



SCREENING FOR APPROPRIATE ASSESSMENT & NATURA IMPACT STATEMENT

APPENDICES



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APPENDIX 1: CONSERVATION OBJECTIVES

National Parks and Wildlife Service

Conservation Objectives Series

Baldoyle Bay SAC 000199



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht



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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

| | |
|--------|--|
| 000199 | Baldoyle Bay SAC |
| 1140 | Mudflats and sandflats not covered by seawater at low tide |
| 1310 | Salicornia and other annuals colonizing mud and sand |
| 1330 | Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) |
| 1410 | Mediterranean salt meadows (<i>Juncetalia maritimi</i>) |

Please note that this SAC overlaps with Baldoyle Bay SPA (004016). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping SPA as appropriate.

Supporting documents, relevant reports & publications (listed by date)

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

Title: Intertidal Benthic Survey Baldoyle Bay SAC and Baldoyle Bay SPA

Year: 2012

Author: MERC; ERM

Series: Unpublished Report to NPWS & MI

Title: Baldoyle Bay SAC (000199). Conservation objectives supporting document - marine habitats [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Baldoyle Bay SAC (000199). Conservation objectives supporting document - coastal habitats [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Saltmarsh Monitoring Report 2007-2008

Year: 2009

Author: McCorry, M.; Ryle, T.

Series: Unpublished Report to NPWS

Title: Coastal Monitoring Project 2004-2006

Year: 2009

Author: Ryle, T.; Murray, A.; Connolly, C.; Swann, M.

Series: Unpublished Report to NPWS

Title: A Survey of Intertidal Mudflats and Sandflats in Ireland

Year: 2007

Author: Aquatic Services Unit

Series: Unpublished Report

Title: Saltmarsh Monitoring Report 2006

Year: 2007

Author: McCorry, M.

Series: Unpublished Report to NPWS

Spatial data sources

| | |
|------------------------|--|
| Year: | Interpolated 2012 |
| Title: | Intertidal surveys 2007, 2010 |
| GIS operations: | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used for: | Marine community types, 1140 (maps 3 and 4) |

| | |
|------------------------|--|
| Year: | 2005 |
| Title: | OSi Discovery series vector data |
| GIS operations: | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used for: | Marine community types base data (map 4) |

| | |
|------------------------|--|
| Year: | Revision 2010 |
| Title: | Saltmarsh Monitoring Project 2007-2008. Version 1 |
| GIS operations: | QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used |
| Used for: | 1310, 1330, 1410 (map 5) |

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------------|----------|--|---|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated as 409ha using OSi data |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Fine sand dominated by <i>Angulus tenuis</i> community complex; and Estuarine sandy mud with <i>Pygospio elegans</i> and <i>Tubificoides benedii</i> community complex. See map 4 | Habitat structure was elucidated from intertidal surveys undertaken in 2007 (Aquafact, 2007) and 2010 (MERC and ERM, 2012). See marine habitats supporting document for further information |

1310 Salicornia and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Baldoye Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoye - 0.383ha. See map 5 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat recorded at one sub-sites surveyed and mapped, giving a total estimated area of 0.38ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). This habitat was more extensive in the past. <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. At Baldoye there are some signs of erosion of the saltmarsh in the mid part and south-eastern corner of the estuary. Accretion has occurred at the lower end of Portmarnock spit. See coastal habitats backing document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). Creeks deliver sediment throughout saltmarsh system. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on date from McCorry (2007). This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimeters | Maintain structural variation within sward | Based on data from McCorry (2007). Saltmarshes at Baldoye are not grazed by livestock and have a diverse sward structure. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from McCorry (2007). See coastal habitats supporting document for further details |

1310 Salicornia and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|------------------|--|---|
| Vegetation composition: typical species and sub-communities | Percentage cover | Maintain the presence of species-poor communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009) | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species- <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from McCorry (2007). <i>Spartina</i> swards occur extensively throughout the Baldoyle sub-site. Additional clumps of cordgrass are present within the <i>Salicornia</i> flats, although at low cover values. See coastal habitats supporting document for further details |

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Baldoye Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoye - 11.98ha. See map 5 | Based on data from the Saltmarsh Monitoring Project (McCorry, 2007). One sub-site supporting Atlantic salt meadow was mapped giving a total estimated area of 11.98ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). No indications of any loss in extent of ASM at Baldoye. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). There are some small areas of erosion in places and these may have been exacerbated by infilling and sea defence measures (sea wall). See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain/restore creek and pan structure to develop, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). The largest area of ASM at Baldoye has a well developed creek and pan structure. The other parts have a poorly developed structure. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Baldoye there are transitions to sanddune habitats as well as transitional mosaics within the saltmarsh habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimeters | Maintain structural variation within sward | Based on data from McCorry (2007). The saltmarshes around Baldoye are not grazed by livestock allowing a diverse sward structure to develop. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of the area outside of the creeks vegetated | See coastal habitats supporting document for further details |

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Baldoye Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|--|--|
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009) | Based on data from McCorry (2007). Species of local distinctiveness at Baldoye include the Red Data Book species, Borrer's saltmarsh-grass (<i>Puccinellia fasciculata</i>) and meadow barley (<i>Hordeum secalinum</i>). The locally rare species rock lavender (<i>Limonium binervosum</i>) was also recorded at Baldoye. See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species- <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from McCorry (2007). <i>Spartina</i> occurs extensively at Baldoye bay. See coastal habitats supporting document for further details |

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

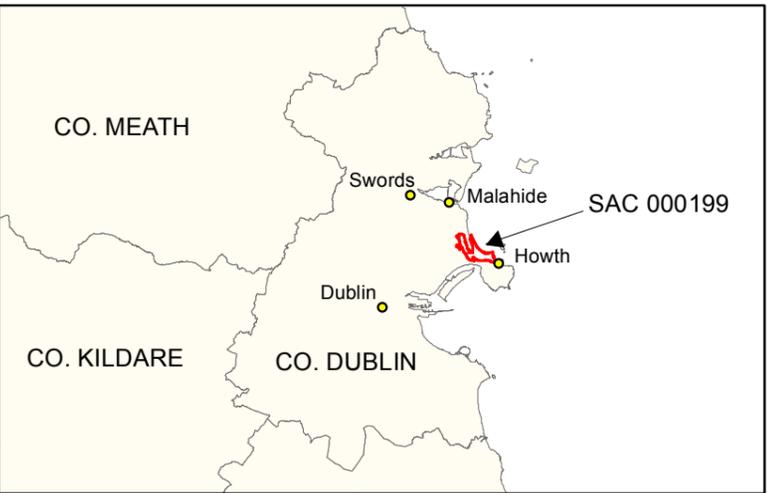
To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoyle - 2.64ha. See map 5 | Based on data from the Saltmarsh Monitoring Project (McCorry, 2007). One sub-site that supports Mediterranean Salt Meadow was mapped, giving a total estimated area of 2.64ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution | See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). There are some indications that the area of brackish marsh at Mayne including the MSM community has decreased. Older maps show that the brackish vegetation was more extensive in the recent past. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from the Saltmarsh Monitoring Project (McCorry, 2007). The MSM at Baldoyle has a poorly developed topography. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Mediterranean salt meadow is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Baldoyle there are transitions to sand dune habitats as well as transitional mosaics within the saltmarsh habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within the sward | Based on data from McCorry (2007). The saltmarshes around Baldoyle are not grazed by livestock allowing a diverse sward structure to develop. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of the area outside of the creeks vegetated | Based on data from McCorry (2007). See coastal habitats supporting document for further details |

