed channel deepening on the tidal regime and inshore wave climate around Dublin Bay

- the stability of the proposed channel deepening and its impact on the sediment transport regime

- the fate of the sediment that is dumped at the spoil site

- the impact of sediment plumes generated during the dredging of Alexandra Basin West and the deepening of the approach channel

This work revealed that the dredging of the shipping channel was not predicted to significantly alter the tidal regime, wave climate or sediment transport regime in Dublin Bay away from the immediate area around the entrance channel at the approaches to the Bull walls and the harbour channels.

Dredging plume simulations indicated that the deposition of material lost during the dredging of the channel at Alexandra Basin will be mostly contained within the inner harbour channel area; resulting in a deposition rate of less than 0.2 g/m^2, which is equivalent to a deposition depth of less than 0.2µm. Simulations also revealed that silty material dredged from the basin and berths and disposed of at the Burford Bank dump site will be carried away by the tide and largely dispersed. Importantly, sediment that is deposited around Dublin Bay (and thus including the South Dublin Bay SAC) is very small at a maximum of c.0.1 g/m^2 (equivalent to a deposition thickness of 0.1µm). Such a depth is, whilst mathematically calculable in a modelling exercise, not measurable in the field.

This is a negligible degree of deposition and demonstrates that in a scenario where in excess of 6 million m^3 of seabed material is dredged and dispersed over a six year campaign, no measurable elevated levels of suspended sediments shall be dispersed from the port to the *Zostera* communities of the South Dublin Bay SAC. None of the remaining development options that may be brought forward in the short term or medium term of the Masterplan include this order of magnitude of seabed

material to be dredged or disposed at sea, and which could therefore possibly be dispersed around Dublin Bay.

4.2.1.2.4 Pollution Incidents

There is a risk involved with any construction activity either in the marine environment or in proximity to marine waters that a pollution incident might arise and result in spills or leaks of polluting substances into the water.

There is also a risk involved with normal port operations. These include the potential for pollution events to occur from:

- Discharges from vessels using the port (ballast water, wastewater, oil spillages, fuel bunkering);
- Discharges from cargo handling (leakages from containers, bulk material spillages, losses from conveyor systems); and
- Discharges from cargo storage areas and onward transportation (losses from hoppers, flat bulk stores and HGVs).

There is additionally a risk involved with any operational end use of Port lands away from the quay side that a pollution incident might arise and result in spills or leaks of polluting substances into the water.

Effects associated with construction or operational stage pollution events (for example leakages / spillages of fuels, oils, other chemicals and waste water, controlled discharges under licence) could lead to a deterioration of water quality in the Annex I mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC.

The risk of such pollution events occurring must be managed to ensure their likelihood is low and that there are effective measures will be put in place in the event that they do occur to prevent any wide reaching or long term adverse effects. Mitigation is required, and those measures are described in Section 5 of this report.

4.2.1.2.5 ABR Annual Environmental Monitoring Report

The 1st Annual Environmental Monitoring Report summarising environmental monitoring works undertaken during the first year of the ABR Project (April 2016 to March 2017), has included within its remit a real-time monitoring regime to confirm the efficacy of the mitigation measures implemented as part of construction phase of ABR.

In agreement with the Planning Authority, monitoring stations have been established in the Port to provide detailed information on relevant water quality parameters. They measure real time water quality and continuously relay the data to a shore based location for compliance assessment. Trigger

levels of dissolved oxygen (falling below 6 mg/l) and peak suspended solids (rising more than 100 mg/l above background levels) that initiate investigations have been set.

High frequency water quality monitoring at the three locations in the port has shown water quality to be satisfactory during the period reported. Occasional low dissolved oxygen and high turbidity values were recorded but these were of no environmental significance and did not reflect any environmental impact by the ABR Project.

Data collected during a maintenance dredging campaign provides evidence that the disposal of dredge material at the Dublin Bay Spoil Ground had no measurable effect on water quality outside the dumpsite, or even within the dump site at relatively short distances away from the spot where the dredger released its load.

4.2.1.2.6 Summary for Water Quality and Habitat Deterioration

Using the ABR project as a proxy for the upper end of an impact envelope on intertidal habitat smothering or water quality deterioration in a nearby SAC, it can be concluded that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance of the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC.

It is important to note that the conclusions drawn in the assessment of ABR takes account of certain mitigating measures being applied to dredging or disposal operations, and those measures are described in Section 5 of this report.

An AEIS is not predicted as a result of elevated suspended sediment with suitable mitigation in place.

With mitigation in place, it can be also concluded that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance of the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC.

Again, an AEIS is not predicted as a result of pollution with suitable mitigation in place.

4.2.1.3 North Dublin Bay SAC

4.2.1.3.1 Conservation Objectives

Figure 2.1 shows that North Dublin Bay SAC is separated by the North Bull Wall from the marine waters of Dublin Port. It is designated for 9 no Annex I habitats and 1 no Annex II species as described in **Table 2.1**.

The CO for ‘Mudflats and sandflats not covered by seawater at low tide [1140]’ is to maintain the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 4 no SSCO attributes and targets.

The CO for 'Annual vegetation of drift lines [1210]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 6 no SSCO attributes and targets.

The CO for '*Salicornia* and other annuals colonising mud and sand [1310]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 10 no SSCO attributes and targets.

The CO for 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]' is to maintain the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 10 no SSCO attributes and targets.

The CO for 'Mediterranean salt meadows (*Juncetalia maritimi*) [1410]' is to maintain the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 10 no SSCO attributes and targets.

The CO for 'Embryonic shifting dunes [2110]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 7 no SSCO attributes and targets.

The CO for 'Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 7 no SSCO attributes and targets.

The CO for 'Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 9 no SSCO attributes and targets.

The CO for 'Humid dune slacks [2190]' is to restore the favourable conservation condition of this Annex I habitat type in North Dublin Bay SAC, as defined by 11 no SSCO attributes and targets.

The CO for 'Petalwort *Petalophyllum ralfsii* [1395]' is to maintain the favourable conservation condition of this Annex II species in North Dublin Bay SAC, as defined by 5 no SSCO attributes and targets.

The short term and medium term development options described in Section 3.4 and above which are envisaged to include significant marine engineering construction works at the Port are all proposed at a distance from the Annex I habitats within the SAC. The QIs of North Dublin Bay SAC can be separated out on the basis of those occurring in the coastal and terrestrial supralittoral zone, and those occurring in the intertidal or littoral zone.

There is no possibility that that development options brought forward in the short term and medium term of the Masterplan period will prevent either the maintenance or restoration of the favourable conservation condition of the following QIs in North Dublin Bay SAC as there is no effective impact pathway linking development options to these QIs:

- Embryonic shifting dunes [2110]

- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
- Humid dune slacks [2190]

The Annex II listed plant Petalwort is also listed as a QI for this SAC. This species occurs within at a single station within the site in a very restricted area (c.37m^2) along a track through the Alder marsh to the south and east of St. Anne's Golf Club. Just like the Annex I habitats listed above, there is no effective impact pathway linking development options to the location of this Annex II species.

For those QI Annex I habitats occurring in the littoral zone, highly turbid water arising from elevated suspended sediments during marine works could occur.

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Annual vegetation of drift lines [1210]
- *Salicornia* and other annuals colonizing mud and sand [1310]
- *Spartina* swards (*Spartinion maritimae*) [1320]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

As noted in Section 4.2.1.1, it is likely that the duration of any such events would be short, within a tidal cycle, but that such events could continue to occur for the duration of marine works at the Port. It is thus possible that attaining attribute targets for any of the SSCOs could be compromised, but on the basis of the discussion in Section 4.2.1.2, and using the ABR project as a proxy for the upper end of an impact envelope on intertidal habitat smothering in a nearby SAC, it can be concluded that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance or restoration of the favourable conservation condition of these Annex I QIs in North Dublin Bay SAC. An AEIS is not predicted as a result of elevated suspended sediment from marine works at the port with suitable mitigation in place.

Similarly for pollution incidents, as discussed in Section 4.2.1.2.4 above, the risk of such pollution events occurring as a result of marine works at the Port must be managed to ensure their likelihood is low and that there are effective measures will be put in place in the event that they do occur to prevent any wide reaching or long term adverse effects. Mitigation is required, and those measures are described in Section 5 of this report.

4.2.1.3.2 Dublin Inland Port

Medium term development options of the Masterplan include bringing forward plans for the Dublin Inland Port. Developing this site is likely to include the construction of roads, buildings, yards and a road juncture, and at operational phase, the relocation of non-core users to Dublin Inland Port.

The Santry River rises in the townlands of Dubber and Merryfalls to the south of the runway at Dublin Airport. The location of the proposed Inland Port is within 200m of the headwaters of the Santry River, which flows for 11.9km east via Santry, Kilmore, Edenmore and Raheny and discharges through North Bull Island SPA and North Dublin Bay SAC.

Section 4.2.1.2.4 discusses the potential for pollution arising from operations at a working port. Similar impact pathways for water quality or deterioration risks arise from construction and operation of an inland port. Concretes, hydrocarbons and other polluting substances could escape to the Santry River system and travel downstream to coastal wetland habitats of North Dublin Bay SAC (and North Bull Island SPA).

Effects associated with construction or operational stage pollution events (for example leakages / spillages of fuels, oils, other chemicals and waste water, controlled discharges under licence) could lead to a deterioration of water quality in the wetland habitats of North Dublin Bay SAC (and North Bull Island SPA).

The risk of such pollution events occurring must be managed to ensure their likelihood is low and that there are effective measures will be put in place in the event that they do occur to prevent any wide reaching or long term adverse effects. Mitigation is required, and those measures are described in Section 5 of this report.

With mitigation in place, it can be concluded that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance or restoration of the favourable conservation condition of the Annex I QIs in North Dublin Bay SAC or wetland SCI of North Bull Island SPA.

An AEIS is not predicted as a result of pollution with suitable mitigation in place.

4.2.1.4 South Dublin Bay and River Tolka Estuary SPA

When considering the possibility of adverse effects upon the conservation objectives of SPA Special Conservation Interests (SCIs) it should be noted that the SSCOs for the overwintering species SCIs are defined by 2 no attributes (Population Trend and Distribution) which are assessed in Sections 4.2.3 and 4.2.4 under ‘Aerial noise and visual disturbance’ and ‘Habitat Loss’ impact pathway themes respectively. The SSCOs for the breeding seabird species SCIs are defined by 5 no attributes in the case of Roseate Tern and Arctic Tern, and 9 no attributes in the case of Common Tern.

One of the attributes is considered here under the Water Quality and Habitat Deterioration impact pathway theme, with the remainder being assessed in Sections 4.2.3 and 4.2.4 under 'Aerial noise and visual disturbance' and 'Habitat Loss' impact pathway themes respectively.