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Baldoye Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|------------------|--|--|
| Vegetation composition: typical species | Percentage cover | Maintain range of sub-communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009) | Based on data from McCorry (2007). Species of local distinctiveness at Baldoye include the Red Data Book species, Borrer's saltmarsh-grass (<i>Puccinellia fasciculata</i>) and meadow barley (<i>Hordeum secalinum</i>). The locally rare species rock lavender (<i>Limonium binervosum</i>) was also recorded at Baldoye. See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species- <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from McCorry (2007). <i>Spartina</i> occurs extensively at Baldoye bay. See coastal habitats supporting document for further details |



Legend
 SAC 000199

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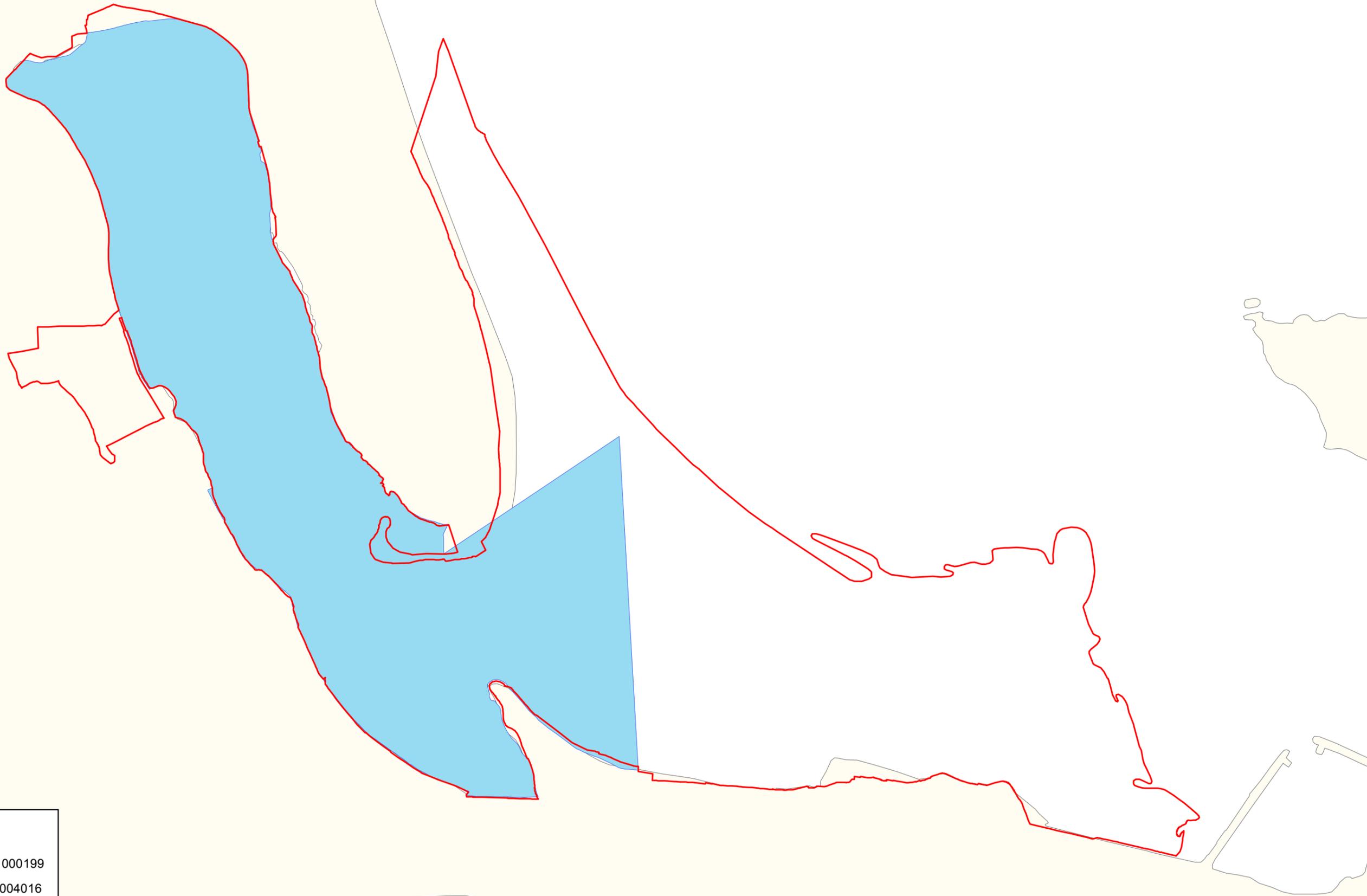
**MAP 1:
 BALDOYLE BAY SAC
 CONSERVATION OBJECTIVES
 SAC DESIGNATION**
 Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:
 SAC 000199 CO. DUBLIN; version 1.2**

0 0.25 0.5 0.75 1 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
 Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaite. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

**Map Version 1
 Date: October 2012**



Legend

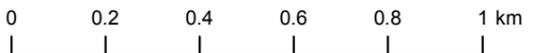
- Baldoye Bay SAC 000199
- Baldoye Bay SPA 004016

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Arts, Heritage and the Gaeltacht*

**MAP 2:
BALDOYLE BAY SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING
DESIGNATIONS**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000199 CO. DUBLIN; version 1.2



The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

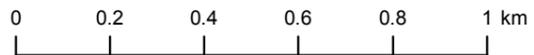


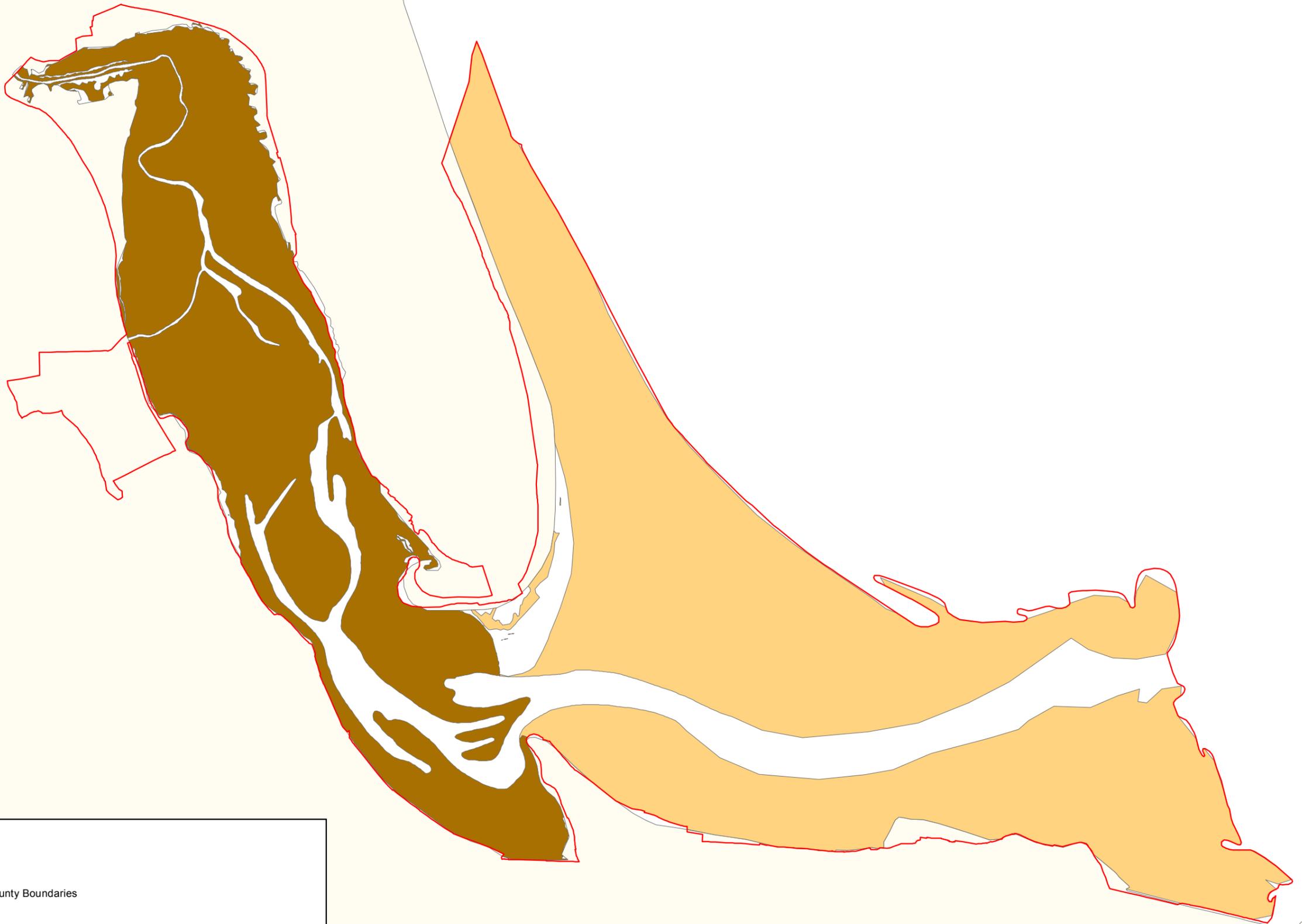
**Map Version 1
Date: October 2012**



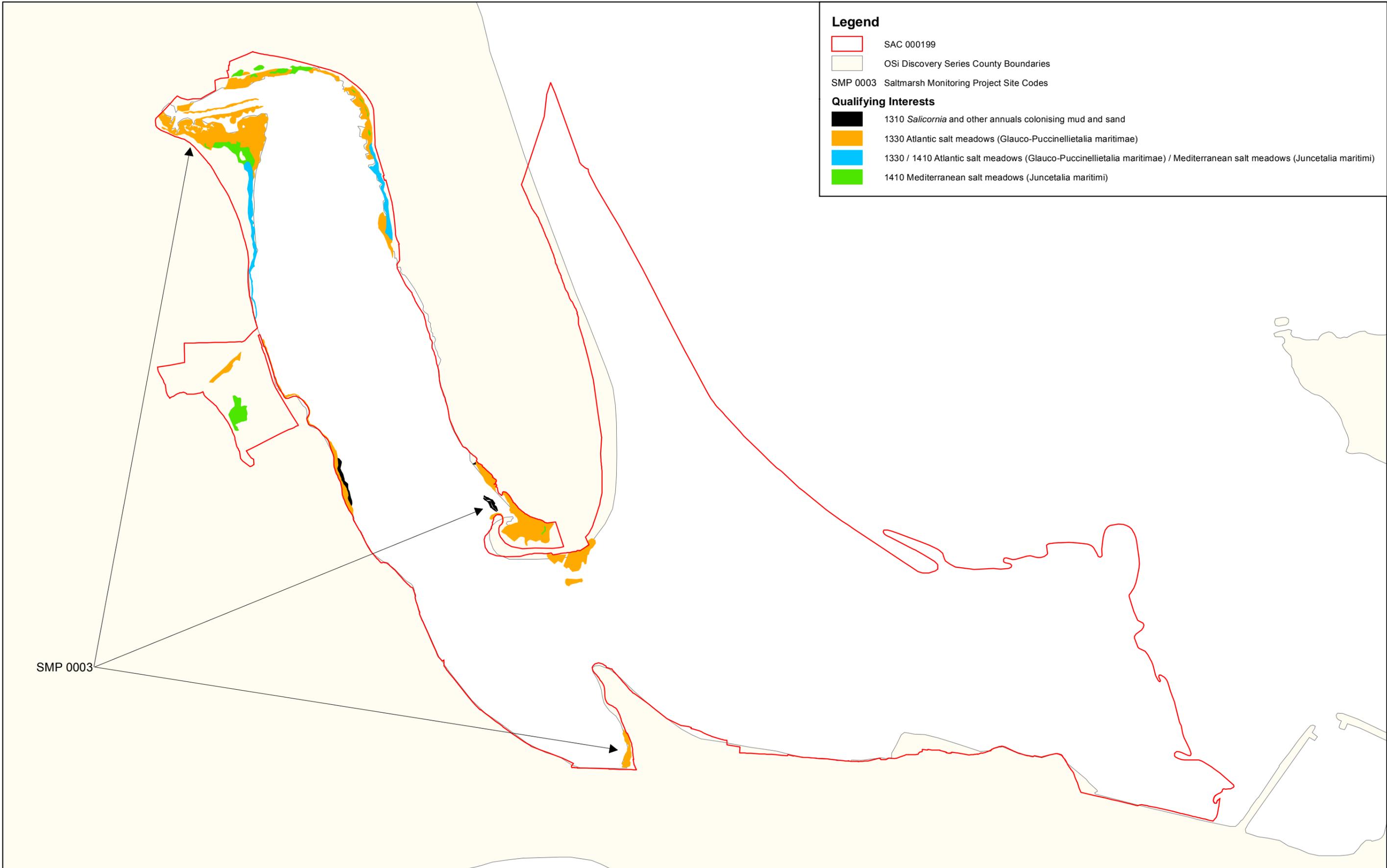
Legend

- SAC 000199
- 1140 Mudflats and sandflats not covered by seawater at low tide
- OSi Discovery Series County Boundaries