The SSCO attribute 'Prey Biomass available' is measured in weight (kg), and the target is for 'no significant decline'. Notes for this SSCO draw attention to that fact that evening observations of terns arriving to the roosting area indicated that most flew in from an easterly and south-easterly direction suggesting that the birds were feeding in the shallow waters of the Kish/Bray and Burford Banks. The mean foraging range of Roseate Tern is listed as 12.3km (mean max. 18.28km; max. 30km). The mean foraging range of Common Tern is listed as 8.67km (mean max. 33.81km; max. 37km). The mean foraging range of Arctic Tern is listed as 11.75km (mean max. 12.24km; max. 20.6km). Key prey items for all species are small fish, with crustaceans and other invertebrates also listed for Arctic and Common Terns.

The conservation target is for no significant decline in prey biomass available, and it is clear that these species forage over a considerable range, within the port, close to it and for many kilometres offshore.

The short term and medium term development options described in Section 3.4 and which are envisaged to include significant marine engineering construction works giving rise to possible adverse effects under the water quality and habitat deterioration impact pathway theme are discussed in Section 4.2.1.2.3 under 'Elevated Suspended Sediments'; Section 4.2.1.2.4 under 'Pollution Incidents'; and conclusions drawn in Section 4.2.1.2.6.

It has been concluded for intertidal habitats of North Dublin Bay SAC and South Dublin Bay SAC that an AEIS is not predicted as a result of pollution incidents or elevated suspended sediments with suitable mitigation in place. Mitigation is described in Section 5 of this report.

For the same reasons discussed there, it is also considered that with mitigation in place, it can be concluded that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance of the favourable conservation condition of Roseate Tern, Common Tern or Arctic Tern in South Dublin Bay and River Tolka Estuary SPA.

An AEIS is not predicted as a result of pollution incidents or elevated suspended sediments on the foraging areas of the three Tern species with suitable mitigation in place.

4.2.1.5 Other European sites

Rockabill to Dalkey Island SAC is located 6.6km seaward of the Port, and is designated for *inter alia* Reefs [1170]. The distance between marine engineering construction works envisaged by development options at the Port and the reef receptor (the marine hydrological link) is two and a half times the distance between the Port and North Dublin Bay SAC, and at a much greater distance than South Dublin Bay SAC or South Dublin Bay and River Tolka Estuary SPA, described above.

Howth Head SAC is 6.7km by sea from the Port but its QIs (Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] and European dry heaths [4030]) are not hydrologically linked to marine waters of the Port. The remaining SACs listed in Table 2.1 are all located in excess of 10km by sea from the Port.

In circumstances where an AEIS is not predicted as a result of pollution incidents or elevated suspended sediments arising from marine engineering construction works envisaged by development options at the Port, on the marine/intertidal habitat feature conservation objectives of those much closer European sites with suitable mitigation in place, then it is reasonable to also conclude that development options brought forward in the short term and medium term of the Masterplan period will not prevent the maintenance or restoration of the favourable conservation condition of QIs for these more distant European sites.

An AEIS is not predicted as a result of pollution incidents or elevated suspended sediments on the remaining SACs with marine/intertidal habitat feature conservation objectives with suitable mitigation in place.

4.2.2 Underwater Noise and Disturbance

The Screening for appropriate assessment report concluded that underwater acoustic energy escaping into the marine environment during marine engineering construction works providing a pathway of possible effect leading to physical injury or disturbance to marine species such as Harbour Seal; Grey Seal; or Harbour Porpoise cannot be discounted. On that basis, LSEs on QIs of Lambay Island SAC and Rockabill to Dalkey Island SAC could not be discounted.

In assessing the risk at this second (appropriate assessment) stage, further evaluation and analysis must be undertaken to characterise the impacts that may occur, and to apply measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects to determine whether or not AEIS will occur.

4.2.2.1 Rockabill to Dalkey Island SAC

Figure 2.1 shows that Rockabill to Dalkey Island SAC encompasses a marine area east of Dublin Port. It is located 6.4km seaward of the eastern edge of the Port estate, and 4km seaward of the eastern terminal points of the North Bull Wall and Great South Wall. The licensed offshore disposal site for dredge spoil used by Dublin Port Company is located to the west of the Burford Bank, within the SAC.

This SAC measures approximately 40km x 7.5km, includes over 27,000ha of marine waters and is designated for *inter alia* Harbour porpoise *Phocoena phocaena* [1351]. The CO for this Annex II species is to maintain the favourable conservation condition of Harbour porpoise in Rockabill to Dalkey Island SAC, as defined by 2 no SSCO attributes and targets:

Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use

Disturbance: Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site

The targets for the SSCO attribute 'Access to suitable habitat' is measured in 'number of artificial barriers'. The target for 'Disturbance' is measured in 'Level of impact'. The short term and medium term development options described in Section 3.4 which are envisaged to include significant marine engineering construction works may generate levels of underwater noise capable of disturbing this species.

Sightings of Harbour porpoise have been relatively common off all coasts of Ireland and in the Irish Sea (Northridge *et al*., 1995; Hammond *et al*., 1995; Pollack *et al*., 1997; Berrow *et al.,* 2001; Ó Cadhla *et al.,* 2004; Anderwald *et al*., 2011). The small size of harbour porpoises and their erratic surfacing behaviour can make them difficult to detect. There are however relatively frequent sightings of the species within Dublin Bay, including the dredge disposal site and shipping channel (IWDG, 2013). Surveys of harbour porpoise carried out at specific sites around the Irish coast identified Dublin Bay as an important area for the species, with high densities in Dublin Bay of 1.19 per km^2 reported, representing one of the highest densities of the species recorded in Ireland to date (Berrow *et al*., 2008). The most recent estimate of harbour porpoise abundance in the Rockabill to Dalkey Island SAC is about 1.6 porpoises per km^2, or a population slightly over 400 (O'Brien and Berrow, 2016). Surveys of cetaceans in the waters outside of Dublin Bay, in the western Irish Sea, indicated that harbour porpoise were by far the most abundant species in the area with relative abundance of harbour porpoise estimated at 0.55 porpoise per $kmkm^2$ (Berrow *et al*., 2011). Sighting rates of harbour porpoise, and thus local densities, were notably higher adjacent to Rockabill and Lambay Islands. This was consistent with Berrow *et al*. (2008) who recorded high densities during smaller scale harbour porpoise surveys in the same area.

4.2.2.2 Lambay Island SAC

Figure 2.1 shows that Lambay Island SAC is located to the north of Dublin Bay. It is offshore from Rogerstown Estuary SAC, and is 22km by sea from Dublin Port. This SAC is designated for *inter alia* Grey Seal *Halichoerus grypus* [1364] and Harbour Seal *Phoca vitulina* [1365].

The COs for these Annex II species are to maintain the favourable conservation condition of Harbour Seal (or Grey Seal) in Lambay Island SAC, as defined by 5 no SSCO attributes and targets:

Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use

Breeding behaviour: The breeding sites should be maintained in a natural condition

Moulting behaviour:	The moult haul-out sites should be maintained in a natural condition
Resting behaviour:	The resting haul-out sites should be maintained in a natural condition
Disturbance:	Human activities should occur at levels that do not adversely affect the harbour seal (or grey seal) population at the site

The targets for the SSCO attribute 'Access to suitable habitat' is measured in 'number of artificial barriers'. The target for 'Breeding behaviour' is measured in 'breeding sites'. The target for 'Moulting behaviour' is measured in 'moult haul-out sites'. The target for 'Resting behaviour' is measured in 'resting haul-out sites'. The target for 'Disturbance' is measured in 'Level of impact'.

The short term and medium term development options described in Section 3.4 which are envisaged to include significant marine engineering construction works may generate levels of underwater noise capable of disturbing these seal species.

Harbour seals (also known as "common seals") have established themselves at terrestrial colonies (or haul-outs) along all coastlines of Ireland, which they leave when foraging or moving between areas, for example, and to which they return to rest ashore, rear young, engage in social activity. These haul-out groups of harbour seals have tended historically to be found among inshore bays and islands, coves and estuaries (Lockley, 1966; Summers *et al.,* 1980), particularly around the hours of lowest tide. Harbour seals in Ireland use terrestrial sites mainly on the western seaboard, with highest numbers in NW and SW Ireland (Cronin *et al*., 2008).

At Lambay Island approximately 30 harbour seals were observed during national census in 2003 (Cronin *et al*., 2004), and 2012 (Duck & Morris, 2013). Smaller haul-out groups were also observed at Skerries Island (n=3) and further north at Clogher Head (n=8) and Dundalk harbour (n=18) (Cronin *et al*., 2004). North Bull Island is also regularly used by grey and harbour seals to haul out. Recent findings from tagging harbour seals in SW Ireland suggest that harbour seals are local foragers, generally staying within 20km of their haul-out sites (Cronin *et al*., 2008); however, studies in the UK have shown that harbour seals travel further distances from haul out sites (over 100km), therefore it is likely that harbour seals from haul-out sites on Lambay ~Island, Skerries and Dundalk harbour use the waters of Dublin Bay and very likely that harbour seals from Lambay Island SAC use Dublin Bay.

Harbour seals are most vulnerable at their terrestrial haul-out sites during breeding and moulting periods. These events occur between June and September in Ireland.

In addition to the identified terrestrial sites, the waters surrounding haul-out sites are likely to be critical habitats for harbour seals, for feeding and/or for navigation to more offshore foraging areas. Results from a study by the author on the haul-out behaviour of harbour seals in southwest Ireland in recent years suggests that harbour seals spend up to 80% of their time at sea (Cronin, 2007; Cronin

et al., 2008). Similar behaviour patterns have been seen in studies of harbour seals in Scotland (Sharples, SMRU *pers comm*; Thompson & Miller, 1990). Unlike grey seals, harbour seal adults continue to forage during the breeding season (Bonnes *et al.,* 1994). In addition the mating strategy is based on males diving and calling at aquatic display sites (Van Parijs *et al.,* 1997, 2000; Hayes *et al*., 2004). Disturbance from anthropogenic noise during this period could potentially affect mating success. 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 (Møhl, 1968; Terhune & Turnbull, 1995).

Grey seals are distributed throughout Irish coastal waters and are commonly seen hauled out on more exposed shores than the harbour seal (Kiely, 1998). The large colonies of grey seals on the Irish coastline are predominantly on the western seaboard on the northwest and southwest coasts and islands; although relatively large numbers of grey seals are also found in southeast Ireland e.g. Wexford harbour, Saltee Islands (O Cadhla *et al*., 2007).