- Legend**
- SAC 000199
 - OSi Discovery Series County Boundaries
- Marine Community Types**
- Estuarine sandy mud with *Pygospio elegans* and *Tubificoides benedii* community complex
 - Fine sand dominated by *Angulus tenuis* community complex



Legend

- SAC 000199
- OSi Discovery Series County Boundaries
- SMP 0003 Saltmarsh Monitoring Project Site Codes

Qualifying Interests

- 1310 *Salicornia* and other annuals colonising mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1330 / 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)

SMP 0003



National Parks and Wildlife Service

Conservation Objectives Series

Howth Head SAC 000202



An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs



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E-mail: nature.conservation@ahg.gov.ie**

Citation:

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National Parks and Wildlife Service, Department of Arts, Heritage, Regional,
Rural and Gaeltacht Affairs.**

**Series Editor: Rebecca Jeffrey
ISSN 2009-4086**

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

| | |
|--------|--|
| 000202 | Howth Head SAC |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic coasts |
| 4030 | European dry heaths |

Please note that this SAC overlaps with North Bull Island SPA (004006) and Howth Head Coast SPA (004113) and adjoins North Dublin Bay SAC (000206) and Rockabill to Dalkey Island SAC (003000). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|--|
| Year : | 2011 |
| Title : | National survey and assessment of the conservation status of Irish sea cliffs |
| Author : | Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F. |
| Series : | Irish Wildlife Manual No. 53 |
| Year : | 2012 |
| Title : | Ireland Red List no. 8: Bryophytes |
| Author : | Lockhart, N.; Hodgetts, N.; Holyoak, D. |
| Series : | Ireland Red List series, NPWS |
| Year : | 2013 |
| Title : | The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments |
| Author : | NPWS |
| Series : | Conservation assessments |
| Year : | 2014 |
| Title : | Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0 |
| Author : | Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B. |
| Series : | Irish Wildlife Manual No. 79 |
| Year : | 2016 |
| Title : | Howth Head SAC (site code: 202) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Other References

| | |
|-----------------|---|
| Year : | 1988 |
| Title : | The Irish red data book 1. Vascular plants |
| Author : | Curtis, T.G.F.; McGough, H.N. |
| Series : | Wildlife Service, Dublin |
| Year : | 2002 |
| Title : | A Catalogue of Alien Plants in Ireland |
| Author : | Reynolds, S.C.P. |
| Series : | National Botanic Gardens, Glasnevin |
| Year : | 2005 |
| Title : | National inventory of sea cliffs and coastal heaths |
| Author : | Browne, A. |
| Series : | Unpublished Report to NPWS |

Spatial data sources

Year : 2011
Title : National survey and assessment of the conservation status of Irish sea cliffs
GIS Operations : Clipped to SAC boundary
Used For : 1230 (map 3)

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Howth Head SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat length | Kilometres | Area stable, subject to natural processes, including erosion. Total length of cliff: 8.22km. See map 3 | Cliffs are linear features and are therefore measured in kilometres. The Irish Sea Cliff Survey (Barron et al., 2011) identified the site, though did not survey it, and the length of cliffs within Howth Head SAC is estimated to be 8.22km. The length of cliff is likely to be underestimated. See the Howth Head SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 3 | See map 3 for the estimated distribution of sea cliffs in the SAC. Hard cliffs have been noted in this SAC and it is thought that all of the cliffs are of the hard type (Browne, 2005). See the coastal habitats supporting document for further details |
| Physical structure: functionality and hydrological regime | Occurrence of artificial barriers | No alteration to natural functioning of geomorphological and hydrological processes, including groundwater quality, due to artificial structures | Attribute and target based on Barron et al. (2011). Maintaining natural geomorphological processes, including natural erosion, is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes, and in some cases tufa formations, that can be associated with sea cliffs. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession | Attribute and target based on Barron et al. (2011). A mosaic of European dry heath (4030) vegetation and maritime grassland occurs on the slopes above the sea cliff vegetation at Howth Head SAC. See the coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Attribute and target based on Barron et al. (2011). See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011) | In places, the cliffs at Howth Head SAC comprise fairly sheer, exposed rock faces. The maritime flora is of particular interest as a number of scarce and local plants have been recorded. Some of these are species of ledges on hard cliffs and coastal heath. See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage | Negative indicator species (including non-natives) to represent less than 5% cover | Attribute and target based on Barron et al. (2011). Hottentot fig (<i>Carpobrotus edulis</i>) is an aggressive invader of coastal habitats that poses a serious ecological threat. The first record for hottentot fig in the wild in Ireland is from Howth Head in 1962 (Reynolds, 2002). See the coastal habitats supporting document for further details |
| Vegetation composition: bracken and woody species | Percentage | Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20% | Attribute and target based on Barron et al. (2011). Bracken occurs on the cliffs tops at Howth Head and there is some scrub encroachment on the heath. See the coastal habitats supporting document for further details |

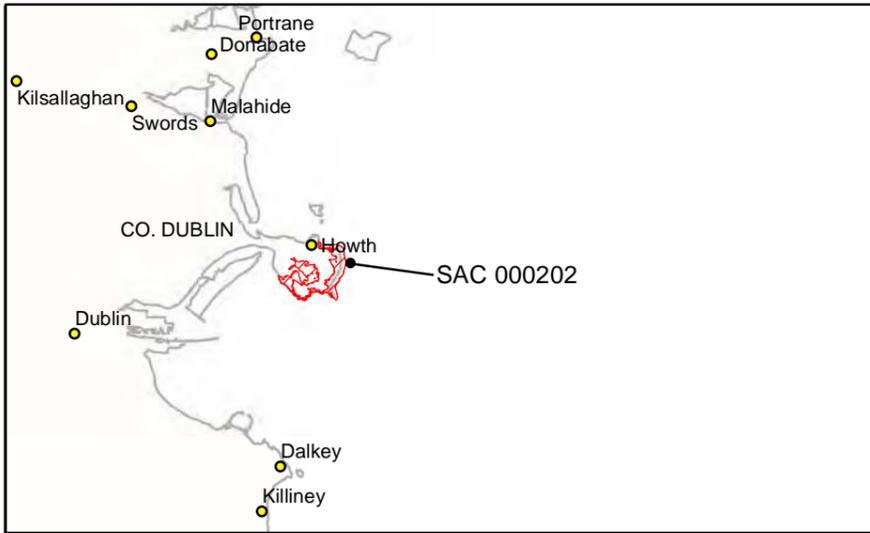
Conservation Objectives for : Howth Head SAC [000202]