A national census of the grey seal population in 2005 identified grey seal breeding sites in Co. Dublin at Lambay Island, Dalkey Island, Irelands Eye and St. Patricks Island (Ó Cadhla *et al.,* 2007). Pup counts were small at these sites (n<3); apart from Lambay where 49 pups were counted. Further surveys conducted in 2009 recorded 77 pups on Lambay Island and Ireland's Eye (Ó Cadhla *et al*., 2013). These sites are also important to grey seals during the annual moult (Jan-April) in particular St. Patricks Island and Lambay Island, where 137 and 110 grey seals respectively were observed during a moult census in 2007 (O Cadhla & Strong, 2007). A group of 36 grey seals were also observed on Dalkey Island during the 2007 census and 26 grey seals on Rockabill. Four grey seals were sighted in Dublin Bay during aerial surveys as part of a harbour seal population survey in August/September 2012, with a further 62 observed on Lambay Island at this time (Duck & Morris, 2013). This suggests over 300 grey seals use the islands in Co. Dublin, particularly for moulting. Grey seals are frequently seen in the waters of Dublin Bay at Dun Laoghaire and Howth Harbour, Bull Island and Sandycove. Larger colonies of grey seals occur further south in Wexford Harbour at Raven Point, where up to 450 grey seals haul-out during the annual moult period (pers. ob.). The Saltee Islands in Co. Wexford are also an important breeding and moulting site for grey seals.

Grey seals are also most vulnerable at their terrestrial haul-out sites during breeding and moulting periods. These events occur between September and March in Ireland. The waters surrounding terrestrial haul-out sites are likely to be a critical habitat for grey seals, for feeding and/or for navigation to more offshore foraging areas. Grey seals have a wider offshore foraging distribution than harbour seals and therefore grey seals from haul-out sites in Co. Dublin as well as from the large breeding and moult colonies on the coast and islands of Co. Wexford will potentially use the waters of Dublin Bay for foraging and/or navigation.

4.2.2.3 Effects of Underwater Noise

The impacts of noise on marine mammals can broadly be split into lethal and physical injury, auditory injury, and behavioural response. The possibility exists for lethality and physical damage to occur at very high exposure levels, such as those typically close to underwater explosive operations or offshore impact piling operations.

Noise or sound can be measured and expressed in a number of ways. Two measurements relevant to this discussion are the average sound level over a given period of time (known as the RMS Sound Pressure Level or SPLRMS) and the sound exposure level (SEL) which takes account of both the level of the sound, and its duration. Both are measured in decibels (dB). The average sound level SPLRMS is used to measure noise of a continuous nature such as background noise or dredging noise. The sound exposure level SEL provides a means of describing fluctuating sounds such as impulsive sounds arising from pile driving.

A permanent threshold shift (PTS) is permanent hearing damage caused by very intensive noise or by prolonged exposure to noise. A temporary threshold shift (TTS) involves a temporary reduction of hearing capability caused by exposure to noise. At lower sound pressure levels it is more likely that behavioural responses to underwater sound will be observed. These reactions may include the animals leaving the area for a period of time, or a brief startle reaction. Masking effects may also occur at lower levels of noise. Masking is the interference with the detection of biologically relevant communication signals such as echolocation clicks or social signals. Masking has been shown in acoustic signals used for communication among marine mammals (see Clark *et al.,* 2009). Masking may in some cases hinder echolocation of prey or detection of predators. If the signal-to-noise ratio prevents detection of subtle or even prominent pieces of information, inappropriate or ineffective responses may be shown by the receiving organism.

4.2.2.3.1 Marine mammal hearing sensitivity

In comparison to fish, marine mammals are more sensitive to noise at higher frequencies and generally have a wider range of hearing than fish (i.e. their hearing ability spans a larger range of frequencies). The hearing sensitivity and frequency range of marine mammals varies between different species and is dependent on their physiology. For example, odontocete cetaceans (toothed whales, porpoises and dolphins) are particularly sensitive to high frequencies.

4.2.2.3.2 Responses of marine mammals to noise

NOAA (2016) provides technical guidance for assessing the effects of underwater anthropogenic (human-made) sound on the hearing of marine mammal species. Specifically, the received levels, or acoustic thresholds, at which individual marine mammals are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for acute, incidental exposure to underwater anthropogenic sound sources are provided. These thresholds update and replace the previously

proposed criteria in Southall *et al.* (2007) for preventing auditory/physiological injuries in marine mammals.

The NOAA (2016) thresholds are categorised according to marine mammal hearing groups. The key marine mammals species found in the study area comprise harbour porpoise, grey seal and bottlenose dolphin. According to NOAA (2016), harbour porpoise is categorised as a high-frequency cetacean, and grey and harbour seals are categorised as phocid pinnipeds.

Behavioural reactions to acoustic exposure are less predictable and difficult to quantify than effects of noise exposure on hearing or physiology as reactions are highly variable and context specific (Southall *et al*., 2007). A number of field observations of cetaceans and pinnipeds to multiple pulse and non-pulse sounds have been made and are reviewed by Southall *et al.* (2007). The results of these studies are considered too variable and context-specific to allow single disturbance criteria for broad categories of taxa and of sounds to be developed. However, the data provide an indication of the levels of received noise that may result in a moderate behavioural reaction (e.g. avoidance of sound source, startle response).

NOAA (2016) provides a behavioural threshold (i.e. average noise levels with a potential to cause disruption of behavioural patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering) for marine mammals of 160 dB SPLRMS. However, research on the more sensitive harbour porpoise suggests that a lower average noise threshold of 140 dB SPLRMS is appropriate, or in the case of fluctuating noise, a sound exposure level of 138-140 dB SEL.

Rockabill to Dalkey Island SAC is 6.6km seaward from the Port, and Harbour porpoise being a highly mobile species, could be disturbed by underwater noise arising from marine engineering construction works associated with development options at the Port, or by dredging and dumping activities at the licenced dump site.

Lambay Island SAC is 22km by sea from the Port and the seal populations for which it is designated are also highly mobile species. Haul out sites are important to seals for breeding, moulting, resting between foraging trips in the sea and engaging in social activity. They too could be disturbed by underwater noise arising from marine engineering construction works associated with development options at the Port, or by dredging and dumping activities at the licenced dump site.

4.2.2.3.3 Summary of potential effects of underwater noise

Short term development options in the Masterplan 2040 with significant marine engineering construction works include continued construction of the ABR Project, infilling of Berths 52/53, development of a new river berth and the development of Alexandra Basin West.

Medium term development options in the Masterplan 2040 with significant marine engineering construction works include 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 (construction and operation of Unified Ferry Terminal and neighbouring container terminal including demolition and reclamation of berths, construction of a new jetty requiring land reclamation), creation of a 400m manoeuvring space at the eastern entrance to the Port's working quays, 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), reclaiming and redevelopment of 13.8ha for deepwater Lo-Lo and multi-purpose berths.

There are no planned **long term** development options in the Masterplan 2040 with significant marine engineering construction works envisaged.

The potential effects of these development options which include marine engineering construction works and which may be brought forward during the lifetime of the Masterplan include:

- Physical injury or death of individuals resulting from close-range exposure to pile-driving noise.

- Chronic hearing damage or disturbance/displacement as a result of piling or dredging noise.

4.2.2.3.4 ABR Annual Environmental Monitoring Report

Part of the environmental monitoring being undertaken as part of compliance with ABR project permitting compliance includes visual and acoustic monitoring of marine mammals.

22 surveys of the North Bull Island haul out site were completed from May 2016 to May 2017 inclusive. Grey seals were recorded on nine survey days with highest numbers of individuals recorded in June 2016. They were present at the site during the six months from May to October, and absent for the remaining six months during the breeding and moulting season. During this period they probably used offshore islands including Lambay.

Harbour seals were present on North Bull Island year round. Numbers were lowest in the summer months and highest in March and early May. The harbour seal's breeding season occurs from approximately May to June and their annual moult is in August to September, again periods when offshore sites are preferred.

Marine Mammal Observers (MMOs) were engaged during maintenance dredging and spoil dumping operations over 42 days in June and July 2016. Two MMOs were stationed full time on the dredge vessel throughout the dredging and dumping operations. The operations were continuous for almost all of this period except for intervals required for bunkering or dredging equipment repairs. An MMO carried out a minimum 30 minutes visual monitoring of a 500m exclusion zone for the presence of marine mammals before commencement of dredging and dumping activities.

Altogether 606 pre-commencement watches were completed. There were 134 sightings of marine mammals during the campaign. Grey seal was the most commonly recorded species with 76 sightings (57%), followed by harbour porpoise with 56 sightings (42%). There was only one sighting of a

harbour seal and one sighting recorded as unidentified seal. Of the 134 sightings recorded, 61% were recorded during the watch prior to the commencement of dredging and dumping operations and all but two marine mammals were outside the exclusion zones at the time of sighting.

Delays to start of operations were implemented by the MMOs on three occasions. One was due to unsuitable weather conditions for a pre-watch and two related to marine mammals being present in the mitigation zone. Operations were allowed to commence 30 minutes after intruding marine mammals had left the mitigation zone in accordance with protocols agreed with NPWS.

As noted in Section 4.2.1.2.5, the 1st ABR Annual Environmental Monitoring Report summarises environmental monitoring works undertaken during the first year of the ABR Project. These works included underwater noise measurement during (i) driving of 2 no test piles as part of construction of a new quay wall at Cross Berth Quay in Alexandra Basin West; and (ii) a dredging campaign in June and July 2016.

At Cross Berth Quay in Alexandra Basin West, a hydraulic hammer type rig was used to install the 1,420 mm diameter piles ('King' piles) 25m inland from the quayside. Hydrophones were located in Alexandra Basin West (250 m from the piling source) and at the ESB pontoon (2.5km from the piling source). The average sound exposure level (SEL) recorded in the basin was approximately 128 dB. Even at this short distance, this is below the SEL at which disturbance of harbour porpoise occurs. Piling noise was not detected at all at the down-river hydrophone location where only background levels of noise were recorded. The results indicate that in this land based piling trial, noise was fully attenuated by 2.5km from the source, and that at 250m from the source noise levels were below the SEL at which disturbance of sensitive marine mammals might be expected. These findings validated earlier modelled predictions in the ABR project EIS.

As regards dredging, underwater noise measurements were taken in July 2016 at three locations in the Dublin Port channel during trailer suction hopper dredging activity, and at one location at the Dublin Bay spoil grounds during dumping of dredged material. The recorder was deployed so that the dredger would pass within 100m at its closest when operating.

On one of the measuring occasions in the channel, it was impossible to distinguish the dredger noise from the noise of other passing ships and normal background noise. On the other two occasions, one when the hydrophone was 213 m from the dredger, and the other when it was 268 m away, the sound levels (SEL 133.6 dB and 138.0 dB respectively) were below the levels that cause any disturbance for the sensitive harbour porpoise.

The measurements at the dumpsite were recorded 90m from the operating dredger. At this distance the noise (SEL 142.7 dB) was marginally above the disturbance level for Harbour porpoise, but it was still below the disturbance level for marine mammals in general.

To inform an assessment for an EIS and NIS of likely underwater noise effects of construction of the ABR project on marine mammals, noise generated from marine piling activities in Alexandra Basin East was measured in 2014 and used to create an underwater noise model for Dublin Port and the wider bay area, which incorporated site specific geological and bathymetric information. This model indicated that piling noise levels reduce to background levels within 500m of the source, and that piling noise was not audible at any point outside the North Bull Wall or Great South Wall.