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in Howth Head SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|--|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes | European dry heath has not been mapped in detail for Howth Head SAC and thus the total area of the qualifying habitat is unknown. Dry heath is the dominant habitat within the SAC and occurs on the slopes above the sea cliffs and in the central part of the peninsula. The habitat occurs in mosaic with other habitats, such as dry grassland and exposed rock in places (NPWS internal files) |
| Habitat distribution | Occurrence | No decline, subject to natural processes | See note on area above |
| Ecosystem function: soil nutrients | Soil pH and appropriate nutrient levels at a representative number of monitoring stops | Maintain soil nutrient status within natural range | Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat (NPWS, 2013) |
| Community diversity | Abundance of variety of vegetation communities | Maintain variety of vegetation communities, subject to natural processes | The diversity of dry heath communities within this SAC is unknown. Information on vegetation communities associated with this habitat is presented in Perrin et al. (2014) |
| Vegetation composition: lichens and bryophytes | Number of species at a representative number of 2m x 2m monitoring stops | Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding <i>Campylopus</i> and <i>Polytrichum</i> mosses | Attribute and target based on Perrin et al. (2014). Dry heath is not necessarily rich in lichen and bryophyte species, but a minimum amount should still be present |
| Vegetation composition: number of positive indicator species | Number of species at a representative number of 2m x 2m monitoring stops | Number of positive indicator species present at each monitoring stop is at least two | Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. Bell heather (<i>Erica cinerea</i>), ling (<i>Calluna vulgaris</i>) and western gorse (<i>Ulex gallii</i>) are listed as present in the dry heath in this SAC (NPWS internal files) |
| Vegetation composition: cover of positive indicator species | Percentage cover at a representative number of 2m x 2m monitoring stops | Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath | Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented |
| Vegetation composition: dwarf shrub composition | Percentage cover at a representative number of 2m x 2m monitoring stops | Proportion of dwarf shrub cover composed collectively of bog-myrtle (<i>Myrica gale</i>), creeping willow (<i>Salix repens</i>) and western gorse (<i>Ulex gallii</i>) is less than 50% | Attribute and target based on Perrin et al. (2014). Bog-myrtle is indicative of flushed conditions and is more characteristic of wet heaths and blanket bogs. Creeping willow is more characteristic of dune heaths. Western gorse is a component of dry heath, but high proportions of it may indicate a history of undesirable levels of grazing |
| Vegetation composition: negative indicator species | Percentage cover at a representative number of 2m x 2m monitoring stops | Total cover of negative indicator species less than 1% | Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented |
| Vegetation composition: non-native species | Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops | Cover of non-native species less than 1% | Attribute and target based on Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances. Rhododendron (<i>Rhododendron ponticum</i>) occurs in places on dry heath in this SAC |
| Vegetation composition: native trees and shrubs | Percentage cover in local vicinity of a representative number of monitoring stops | Cover of scattered native trees and shrubs less than 20% | Attribute and target based on Perrin et al. (2014). High cover of native trees and shrubs would indicate that the habitat may be succeeding towards scrub or woodland due to lack of grazing |

| | | | |
|---|--|--|--|
| Vegetation composition: bracken | Percentage cover in local vicinity of a representative number of monitoring stops | Cover of bracken (<i>Pteridium aquilinum</i>) less than 10% | Attribute and target based on Perrin et al. (2014). High cover of bracken would indicate that the habitat may be succeeding towards a dense bracken community |
| Vegetation composition: soft rush | Percentage cover in local vicinity of a representative number of monitoring stops | Cover of soft rush (<i>Juncus effusus</i>) less than 10% | Attribute and target based on Perrin et al. (2014). High cover of soft rush would suggest undesirable hydrological conditions. Note however, that poor flushes dominated by soft rush can naturally occur in mosaic with this habitat. Discrete areas of this separate habitat should not be considered here |
| Vegetation structure: senescent ling | Percentage cover at a representative number of 2m x 2m monitoring stops | Senescent proportion of ling (<i>Calluna vulgaris</i>) cover less than 50% | Attribute and target based on Perrin et al. (2014). Senescence is part of the natural cycle of ling, but a dominance of ling in the senescent phase would indicate a lack of management (appropriate grazing or burning) to promote ling regeneration |
| Vegetation structure: signs of browsing | Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops | Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing | Attribute and target based on Perrin et al. (2014) |
| Vegetation structure: burning | Occurrence in local vicinity of a representative number of monitoring stops | No signs of burning in sensitive areas | Attribute and target based on Perrin et al. (2014), where the list of sensitive areas is also presented. Fires can be part of the natural cycle of dry heath and may also be used as a valuable management tool to promote a diversity of growth phases in ling (<i>Calluna vulgaris</i>). However, fires which are too intense, too frequent, too extensive or which occur in sensitive areas are damaging to the habitat |
| Vegetation structure: growth phases of ling | Percentage cover in local vicinity of a representative number of monitoring stops | Outside sensitive areas, all growth phases of ling (<i>Calluna vulgaris</i>) should occur throughout, with at least 10% of cover in the mature phase | Attribute and target based on Perrin et al. (2014), where the list of sensitive areas is also presented. The growth phases of ling are pioneer (<10cm high), building (10-30cm high) and mature (<30cm high). As burning is undesirable in sensitive areas, it is not reasonable to require the stated diversity of growth phases within these areas |
| Physical structure: disturbed bare ground | Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops | Cover of disturbed bare ground less than 10% | Attribute and target based on Perrin et al. (2014). Disturbance can include hoof marks, wallows, human foot prints and vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for heaths and peatlands |
| Indicators of local distinctiveness | Occurrence and population size | No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat | This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Curtis and McGough, 1988; Lockhart et al., 2012) |



Legend

Howth Head SAC 000202

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

**MAP 1:
HOWTH HEAD SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:
SAC 000202; version 3.02 CO. DUBLIN**

0 0.25 0.5 0.75 1 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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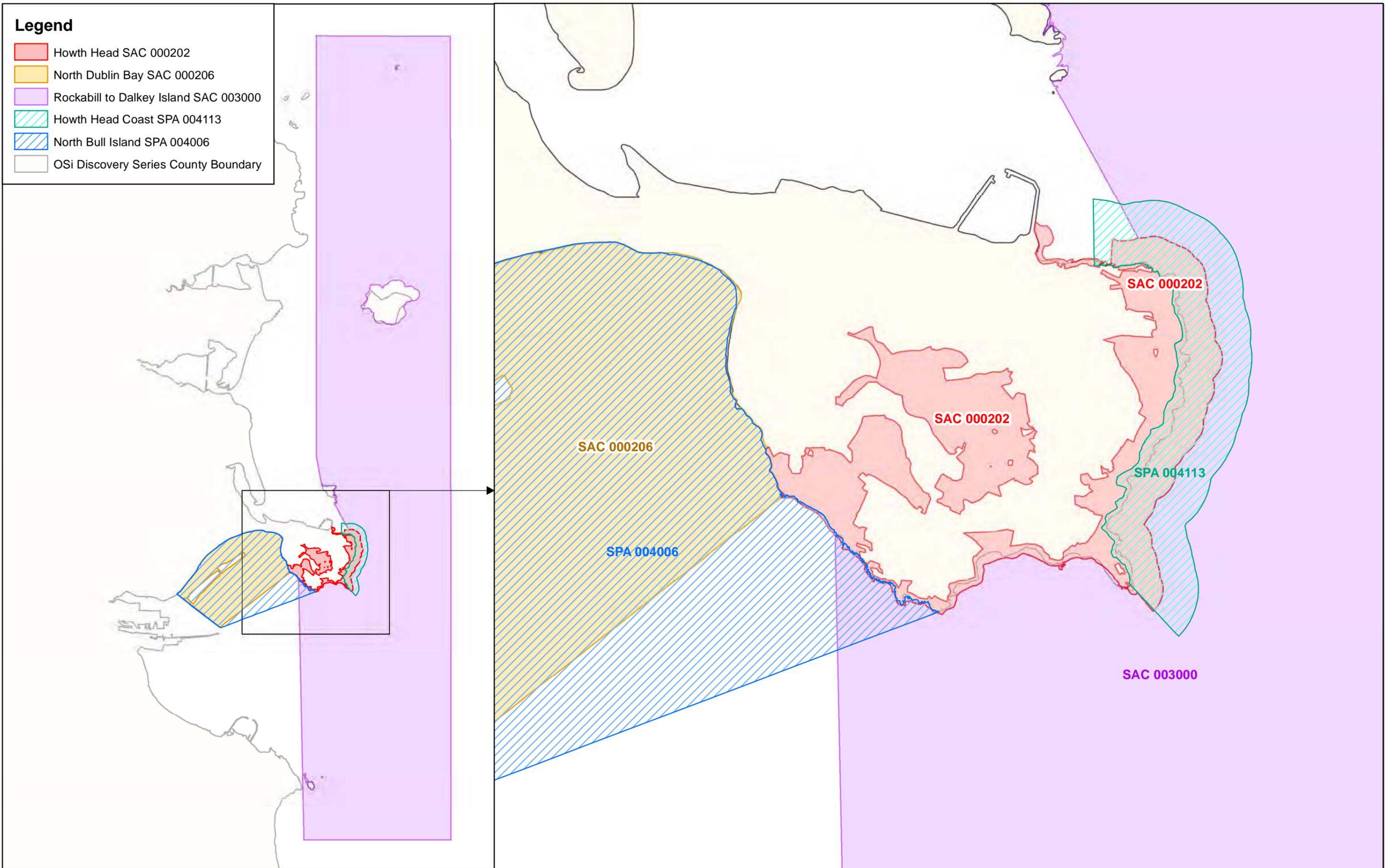
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaite. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