4.2.2.4 Summary for Underwater Noise and Disturbance Effects

Having considered the conservation objectives set for marine mammals in the Rockabill to Dalkey Island SAC and Lambay Island SAC, and having discussed the possible effects of underwater noise and disturbance on these QIs and the outcome of monitoring at Dublin Port, what this discussion reveals is that:

- the marine area within the Port is not important for marine mammals
- the marine area outside of the port is very important for marine mammals
- underwater noise can result in -
    - physical injury or death of individuals resulting from close-range exposure to pile-driving noise, or
    - chronic hearing damage or disturbance/displacement as a result of piling or dredging noise
- marine piling inside the port -
    - produces significant underwater noise levels
    - reduces to background levels within 500m of the source
- deployment of MMOs to implement NPWS guidelines for marine mammals is effective

The range of Harbour porpoise within the Rockabill to Dalkey Island SAC will not likely be restricted by artificial barriers to site use, and achieving the SSCO attribute 'Access to suitable habitat' shall not likely be impeded or prevented by development options brought forward during the lifetime of the Masterplan. The target for SSCO attribute 'Disturbance' is that human activities should occur at levels that do not adversely affect the harbour porpoise community at the site. Individuals of the Harbour porpoise community could suffer physical injury, hearting damage and disturbance or displacement by underwater noise levels generated by marine construction of development options brought forward during the lifetime of the Masterplan. Mitigation is required to ensure that such possible effects do not occur so as to adversely affect the harbour porpoise community in Rockabill to Dalkey Island SAC.

It is concluded that an AEIS is not predicted as a result of underwater noise or disturbance with suitable mitigation in place. Mitigation is described in Section 5 of this report.

The range of grey seals and harbour seals within Lambay Island SAC will not likely be restricted by artificial barriers to site use, and achieving the SSCO attributes of 'Access to suitable habitat', 'Breeding behaviour', 'Moulting behaviour' and 'Resting behaviour' shall not likely be impeded or prevented by development options brought forward during the lifetime of the Masterplan.

The target for SSCO attribute 'Disturbance' is that human activities should occur at levels that do not adversely affect the seal populations at the site. Individuals of the seal populations could suffer physical injury, hearting damage and disturbance or displacement by underwater noise levels generated by marine construction of development options brought forward during the lifetime of the Masterplan. Mitigation is required to ensure that such possible effects do not occur so as to adversely affect the harbour seal or grey seal populations in Lambay Island SAC.

It is concluded that an AEIS is not predicted as a result of underwater noise or disturbance with suitable mitigation in place. Mitigation is described in Section 5 of this report.

4.2.3 Aerial Noise and Visual Disturbance

Looking next at the possibility of adverse effects as a result of aerial noise and visual disturbance, the Screening for appropriate assessment report could not discount the possibility of LSEs on the conservation objectives of South Dublin Bay and River Tolka Estuary SPA. The possibility of LSEs as a result of aerial noise and disturbance on other SPA sites was discounted at screening stage.

In assessing the risk at this second (appropriate assessment) stage, further evaluation and analysis must be undertaken to characterise the impacts that may occur, and to apply measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects to determine whether or not AEIS will occur.

4.2.3.1 Conservation Objectives

The SPA is designated for 13 no regularly occurring migratory waterbird species including 3 no breeding and/or passage species of tern. Section 4.2.1.4 discusses possible adverse water quality and habitat deterioration effects on the Common, Arctic and Roseate Tern available prey biomass SSCO attribute, which is not discussed further here.

Grey Plover is proposed for removal from the list of SCIs for South Dublin Bay and River Tolka Estuary SPA, and as a result, a SSCO has not been set for this species.

The CO for the remaining 9 no overwintering species SCIs is to maintain the favourable conservation condition of the target species in South Dublin Bay and River Tolka Estuary SPA, as defined by 2 no SSCO attributes and targets:

Population trend: Long term population trend stable or increasing

Distribution: No significant decrease in the range, timing or intensity of use of areas by the target species, other than that occurring from natural patterns of variation

The targets for the SSCO attribute 'Population trend' is measured in '% change'. The target for 'Distribution' is measured in 'Range, timing and intensity of use of areas'.

The CO for Roseate Tern and Arctic Tern is to maintain the favourable conservation condition of the two species in South Dublin Bay and River Tolka Estuary SPA, as defined by 5 no SSCO attributes and targets. Prey biomass available is dealt with in Section 4.2.1.4. The remaining SSCOs are:

Passage population: Individuals: No significant decline

Distribution: Roosting areas: No significant decline

Barriers to connectivity: No significant increase

Disturbance at roosting site: Human activities should occur at levels that do not adversely affect the numbers of roseate tern (or arctic tern) among the post-breeding aggregation of terns

The target for the SSCO attribute '*Passage population: Individuals*' is measured in 'number'. The target for '*Distribution: Roosting areas*' is measured in 'Number; location; area (hectares)'. The target for '*Barriers to connectivity'* is measured in 'Number; location; area (hectares)'. The target for '*Disturbance at roosting site'* is measured in 'Level of impact'.

The CO for Common Tern is to maintain the favourable conservation condition of the species in South Dublin Bay and River Tolka Estuary SPA, as defined by 9 no SSCO attributes and targets. Prey biomass available is dealt with in Section 4.2.1.4. The remaining SSCOs are:

Breeding population abundance: apparently occupied nests (AONs): No significant decline

Productivity rate: fledged young per breeding pair: No significant decline

Passage population: Individuals: No significant decline

Distribution: *breeding colonies*: No significant decline

Barriers to connectivity: No significant increase

Disturbance at breeding site: Human activities should occur at levels that do not adversely affect the breeding common tern population

Disturbance at roosting site: Human activities should occur at levels that do not adversely affect the numbers of common tern among the post-breeding aggregation of terns

The target for the SSCO attribute '*Breeding population abundance: apparently occupied nests (AONs)'* is measured in 'number'. The target for the SSCO attribute '*Productivity rate: fledged young per breeding pair'* is measured in 'mean number'. The target for the SSCO attribute '*Passage population: Individuals*' is measured in 'number'. The target for '*Distribution: breeding colonies'* is measured in 'Number; location; area (hectares)'. The target for '*Distribution: Roosting areas*' is measured in 'Number; location; area (hectares)'. The target for '*Barriers to connectivity'* is measured in 'Number; location; area (hectares)'. The target for '*Disturbance at breeding site'* is measured in 'Level of impact'. The target for '*Disturbance at roosting site'* is measured in 'Level of impact'.

4.2.3.2 Development Options

This SPA flanks both the northern and southern port lands, and as outlined in Section 3.4, short term development options will be focused in the northern port lands whilst medium tern development options will be focused on both northern and southern port lands.

Short term development options in the Masterplan 2040 with significant marine engineering construction works include continued construction of the ABR Project, infilling of Berths 52/53, development of a new river berth and the development of Alexandra Basin West.

Medium term development options in the Masterplan 2040 with significant marine engineering construction works include 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 (construction and operation of Unified Ferry Terminal and neighbouring container terminal including demolition and reclamation of berths, construction of a new jetty requiring land reclamation), creation of a 400m manoeuvring space at the eastern entrance to the Port's working quays, 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), reclaiming and redevelopment of 13.8ha for deepwater Lo-Lo and multi-purpose berths.

There are no planned **long term** development options in the Masterplan 2040 with significant marine engineering construction works envisaged.

Development of the public realm and a greenway will interface with the Tolka Estuary along the perimeter of the northern port lands under short term proposals, with proposed port road network improvements behind this greenway corridor. Similarly, development of the public realm and a greenway (and to a lesser degree port road improvements also) will interface with South Dublin Bay/Sandymount Strand under medium term proposals. The MP2 project will abut the SPA at the eastern edge of the northern port lands in the medium term. The overwintering bird assemblage

feeds in these parts of the SPA on low tide. Reclamation and redevelopment of deepwater berthage on the southern port lands will occur where the principal breeding colonies of the tern populations are located.

In short, a number of the short term and medium term development options described in Section 3.4 are envisaged to interface with the South Dublin Bay and River Tolka Estuary SPA and could include significant noise and or visual stimuli resulting in decreased range, timing or intensity of use of areas of the SPA by the target overwintering species or disturbance at the breeding and/or roosting sites of the target tern species.

4.2.3.3 Waterbird Disturbance

Disturbance often implies a short-term or temporary effect that is unlikely to impact upon the individuals or populations of waterbirds concerned. However, it is a term that covers a wide range of responses in waterbirds. Waterbirds are defined as "birds that are ecologically dependent on wetlands'' (Ramsar Convention 1971). Disturbance is any situation in which human activities cause a bird to behave differently from the behaviour it would be reasonably expected to exhibit without the presence of that activity.

In the estuarine environment, disturbance can manifest in a number of forms of varying severity depending on the nature, duration and intensity of the disturbance source:

- Birds looking up or heads raised, temporarily stopping feeding or roosting
- Birds moving away from the cause of the disturbance by walking or swimming before resuming previous activity
- Birds taking flight and landing somewhere in the same feeding area or mudflat
- Birds taking flight and leaving the target area completely

The resulting effects of disturbance episodes for estuarine birds are variable. In general, each subsequent level of severity will result in a greater reduction in feeding time, and greater energy expenditure. Flushing is an energetically expensive activity that increases energy expenditure and can result in decreases in the overall fitness of a population, which in turn can lead to reduced breeding success and increased mortality. Birds that are more tolerant than other individuals and remain in an area affected by disturbance may not forage efficiently. If there are additional pressures on the birds (for example cold weather), then this may impact upon the survival of individual birds or their ability to breed later in the year. The term habituation is used to describe birds that have become accustomed to particular sources of disturbance.

Additionally, at breeding seabird colonies such as those which occur on some structures in the Port, a response to disturbance can be a moderate response such as a heads up, or walking behaviour. The

most extreme response is flushing. Flushing during incubation or chick-rearing periods can lead to egg or chick loss because of displacement from the breeding site, egg breakage or predation. Effects of flushing on birds that are not attending eggs or chicks include disruption of courtship, nest site defence and prospecting activities.

A range of literature to assist with the analysis and assessment has been consulted for estuarine and marine environment. The sounds that birds hear can be divided into non-threatening sounds, to which birds may be habituated and threatening sounds. Examples of non-threatening sounds are constant background traffic noise or regular recurring operational port noise. Threatening sounds include impulsive sounds such as rock breaking or piling. A study on the Humber estuary (IECS, 2009) concluded that birds become habituated to regular noise below 70dB. 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 levels above 72.25dB(A), flight with abandonment of the site becomes the most likely outcome of the disturbance.

Cutts *et al*. (2009) 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. At levels above 85dB(A), response includes preparing to fly away, flying away and possibly leaving the area (**Figure 4.1**).

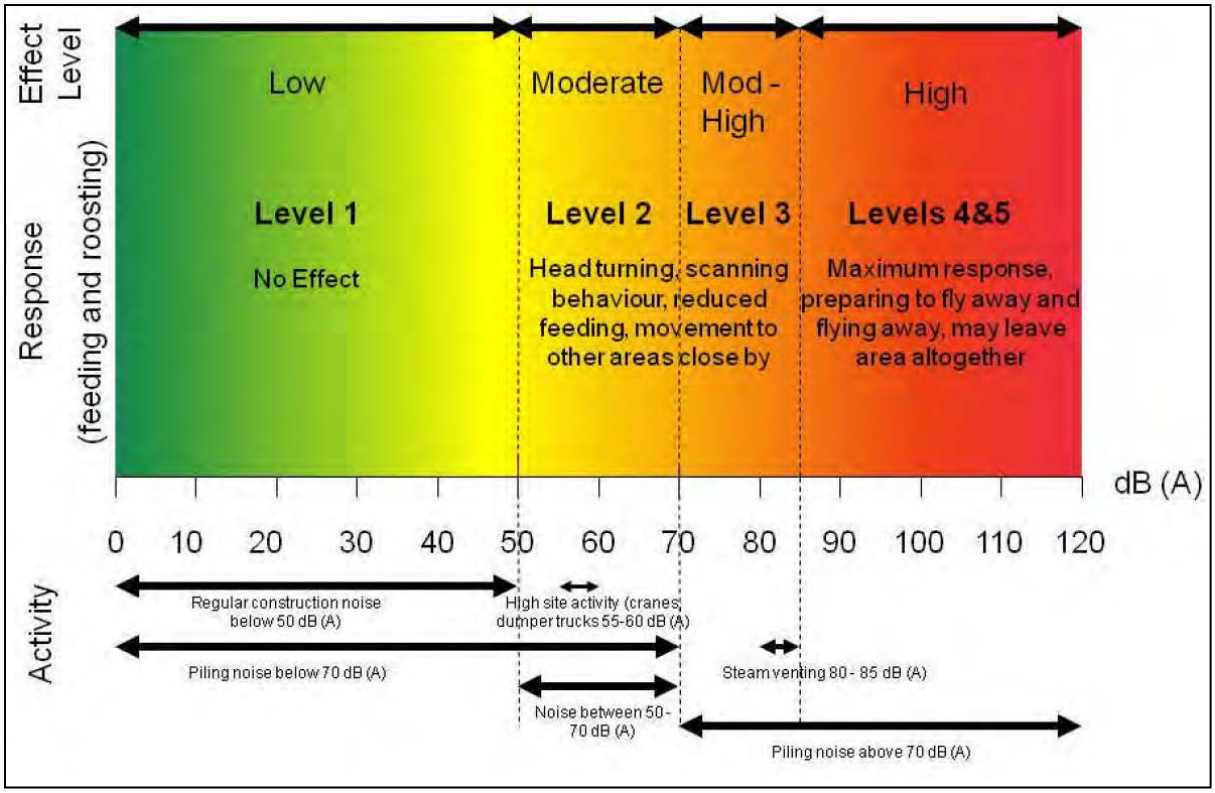

Figure 4.1 Waterbird response to construction disturbance (from Cutts *et al*., 2009)

The authors of that paper recommend that ambient construction noise levels should be restricted to below 70dB(A), as birds will habituate to regular noise below this level (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.

Phalan and Nairn (2007) reported on disturbance to waterbirds in South Dublin Bay. Waterbird numbers, human activities and disturbance events were systematically recorded at Irishtown in South Dublin Bay over a three-month period in the winter of 2000/2001. Birds feeding in the study area generally seemed habituated to people, dogs and vehicles that moved predictably along paths, and even to low-flying aircraft.

Sensitivity to disturbance varies between bird species and also dependent upon other factors, including, bird activity at the time of disturbance, frequency of disturbance, distance from the disturbance source, visual disturbance levels and seasonality. As an example one study (Smit *et al*., 1993) found that brent geese, curlew and redshank were among those species which react most strongly to aircraft noise, with shelduck and bar-tailed godwit react less often.

A review of the impacts of capital and maintenance dredging in the Tamar estuary, in south-west England, was published by Widdows *et al.* (2007). This estuary is a SPA under the EU Birds Directive which requires annual maintenance dredging as well as occasional capital dredging for new installations. Maintenance dredging here involves annual removal of between 5,000 and 200,000 tonnes of dry sediment per year. During two periods of capital dredging in the Tamar, the amount of sediment dredged was between 500,000 and 700,000 tonnes per year. Annual estimates for ten species of wildfowl and waders were analysed over several decades in the Tamar Estuary. There were no significant correlations between overwintering bird numbers and dredging activity. Declines in Teal and Wigeon over 30 years were related to milder winters which changed the migratory patterns of these species. An assessment of the ecological impacts of maintenance dredging noise in the Plymouth Sound and Estuaries European Marine Site reached similar conclusions (Debut Services, 2011)

4.2.3.3.1 ABR Project

As part of the ornithological assessment of possible effects of ABR project construction noise on the South Dublin Bay and River Tolka Estuary SPA SCIs, the aerial noise model was interrogated to determine likely noise levels at the nearest part of the SPA from the closest significant noise generating activity, which was pile-driving at Berths 52/53. This site is approximately 120m from the nearest boundary of the SPA. A worst-case predicted noise level of 51dB(A) was predicted at the

nearest point of the Tolka Estuary section of the SPA in circumstances where the entire site of pile-driving is screened from the Tolka Estuary on the eastern and northern sides of the Berths by the elevated embankment of the seawall, by stock-piles of sand and gravel and by buildings and other port structures. These features were deemed to significantly attenuate any aerial noise arising from proposed piling operations.

Given this attenuation, the distance of 120m to the SPA, and the fact that the predicted noise from this activity was in the lower end of the moderate effect category of Cutts *et al*. (2009); it was predicted that birds in all parts of the SPA would be expected to rapidly habituate to noise from pile-driving operations and there will be no adverse impacts.

4.2.3.4 Waterbirds in South Dublin Bay and River Tolka Estuary SPA

4.2.3.4.1 Dublin Bay Birds Project

The Irish Wetland Bird Survey (I-WeBS) has since 1994/95, provided the evidence that shows that Dublin Bay is an internationally important site, regularly featuring within the top-10 most important sites in Ireland (Hutchinson, 1979; Sheppard, 1993; Crowe, 2005; Boland and Crowe, 2012). I-WeBS undertakes (mainly) rising-tide counts to establish the size of the waterbird populations at wetland sites throughout Ireland. However, these winter-time surveys can only provide part of the picture.

The purpose of the Dublin Bay Birds Project (2013-2016) is to compile a comprehensive dataset on the waterbirds in Dublin Bay and the extent of their usage of the area to serve as a baseline upon which future monitoring can be compared. It is managed by BirdWatch Ireland with support from DPC and the Dublin Bay Biosphere Partnership.

4.2.3.4.1.1 Surveys

A programme of bi-monthly waterbird surveys took place in each month between July 2013 and June 2016 covering all of Dublin Bay recording the distribution and abundance of waterbirds and seabirds at low tide, when intertidal flats are exposed and available for feeding, and at high tide, when most birds are roosting.

Annual Gull Roost surveys were carried out each February to determine the number of gulls that use Dublin Bay for roosting at night. A further four dusk gull roost surveys focused on the Tolka Estuary, as it is known to be important for roosting gulls.

Eighteen ‘All-day’ focused observations were carried out on the outer Tolka Estuary (the nearest part of the Bay to Dublin Port) between October 2013 and April 2016. This involved surveying waterbirds and seabirds iteratively throughout daylight hours in order to record how waterbird and seabird species use the area throughout the tidal cycle.

Low tide surveys on spring tides were also carried out on seven occasions during the winter months between September 2013 and March 2016, during daylight hours on the outer Tolka Estuary to

measure waterbird and seabird occupancy during extreme low tide events, when areas of mud and sand that are not usually exposed become available for exploitation by foraging waterbirds and seabirds.

Monitoring of the Common Tern (*S. hirundo*) and Arctic Tern (*S. paradisaea*) colonies in Dublin Port was undertaken each breeding season, by conducting an annual nest census and determining productivity (the number of chicks raised per egg-laying pair). In 2015 and 2016, an additional project element was added, namely the colour-marking of Common and Arctic Tern chicks that will facilitate future assessments of juvenile recruitment into the breeding population.

Dusk post-breeding tern surveys were carried out on the intertidal sandflats between Poolbeg and Dun Laoghaire on 26 evenings, each August and September, between 2013 and 2016. Two surveys took place on Dollymount Strand in August and September 2016. Surveys involved counting the flocks of terns as they arrived to roost on the sandflats each evening.

A programme of wintertime wader ringing and post-breeding season tern ringing was also carried out at several locations across Dublin Bay between 2013 and 2016. Oystercatcher, Bar-tailed Godwit and Redshank, were chosen as target species for in-depth research, which involved assessing local and long-distance movements of birds at an individual level, through radio-tracking and colour-ringing, respectively.

4.2.3.4.1.2 Tolka Estuary and Dublin Port

Outputs from this project reveal that the Tolka Estuary, Liffey Channel and Dublin Port are totally covered with water at high tide, and thus this part of the study area is mostly used for foraging during other tidal states. There are no significant high tide roosts.

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, and specific observations were undertaken on the outer Tolka Estuary to determine the importance of the area during such conditions, which are highly infrequent.

The Liffey Channel is mainly used by gulls, Black Guillemots and Cormorants for feeding and roosting. The Alexandra Basin is used by foraging gulls and Brent Geese throughout the tidal cycle and the use of this area by birds is likely to be governed by the availability of spilled agricultural produce.

4.2.3.4.1.3 South Dublin Bay

At low tide, waders and gulls were widely distributed across Sandymount Strand. Some waders, notably Oystercatcher, Curlew and Redshank, were recorded foraging in nearby terrestrial areas. Most of the wildfowl that use this region were in Booterstown Marsh, but Brent Geese were regularly observed on the strand, especially in early winter. However, as the tide rises, the amount of intertidal foraging area is dramatically reduced and most of the birds were recorded roosting on the sand spit at Merrion Gates. This region supported the highest number of species of any part of the project area, with more than 29 species recorded across all survey types in all months.

This South Dublin Bay region of the SPA is especially important for waders, both as a foraging and roosting area. Oystercatchers occurred in nationally important numbers from August through to February, and during this time 45% of the Dublin Bay total occurred on Sandymount Strand.

Sandymount Strand was particularly important for Ringed Plover, supporting almost 80% of the Dublin Bay total during the winter months. Ringed Plovers were recorded in nationally important numbers in August and October. Knot numbers on Sandymount Strand exceeded the threshold for national importance between November and March, and on these occasions, almost half (45%) of the Dublin Bay total were on Sandymount Strand. Sanderling occurred in nationally important numbers in six months between August and February, and Sandymount Strand was also important for the passage populations that spend time in Dublin Bay in May en route to their breeding grounds.