© Ordnance Survey Ireland

**Map Version 1
Date: July 2016**

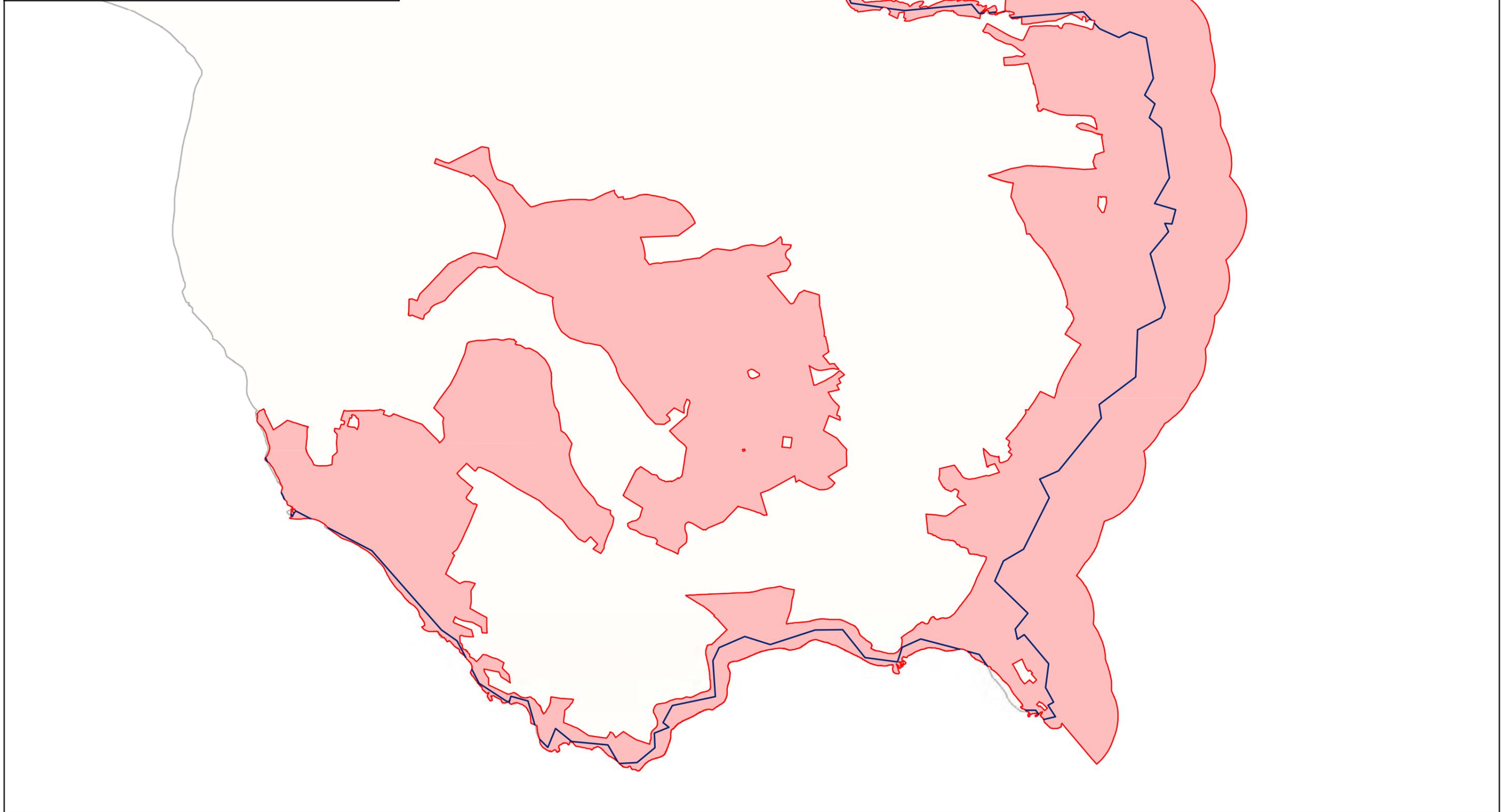
Legend

- Howth Head SAC 000202
- North Dublin Bay SAC 000206
- Rockabill to Dalkey Island SAC 003000
- Howth Head Coast SPA 004113
- North Bull Island SPA 004006
- OSi Discovery Series County Boundary



Legend

-  Howth Head SAC 000202
-  1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
-  OSi Discovery Series County Boundary



National Parks and Wildlife Service

Conservation Objectives Series

Lambay Island SAC 000204



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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E-mail: nature.conservation@ahg.gov.ie**

Citation:

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National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

**Series Editor: Rebecca Jeffrey
ISSN 2009-4086**

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|--|
| 000204 | Lambay Island SAC |
| 1170 | Reefs |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic coasts |
| 1364 | Grey seal <i>Halichoerus grypus</i> |
| 1365 | Harbour seal <i>Phoca vitulina</i> |

Please note that this SAC overlaps with Lambay Island SPA (004069) and adjoins Rockabill to Dalkey Island SAC (003000). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|--|
| Year : | 1988 |
| Title : | A second report on Areas of Scientific Interest in County Dublin |
| Author : | Goodwillie, R.N.; Ni Lamhna, E.; Webb, R. |
| Series : | Unpublished report |
| Year : | 2004 |
| Title : | Harbour seal population assessment in the Republic of Ireland: August 2003 |
| Author : | Cronin, M.; Duck, C.; O'Cadhlá, O.; Nairn, R.; Strong, D.; O'Keefe, C. |
| Series : | Irish Wildlife Manual No. 11 |
| Year : | 2004 |
| Title : | Summary of National Parks & Wildlife Service surveys for common (harbour) seals (<i>Phoca vitulina</i>) and grey seals (<i>Halichoerus grypus</i>), 1978 to 2003 |
| Author : | Lyons, D.O. |
| Series : | Irish Wildlife Manual No.13 |
| Year : | 2007 |
| Title : | Grey seal moult population survey in the Republic of Ireland, 2007 |
| Author : | O'Cadhlá, O.; Strong, D. |
| Series : | Unpublished report to NPWS |
| Year : | 2008 |
| Title : | An assessment of the breeding population of grey seals in the Republic of Ireland, 2005 |
| Author : | O'Cadhlá, O.; Strong, D.; O'Keefe, C.; Coleman, M.; Cronin, M.; Duck, C.; Murray, T.; Dower, P.; Nairn, R.; Murphy, P.; Smiddy, P.; Saich, C.; Lyons, D.O.; Hiby, L. |
| Series : | Irish Wildlife Manual No. 34 |
| Year : | 2010 |
| Title : | Irish Sea reef survey |
| Author : | MERC |
| Series : | Unpublished report to NPWS |
| Year : | 2011 |
| Title : | National survey and assessment of the conservation status of Irish sea cliffs |
| Author : | Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F. |
| Series : | Irish Wildlife Manual No. 53 |
| Year : | 2013 |
| Title : | Lambay Island SAC (ste code 204) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |
| Year : | 2013 |
| Title : | Lambay Island SAC (site code 204) Conservation objectives supporting document- marine habitats and species V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Other References

| | |
|-----------------|--|
| Year : | 1983 |
| Title : | The grey seal (<i>Halichoerus grypus</i>) in Ireland |
| Author : | Summers, C.F. |
| Series : | Unpublished Report to the Minister for Fisheries, Forestry and Wildlife |
| Year : | 2000 |
| Title : | Grey Seals: status and monitoring in the Irish and Celtic Seas |
| Author : | Kiely, O.; Lidgard, D.C.; McKibben, M.; Baines, M.E.; Connolly, N. |
| Series : | Maritime Ireland/Wales INTERREG Report no. 3. Marine Institute |
| Year : | 2001 |
| Title : | The status of breeding grey seals (<i>Halichoerus grypus</i>) on the east and south-east coast of Ireland |
| Author : | Lidgard, D.C.; Kiely, O.; Rogan, E.; Connolly, N. |
| Series : | Mammalia 65 (3): 283-294 |
| Year : | 2002 |
| Title : | New atlas of the British and Irish flora |
| Author : | Preston, C.D.; Pearman, D.A.; Dines, T.D. |
| Series : | Oxford University Press, Oxford |
| Year : | 2005 |
| Title : | National inventory of sea cliffs and coastal heaths |
| Author : | Browne, A. |
| Series : | Unpublished Report to NPWS |
| Year : | 2012 |
| Title : | Intertidal reef survey of Lambay Island SAC and SPA, Rockabill Island SPA, Ireland's Eye SAC, Dalkey Islands SPA and Muglins |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |
| Year : | 2012 |
| Title : | Subtidal reef survey of Intertidal reef survey of Lambay Island SAC and SPA, Rockabill Island SPA, Ireland's Eye SAC, Dalkey Islands SPA and Muglins |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |

Spatial data sources

| | |
|-------------------------|---|
| Year : | Interpolated 2013 |
| Title : | 2010 intertidal survey; 2011 subtidal survey |
| GIS Operations : | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used For : | Marine community types, 1170 (maps 3 and 4) |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present OSi Discovery series vector data 2005 High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used For : | Marine community types base data (map 4) |
| Year : | 2005 |
| Title : | National inventory of sea cliffs and coastal heaths |
| GIS Operations : | Lines clipped to SAC boundary and used to indicate habitat extent |
| Used For : | 1230 (map 5) |
| Year : | 2008 |
| Title : | OSi 1:5000 IG vector data |
| GIS Operations : | Naturalfeatures line clipped to extent of national inventory of sea cliffs and coastal heaths polyline |
| Used For : | 1230 (map 5) |
| Year : | 2013 |
| Title : | NPWS rare and threatened species database |
| GIS Operations : | Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1364, 1365 (maps 6 and 7) |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1364, 1365 (maps 6 and 7) |