The number of Dunlin in this region exceeded the threshold for national importance between November and March. Black-tailed Godwits occurred in nationally important numbers in Booterstown Marsh in April, August, September and October (during the period when birds are moving to and from breeding grounds in Iceland). Bar-tailed Godwits occurred in nationally important numbers throughout the non-breeding season, from August to March, and Sandymount Strand supports about 40% of the Dublin Bay total during this period.

4.2.3.4.1.4 Breeding Terns

As well as the wintering birds, Common Terns and Arctic Terns have been known to breed in the Dublin Port area since at least 1949 (Merne 2004). Each year since 1994, they have nested on two isolated mooring dolphins situated on the south side of the port, with Common Terns almost exclusively on the ESB dolphin and Arctic Terns on the CDL dolphin. They typically arrive in April and remain within the area up until their nesting period has ended, usually around late July. The ESB dolphin comprises a wooden platform and a concrete one, which are connected by a gangway. This serves as the principal breeding site for Common Terns in Dublin Port and is included in the South Dublin Bay and River Tolka Estuary SPA. This dolphin has been managed to facilitate breeding terns

since 1995, when the nesting substrate was improved by adding a layer of gravel and chick shelters, and a wooden perimeter barrier was installed. Subsequent maintenance has been undertaken on several occasions, with the most recent occurring in spring 2014. However, since 2014, there has been significant deterioration to the structural integrity of the dolphin. Due to subsidence, it was deemed unsafe to alight on the wooden section of this dolphin in 2015 and 2016, and the wooden section was demolished on safety grounds after the 2016 breeding season.

The CDL dolphin is regularly used for mooring ships, but in 2016 a wooden perimeter was affixed to the edge of the structure to prevent chicks from falling into the water when vessels were being secured. In 2013, a specially modified pontoon was floated in the Tolka Estuary and this structure (known as Pontoon No. 1) has been used by nesting terns in each year since deployment. Then, in 2015, a second, larger modified pontoon (Pontoon No. 2) was floated at the Great South Wall at Poolbeg. In spring 2016, it was relocated and moored alongside the ESB dolphin for the duration of the breeding season. This means that there were four structures available for nesting terns within the Port in 2016 and 2017.

The expansive sandflats on Sandymount Strand serve as a post-breeding staging site for Roseate, Common and Arctic Terns. This phenomenon was first noted in 1959 (Merne *et al*. 2008) and dedicated dusk counts have taken place sporadically since then. Merne (2010) reported an average of 2,845 terns in the 2010, Merne *et al*. (2008) reported averages of 3,868 and 2,344 terns in 2006 and 2007, and an average of 1,230 was recorded between 2002 and 2004. In 1998 and 1999, Newton & Crowe (1999) recorded total counts of 2,000 and 5,040 terns.

Typically, the number of terns using Sandymount Strand builds from late July onwards when birds disperse from the breeding colonies. There are roosting terns present on Sandymount Strand for up to two months each year, building reserves for migration and commencing their moult (Ginn and Melville, 1983; Cabot and Nisbet, 2013). Five species of tern, namely Black Tern, Sandwich Tern, Common Tern, Roseate Tern and Arctic Tern have been recorded regularly, and Little Terns have been reported occasionally. This staging site is especially important as there are only a small number of other such sites in the Irish Sea, in the southeast of Ireland close to the Lady's Island Lake Tern colony in Wexford, and on the west coast of England at Seaforth, near Liverpool.

During this project, peaks of 6,645 in 2013, 2,264 in 2014, 4,035 in 2015 and 17,440 terns in 2016 were recorded (Tierney *et al*. 2016b). The peak number of terns recorded in (August) 2016 is the second highest total ever recorded at the site. This post-breeding roost is located within c.30km of three breeding colonies: Rockabill (Common, Roseate and Arctic Terns), Dublin Port (Common and Arctic Terns) and the Dalkey Islands (Common, Roseate and Arctic Terns); and many of the terns that occur in the Sandymount roost are thought to originate from these breeding colonies.

4.2.3.4.2 ABR Annual Environmental Monitoring Report

The 1st Annual Environmental Monitoring Report includes results of ornithological monitoring surveys. Three bird species in particular that nest within the port area are being monitored during the nesting season to ensure that the ABR Project will not have adverse effects on them. The species are the Black Guillemot, a seabird that nests in crevices within the quays and other structures, and the Common Tern and Arctic Tern, seabird species that nest on permanent structures and floating pontoons within Dublin Port.

In addition to the census of nesting seabirds, a Winter Wetland Bird Monitoring Programme is carried out in the South Dublin Bay and River Tolka Estuary SPA. This includes all intertidal areas between Dun Laoghaire West Pier and the North Bull Wall.

A comparison between total number of nests in each of the sub-sites over the five years 2012-2016 shows that despite the installation of the two pontoons in recent years (as discussed in Section 4.2.3.4.1.4) the number of nests in the overall colony had declined even though the area of available nesting space provided by the two new pontoons, is greater than the reduction in nesting space on the ESB wooden platform. The number of nests in the port colony has decreased by 8.2% between 2015 and 2016 and are now 5.6% lower than the 4-year mean (2012 – 2015). This decrease in the number of nests is likely to be a result of the reduced nesting space on the ESB wooden platform, which has been the favoured nesting site over many years. This decrease is likely to have been buffered by the relocation of Pontoon No. 2, which saw a considerable increase in the number of birds nesting on it. However, it may take several years before this pontoon is one of the most favoured sub-sites. The reduction in the number of nesting terns could be partly attributed to the complete colony failure in 2012, as the almost zero productivity in that year will likely have lowered the recruitment rates in 2015 and 2016, but it is also probable that birds will be recruiting from nearby productive colonies, such as Rockabill. The greatly reduced number of Arctic Terns is a result of the abandonment of the CDL dolphin in 2016.

4.2.3.5 Summary for Aerial noise and visual disturbance effects

The assessment has given consideration to:

- the conservation objectives set for the SCIs of South Dublin Bay and River Tolka Estuary SPA;

- the possible effects of noise and disturbance (in particular how a number of the short term and medium term development options could include significant noise and or visual stimuli resulting in decreased range, timing or intensity of use of areas of the SPA by the target overwintering species; or disturbance at the breeding sites of the target tern species); and

- the occurrence of the SPA SCI species in coastal locations around Dublin Port through various recent monitoring programmes.

This discussion reveals that:

- the marine area within the Port is not important for overwintering SPA SCI species
- the marine area within the Port is of great significance for breeding tern SPA SCI species
- the intertidal areas outside of the port in the Tolka Estuary and South Dublin Bay are very important for overwintering SPA SCI species and post-breeding tern SPA SCI species
- aerial noise and visual disturbance stimuli can result in -
    - energetically expensive behavioural responses
    - decreases in the overall fitness of a population
    - reduced breeding success or increased mortality
- deployment of noise barriers and visual screens is an effective way to reduce disturbance

The long term population trend and distribution (range, timing or intensity of use of areas of the SPA by the target species) of wintering bird SCIs is not likely to be adversely affected by the vast majority of development options brought forward during the lifetime of the Masterplan, however development of the public realm and greenway will interface with the SPA Tolka Estuary along the perimeter of the Northern Port Lands under short term proposals, with proposed port road network improvements behind this greenway corridor. Similarly, development of the public realm and a greenway (and to a lesser degree port road improvements also) will interface with South Dublin Bay/Sandymount Strand under medium term proposals. These development options will result in people moving along a corridor adjacent to the SPA, and in all likelihood stopping to take in views overlooking the SPA. The MP2 project will abut the SPA at the eastern edge of the northern port lands in the medium term. This will include tall structures or buildings overlooking the SPA, and a new jetty is proposed to be located at or in close proximity to the SPA boundary in a subtidal area at the southeastern corner of Terminal 5 lands. The overwintering bird assemblage feeds on low tide in the parts of the SPA adjacent to the proposed greenway corridors and at the eastern port where MP2 proposals are to be located.

The long term passage population trend of the tern species SCIs; the distribution of their roosting areas; barriers to connectivity and disturbance of post-breeding aggregations of terns at their roosting sites are SSCOs not likely to be adversely affected by any development options brought forward during the lifetime of the Masterplan.

Additional SSCOs for Common Tern are ‘Productivity rate’ and ‘Disturbance at breeding site’, and reclamation and redevelopment of deepwater berthage on the southern port lands in the medium term of the Masterplan will occur where the principal breeding colonies of the tern populations are located. These SSCO attributes are likely to be significantly affected by development options for reclamation

and redevelopment of existing south port lands to provide new deepwater Lo-Lo and multipurpose berths brought forward in the medium term of the Masterplan.

Whilst the terns are very resilient seabirds that have chosen to breed on structures in Dublin Port, they breed on structures separated from port activities by a stretch of open water in the Liffey channel. The CDL dolphin (a NHA) is >20m from shore. The ESB dolphin (a SPA) is >100m from shore. Pontoon No.1 is in the Tolka Estuary >100m from shore. Pontoon No.2 is located adjacent to the new nesting platform on the ESB dolphin near Pigeon House Harbour and it too is >100m from shore. Reclamation and redevelopment of existing south port lands to provide new deepwater Lo-Lo and multipurpose berths will require marine demolition and construction in close proximity to and in full view of the tern colony at the locations noted above (with the exception of Pontoon No.1 in the Toka Estuary). It is very likely that if such works were to be undertaken within the breeding season, or spanning a number of consecutive breeding seasons, a loss of attractiveness of the nest sites would occur, disturbance at the breeding sites would occur and a reduction in productivity would occur.

A similar type of effect arose at a Common Tern breeding colony in Ringaskiddy Deepwater Port in Co. Cork where the colony was located approximately 30m from proposed port redevelopment, and significant screening and timing restriction measures were conditioned to the consent issued for port redevelopment by the competent authority to ensure the favourable conservation condition of Common Tern was maintained in Cork Harbour SPA.

As such, mitigation is required to ensure that such possible effects do not occur so as to adversely affect disturbance at the breeding site of Common Tern; or the range, timing or intensity of use of intertidal areas by overwintering waterbird species in South Dublin Bay and River Tolka Estuary SPA.

It is concluded that an AEIS is not predicted as a result of aerial noise or visual disturbance with suitable mitigation in place. Mitigation is described in Section 5 of this report.

4.2.4 Habitat Loss

Looking finally at the possibility of adverse effects as a result of habitat loss, the Screening for appropriate assessment report could not discount the possibility of LSEs on the conservation objectives of South Dublin Bay and River Tolka Estuary SPA. The possibility of LSEs as a result of habitat loss on other SPA sites was discounted at screening stage.

In assessing the risk at this second (appropriate assessment) stage, further evaluation and analysis must be undertaken to characterise the impacts that may occur, and to apply measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects to determine whether or not AEIS will occur.

4.2.4.1 MP2 Project

Part of the MP2 project anticipated to be brought forward during the medium term of the Masterplan period include construction of a new jetty requiring land reclamation and creation of a 400m manoeuvring area at the eastern edge of the port. These development options are located adjacent to (in the case of the new jetty) and in close proximity to (in the case of the manoeuvring area) the South Dublin Bay and River Tolka Estuary SPA. Modifications to the seabed bathymetry in this area or introduction of new marine structures could change the tidal flow regime or wave patterns in that portion of the SPA adjacent to the eastern edge of the Northern Port lands. These changes which may modify the current sedimentation and scouring patterns in the SPA could possibly result in net loss of intertidal habitat or changes to the type of benthic habitats (and their productivity as a food resource for waders and waterbirds) in this portion of the SPA.

Such an outcome would likely result in a significant decrease in the range, timing or intensity of use of these intertidal areas of the SPA by SCI species, leading to AEIS. As such, mitigation is required to ensure that such possible adverse effects do not occur.

It is concluded that an AEIS is not predicted as a result of habitat loss with suitable mitigation in place. Mitigation is described in Section 5 of this report.

4.2.4.2 Redevelopment of South Port Lands

As noted in Section 4.2.3.1, this SPA is designated for 13 no regularly occurring migratory waterbird species including 3 no breeding and/or passage species of tern, and COs for these SCI species are described there. It has been previously discussed (under the aerial noise and visual disturbance impact pathway section) how reclamation and redevelopment of existing south port lands to provide new deepwater Lo-Lo and multipurpose berths could result in a loss of attractiveness of the tern species nest sites leading to possible disturbance and/or reduced productivity. There is also however a very real possibility that when the design of development options for these new deepwater berths at the south port is advanced to a project stage level, locating the new deepwater berths and associated dredged areas may be incompatible with the existing locations of the tern colonies atop the ESB and CDL dolphins.

Removal of the dolphins would do more than simply disturb the terns at their breeding site – it would result in the loss of the breeding site of Common Tern within the South Dublin Bay and River Tolka Estuary SPA which would inevitably cause a significant decline in three of the nine SSCOs set for Common Tern, leading to AEIS:

(i) Breeding population abundance;

(ii) Productivity rate; and

(iii) Distribution of breeding colonies

That there are other moveable locations (e.g. Pontoon No's 1 and 2) for the tern colonies to breed at is extraneous. Important precedents settled by recent European case law [Briels C-521/12 (2014); Orleans C-387/15 (2016)] mean that conservation measures implemented in advance of a project level consent by a competent authority cannot be taken into consideration in an assessment of the implications of a project which will result in the loss of the breeding site within the SPA. Also, protective measures provided for in a proposed project which are aimed at compensating for the negative effects of the project on a European site cannot be taken into account in the assessment of the implications of the project provided for in Article 6(3).

A significant decline in three of the nine SSCOs set for Common Tern would lead to AEIS. This will require compensation measures to be taken, and only when the requirements of Article 6(4) of the Habitats Directive 92/43/EEC have been met. Compensation measures are described in Section 5 of this report.

4.2.5 In-Combination Effects

Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are considered. It is envisaged that port operations will be ongoing in tandem with all development options being brought forward as projects throughout the life of the Masterplan. The simultaneous construction of several developments is likely to result in temporary, cumulative and in-combination impacts on the wider environment unless well phased and well planned approaches are developed that can minimise or eliminate the potential for these collective construction impacts.

A number of in-combination effects with other Plans and Programmes have been identified. The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 and the Dublin City Development Plan 2016-2022 have the potential for impacts in relation to planned infrastructure. In particular, the Poolbeg West SDZ in the Southern Port Lands is zoned for mixed use development (to principally comprise residential development, commercial and employment activities) which may be realised in the timeframe of the Masterplan. Development in the area surrounding the Port Estate also includes a 170,000 square foot office building which was approved in March 2016 to be built in Point Square, and will accommodate up to 2,000 commuting employees. The project level developments envisaged by these Plans will result in more people regularly occurring both in proximity to Dublin Port and the surrounding European sites.

Visitor pressures may increase and the possibility of an in-combination effect arises as a result of increased demand for and use of the Greenways along the edges of the northern and southern port lands due to the policies, objectives and zonings contained in the Regional Planning Guidelines for the Greater Dublin Area and the Dublin City Development Plan. The principals of screening will however be applied to the detailed design of the Greenways to ensure that they do not cause a significant decrease in the range, timing or intensity of use of intertidal areas by overwintering waterbird species in South Dublin Bay and River Tolka Estuary SPA.

5 MITIGATION MEASURES

The section sets out the strategic approach to mitigation to address potential adverse effects on the integrity of Natura 2000 sites as identified in Section 4 above.

Mitigation measures are aimed at minimising or cancelling the potential adverse effects of a plan or project on a European site, during or after completion, and form an integral part of the specifications of the project (EC, 2000). In addition, they must ensure the continuity of biological processes and protect the overall coherence of the Natura 2000 network (EC, 2011).

5.1 MITIGATION AT PLAN LEVEL

UK Department for Transport guidance on Port Masterplanning (DfT, 2008) acknowledges that it is not always possible to identify detailed mitigation or offsetting measures for all potential environmental impacts of new development at the Masterplan stage, leaving that level of detail to the project level assessment stage

In [2015] EWCA Civ 88 (*No Adastral New Town Limited (NANT) v Suffolf District Coastal Council*), the UK Court of Appeal determined that appropriate assessment of a Plan can leave the detail of project specific mitigation or offsetting measures to be decided at the later project consent stage. The case relates to a Core Strategy adopted by the Council, which includes a Strategic Policy to zone an area in proximity to Deben Estuary SPA for housing. The development and adoption of the Core Strategy was subjected to assessment under the SEA and Habitats Directives.

The Court stated that the important question in a case such as this is not whether mitigation measures were considered at the stage of Core Strategy in as much detail as the available information permitted, but whether there was sufficient information at that stage to enable the Council (the authority adopting the Plan) to be duly satisfied that the proposed mitigation could be achieved in practice. The Council needed to be satisfied as to the achievability of the mitigation in order to be satisfied that adopting the Core Strategy would result in no adverse effect.

Policy wording in the Core Strategy provided that at the project consent stage if it appears that the Core Strategy cannot be implemented without adverse impacts which cannot be adequately mitigated or compensated then the proposals will only make provision for the level and location of development for which it can be concluded that there will be no adverse effect.

This is considered a sensible safeguard to incorporate into such a Plan, serving to underline the obligation to have continuing regard to the avoidance of harm to the SPA at all subsequent stages of consent. Such an approach is in accordance with Article 6 of the Habitats Directive, and not in breach of it.

5.2 PROPOSED MASTERPLAN 2040 MITIGATION

5.2.1 Strategic Mitigation Strategy

Mitigation proposed is aligned with and has been drawn up in parallel with Section 9 of the allied SEA Environmental Report. The overarching mitigation strategy is that potential LSEs or AEIS will be considered at a project level during pre-planning design and AA, when the specific effects of a development option can be reduced or eliminated through targeted project-specific surveys and iterative design, in order to limit the potential for LSEs or AEIS.

The environmental conditions of consent and future monitoring which has been applied to the ABR Project shall be incorporated into all large-scale projects brought forward to project level EIA and AA stage throughout the lifetime of the Masterplan.

Targeted and 'appropriate' evaluation and analysis will be undertaken at a project stage, supported where necessary with site-specific or project-specific surveys or studies.

Project level screening for appropriate assessment reports and if applicable Natura Impact Statements shall be prepared for all projects falling out of the Masterplan.

Assessment shall be informed by design information, construction method statements and construction stage or operational stage environmental management plans as necessary defining the sequencing of construction, timing of works, and emissions to the aerial and aquatic environment.

The timing of construction and if necessary operational maintenance works will be planned and programmed to avoid significant and adverse in-combination and cumulative effects with other projects.

More targeted mitigation measures have been recommended where potential AEIS have been identified from development options in the short and medium term of the Masterplan period under four impact themes:

- Water quality and habitat deterioration
- Underwater noise and disturbance
- Aerial noise and visual disturbance
- Habitat loss

5.2.2 Water Quality and Habitat Deterioration

Individual projects will include a requirement for appointed main contractors to prepare Construction-stage Environmental Management Plans (CEMPs); Erosion and Sediment Control Plans; Invasive Species Management Plans; Emergency Response Plans; Dust and Noise Minimisation Plans or Dredging Mitigation Plans as applicable to ensure marine water quality is maintained and the favourable conservation condition of marine, coastal and wetland habitats does not deteriorate.

Where it is required, dredging will be confined to period between September and March inclusive to avoid impacting on seabird foraging in the breeding season.

Coastal process modelling will be undertaken to predict the extent, duration and concentration of plumes of suspended sediments associated with marine construction or dredging/dumping activities, to support any assessment made of the implications of these activities for coastal and marine habitats which are QIs of European sites.

Modelling of waste water and storm water discharges from treatment areas will be undertaken to predict the volume and concentration of discharges associated with construction or operational activities, to support any assessment made of the implications of these activities for coastal and marine habitats which are QIs of European sites.

Drainage systems shall be designed to maintain a separation between the clean storm water and potentially contaminated runoff to ensure that water is treated onsite before discharge.

Drainage from bunded and waste storage areas will be managed and treated as contamination.

Shore-side electricity facilities will be provided at all new berths, reducing atmospheric emissions and deposition in the marine and coastal wetland environment.

An Emergency Response Plan and an Accident Prevention Procedure are being implemented at Dublin Port to reduce the potential for accidental spillages and the severity of actual spillages. These plans shall be kept under review as the development options falling out from the Masterplan are brought forward to ensure they continue to be fit-for-purpose and effective.

5.2.3 Underwater Noise and Disturbance

Where it is required, dredging will be confined to periods between September and March inclusive to avoid impacting on harbour porpoises during the breeding and calving season.

Marine Mammal Observers (MMOs) shall be stationed on survey vessels prior to and during any activities producing significant underwater noise emissions (e.g. geophysical surveys, piling or dredging/dumping) to implement protocols contained in the NPWS (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.

MMOs will have the authority to stop activities when marine mammals are close enough to be at risk. This will minimise the construction phase impacts of these works in the short and medium term on marine mammals.

Full reporting on MMO operations and mitigation undertaken must be provided to the Consenting Authority as outlined in Appendix 6/7 of NPWS (2014).

5.2.4 Aerial Noise and Visual Disturbance

Individual projects will include proposals for any activities producing significant aerial noise emissions (e.g. rock-breaking, demolition, piling) stimuli to be restricted to daylight hours and subject to ornithological monitoring of responses of waterbirds to noise.

Construction phase and regular operational phase activities during the overwintering season adjacent to SPAs will be screened to prevent waders and waterbirds being disturbed by the presence of people in close proximity to intertidal areas.

Design of the greenways will include screening to ensure that amenity users do not disturb or displace waterbirds from continuing to use intertidal areas of the South Dublin Bay and River Tolka Estuary SPA for feeding.

5.2.5 Habitat Loss

5.2.5.1 Mitigation

Coastal process modelling will be undertaken at an early stage as part of MP2 project to predict the magnitude and extent of changes to the sedimentation and scouring patterns in the South Dublin Bay and River Tolka Estuary SPA as a result of construction of a new jetty requiring land reclamation or creation of a 400m manoeuvring area at the eastern edge of the port.

Iterative design shall take account of the results of the predictive modelling to ensure that a design solution is promoted that meets the objectives of the Masterplan whilst not resulting in AEIS.

Loss of the dolphins as the principal nesting site of the breeding terns in Dublin Port cannot be mitigated. Compensation is instead envisaged.

5.3 COMPENSATION MEASURES

5.3.1 Masterplan 2012

The original Masterplan published in 2012 noted that two types of compensation measures might be required to offset AEIS in South Dublin Bay and River Tolka Estuary SPA. One set of measures was to offset effects of reclamation of 21ha of the SPA (the Gateway Project) which would have resulted in AEIS as a result of the loss of mudflats, but this reclamation project is no longer being considered by

DPC. The second set of measures was to offset effects of the removal of marine structures used by breeding terns, and is set out in Table 9 of the 2012 Masterplan NIS.

It was proposed that alternative and larger breeding areas were to be provided initially in year 2 of the conservation measures programme of works following monitoring of the terns in year 1. Exclusion of the colony on the CDL dolphin was proposed in year 2 also. Exclusion of the colony from the ESB dolphin was proposed in year 4, and finally removal of the dolphins was proposed in year 5. All steps were dependant on success and uptake of the alternative nesting sites to be provided through a campaign of monitoring in years 1 – 4 of the conservation measures programme of works.

It was intended that a Wildlife Observation Platform / Viewing Gallery be located in proximity to the relocated tern colony, and that all proposed works would be reviewed by and agreed with NPWS.

5.3.2 European Commission Guidance

The European Commission has published guidelines (EC, 2011a) to provide competent authorities, port authorities and port operators with a practical set of recommendations on the implementation of the Birds and Habitats Directives in estuaries and coastal zones with special attention to port development and dredging operations. These guidelines are supported by a Commission Staff working document (EC, 2011b) on integrating biodiversity and nature protection into port development. EC (2011a) is instructive on compensation schemes permitted under Article 6(4) of the Habitats Directive, resulting from AEIS. The guidelines advise in Section 3.4 that:

- In instances where damaging developments are, in the absence of alternative solutions, to be allowed to proceed there will be a need for compensation measures to fully offset any loss or damage to the site. These should be precisely adapted to the type of impact predicted and should be focused on the coherence of the Natura 2000 network and the particular elements affected at site level.

- Once the compensation scheme is agreed, the permits granted and a monitoring programme in place, unforeseen uncertainties should in principle not significantly hamper the core of a plan or project. Such possible new uncertainties should, however, trigger targeted investigations and if necessary extended monitoring and adaptive or corrective measures.

- Environmental damage/ environmental benefit from compensation ratio should be assessed: there is wide acknowledgement that compensation/ damage ratios should be generally well above 1:1. Thus, compensation ratios of 1:1 or below should only be considered when it is demonstrated that such measures will be 100% effective in restoring good structure and functionality within a short period of time.

- Appropriate compensation should be considered firstly within the Natura 2000 site suffering an AEIS if the necessary elements to ensure ecological coherence and network functionality

exist within the site, and if that is not possible then compensation outside the Natura 2000 site if the same contribution to the ecological network is feasible.

- The compensatory measures must ensure the continuity of the ecological processes essential for maintaining the overall coherence of the Natura 2000 network. The compensation scheme should be 'effective' at the time the negative effects occur on the site concerned. Early implementation is of the essence. The application of specific mitigation measures to overcome possible interim losses may be necessary.

- All necessary technical, legal or financial provisions necessary to implement the compensatory measures should be completed before implementation of the plan or project starts, so as to provide a sound legal and financial basis for long-term implementation, protection, monitoring and maintenance; and prevent any unforeseen delays that may hinder the effectiveness of the measures proposed.

5.3.3 Port of Southampton Masterplan

Appropriate assessment of the Port of Southampton Masterplan 2016-2035 noted that if certain future port expansion identified in the Masterplan is brought forward as a project to planning consent stage and the competent planning authority determines that an AEIS will result, the Port Authority will need to provide sufficient evidence that there are no alternative solutions and that the proposed development is necessary for Imperative Reasons of Overriding Public Interest (IROPI), including those of a social or economic nature. In these circumstances, and before such a project can commence, compensatory measures will need to be identified as part of the design of the project and proposed as part of the application(s) for consent, in consultation with the statutory nature conservation body (in that case being Natural England).

This is in our view, a sensible safeguard to incorporate into such a Plan, serving to underline the obligation to have continuing regard to the avoidance of harm to the SPA at all subsequent stages of consent. Such an approach is in accordance with Article 6 of the Habitats Directive, and not in breach of it.

5.3.4 Uncertainty of Compensatory Measures

EC (2011a) notes that compensation/damage ratios should be generally well above 1:1, with like-for-like (or 1:1) replacement only being considered when it is demonstrated that such measures will be 100% effective in restoring good structure and functionality within a short period of time.

In both Briels (C-521/12) and Orleans (C-387/15), the CJEU held that positive effects of measures aimed at compensating for the loss of area and quality of that same habitat type in a European site, even where the new area will be bigger and of higher quality, are highly difficult to forecast with any degree of certainty and, in any event, will be visible only several years into the future.

5.3.4.1 Dublin Port Tern Conservation Project

Dublin Port is at a huge advantage as regards certainty or uncertainty of the success of installing tern nesting habitats, as additional nesting habitat has been provided in the form of two pontoons (refer to Section 4.2.3.4.1.4) and the colony has been monitored by Birdwatch Ireland for a number of years.

The first census of all coastal breeding seabirds in Britain and Ireland in 1969-70 reported 32 and 6 pairs of Common and Arctic Terns, respectively, in the Dublin Port area. In 1984, the All-Ireland Tern Survey recorded 61 pairs of Common Terns and 30 pairs of Arctic Terns, noting that the terns were nesting at three locations: the oil terminal jetty at the North Wall, on reclaimed land on the East Wall and on a mooring dolphin at Poolbeg.

By 1994, the breeding Common and Arctic Terns at Dublin Port nested on two isolated mooring dolphins (the ESB and CDL dolphins) situated on the south side of the port. In 2013, a specially modified pontoon was floated in the Tolka Estuary and this structure has been used by nesting terns in each year since deployment. Then, in 2015, a second, larger modified pontoon was floated at the Great South Wall at Poolbeg. In Spring 2016, it was relocated and was moored alongside the ESB dolphin for the duration of the breeding season.

Significant deterioration to the structural integrity of the ESB dolphin occurred in 2014 and subsequently, so much so that it could not be safely accessed by the monitoring team it in 2015 and 2016. In 2017 ESB, in consultation with NPWS, replaced the wooden and concrete platform with a new, single rectangular platform of equal size fixed to the original concrete base.

Thus, since 2015 four structures have been available for nesting terns within the Port. Access to the new ESB platform was not permitted during the 2017 breeding season which affected the ability to conduct a nest census and productivity estimate at that location. The total number of nests on all colony structures has varied since 2013, and those numbers exclude counts from the new ESB platform in 2017 and zero nests on the CDL dolphin in 2016.

5.3.4.1.1 Success of the new installation

Notably however, the counts on each of the two pontoon structures have shown uptake over the monitoring period. In 2013, 1 nest was counted on Pontoon No.1 and this number increased in 2014 and 2015, dropped in 2016 and rose again to over 80 nests in 2017. Pontoon No.2 was installed in 2015 and 1 nest was counted. This number rose in 2016 and again in 2017 when over 300 nests were counted.

This census information shows that the installation of alternative nesting habitat in the Port is successful, and provides a level of confidence that future compensatory measures can be demonstrated to succeed to help maintain the following SSCOs set for Common Tern that might otherwise result in AEIS due to South Port berth redevelopment:

(i) Breeding population abundance;

(ii) Productivity rate; and

(iii) Distribution of breeding colonies

It is critical that future monitoring of the new ESB platform is also conducted In order to adequately report on uptake of the mooring dolphin installation along with monitoring of the two pontoon installations.

5.3.5 Procedure for provision of compensatory measures

The procedure for the provision of compensatory measures is provided for, in broad terms, in Article 6(4) of Directive 92/43/EEC:

> *If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*
>
> *Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest*.

The same legislative provisions occur in the Planning and Development Act 2000, as amended and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended which transpose this requirement of the Habitats Directive.

At project level and through the appropriate assessment process, any application for consent which is incompatible with the location of any existing tern breeding structure and results in a negative assessment of the implications for a European site must meet the requirements of Article 6(4) by demonstrating:

- an absence of alternative solutions, and
- imperative reasons of overriding public interest, including those of a social or economic nature

If these conditions are met, and the competent authority in consultation with the Department of Culture, Heritage and the Gaeltacht is certain that all compensatory measures necessary to ensure

that the conservation objective targets set for breeding terns in the European site are met can be delivered and are likely to be successful, consent can be granted.

6 CONCLUSION

Having regard to the relevant legislation and the methodology followed and conclusions of a screening stage exercise, a NIS was prepared to document an appropriate assessment of the implications of the Masterplan 2040 on European sites in view of their conservation objectives. The NIS considered four impact themes and focused on the following possible LSEs:

- The possibility of likely significant Water Quality and Habitat Deterioration effects on QIs and SCIs of all European sites in Table 2.1
- The possibility of likely significant Underwater Noise and Disturbance effects on QIs of Lambay Island SAC or Rockabill to Dalkey Island SAC
- The possibility of likely significant Aerial Noise and Visual Disturbance effects on SCIs of South Dublin Bay & River Tolka Estuary SPA
- The possibility of likely significant Habitat Hoss effects on SCIs of South Dublin Bay & River Tolka Estuary SPA

Having conducted further investigation and analysis, adverse effects upon the integrity of a European site were not predicted, with mitigation measures being applied, as a result of:

- pollution incidents or elevated suspended sediments
- underwater noise or disturbance
- aerial noise or visual disturbance

Adverse effects on the integrity of the South Dublin Bay and River Tolka Estuary SPA were predicted to occur at project stage as a result of bringing forward some development options in the medium term of the Masterplan to provide new deepwater Lo-Lo and multipurpose berths in a location incompatible with the existing tern breeding site on the ESB dolphin. A negative assessment of the implications for this SPA must meet the requirements of Article 6(4) of the Habitats Directive by demonstrating an absence of alternative solutions and imperative reasons of overriding public interest including those of a social or economic nature, if a consent is to be granted.

The likely impacts to the integrity of the Natura 2000 network of sites that could arise from the development options proposed in the Masterplan 2040 have been examined. The Masterplan 2040 has fully integrated the findings of the NIS. The implementation of the development options in the Masterplan 2040 will not adversely affect the integrity of any European site, with the mitigation identified having being applied, with one notable exception, as discussed above.

The rigour of appropriate assessment in accordance with Article 6 of the Habitats Directive will continue to be applied as part of the next review of Masterplan 2040.

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