1170 Reefs

To maintain the favourable conservation condition of Reefs in Lambay Island SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---------------------|------------------------|--|--|
| Habitat area | Hectares | The permanent area is stable or increasing, subject to natural processes. See map 3 | Habitat area estimated as 58ha from intertidal and subtidal reef surveys in 2010 and 2011 (MERC, 2010, 2012a,b) |
| Distribution | Occurrence | The distribution of reefs is stable or increasing, subject to natural processes. See map 3 | Based on information from intertidal and subtidal reef surveys in 2010 and 2011 (MERC, 2010, 2012a,b) |
| Community structure | Biological composition | Conserve the following community types in a natural condition: Intertidal reef community complex; <i>Laminaria</i> -dominated community complex. See map 4 | Reef community mapping based on information from intertidal and subtidal reef surveys in 2010 and 2011 (MERC, 2010, 2012a,b) |

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Lambay Island SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat length | Kilometres | Area stable, subject to natural processes, including erosion. Total length of cliff section mapped: 7.27km. See map 5 | Based on data from Browne (2005). Cliff extent re-digitised onto 1:5000 OSI map background. Cliffs are linear features and are therefore measured in kilometres. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 5 | Cliffs distributed along north, east and south coasts of Lambay Island. Hard cliffs are the dominant type. See coastal habitats supporting document for further details |
| Physical structure: functionality and hydrological regime | Occurrence of artificial barriers | No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures | Maintaining natural geomorphological processes including natural erosion is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes and in some cases tufa formations that can be associated with sea cliffs. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession | On Lambay Island, grazing has resulted in a zone of cliff vegetation that is very narrow and confined to the cliff edge. This is observed as an abrupt change from cliff vegetation to semi-improved pasture. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Excessive grazing close to the cliff edge has confined the maritime vegetation to a narrow zone. See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011) | Based on Goodwillie et al. (1988). Locally distinctive species include knotted clover (<i>Trifolium striatum</i>), Spring vetch (<i>Vicia lathyroides</i>) and spring squill (<i>Scilla verna</i>), which are locally common on the east coast of Ireland (Preston et al., 2002). See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from the ISCS (Barron et al., 2011). See coastal habitats supporting document for further details |
| Vegetation composition: bracken and woody species | Percentage | Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20% | Based on data from the ISCS (Barron et al., 2011). Bracken is common on the gently sloping northern cliffs. Some sheltered gullies support scrub with stunted elder (<i>Sambucus nigra</i>). See coastal habitats supporting document for further details |

Conservation Objectives for : Lambay Island SAC [000204]**1364 Grey seal *Halichoerus grypus***

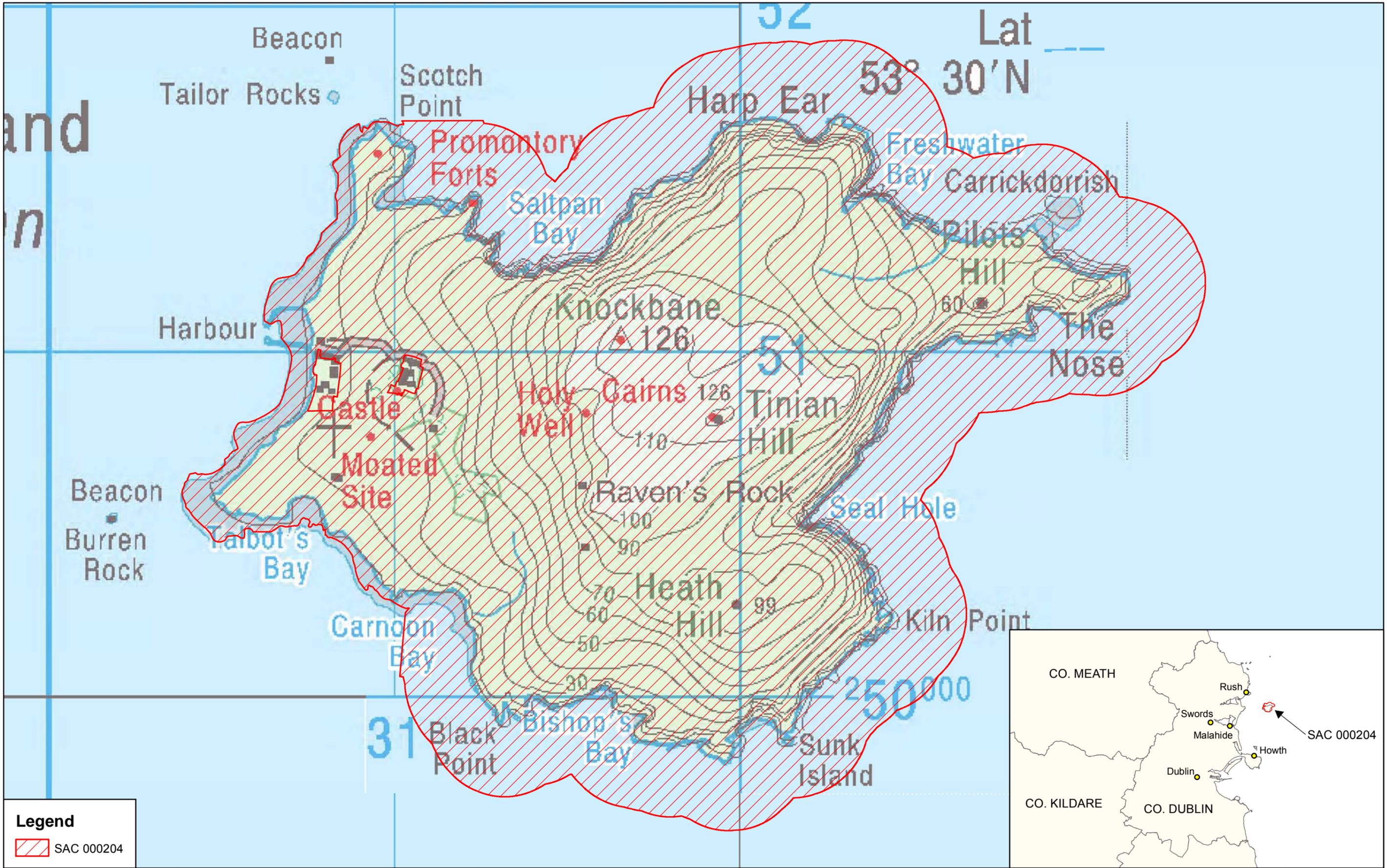
To maintain the favourable conservation condition of Grey Seal in Lambay Island SAC, which is defined by the following list of attributes and targets:

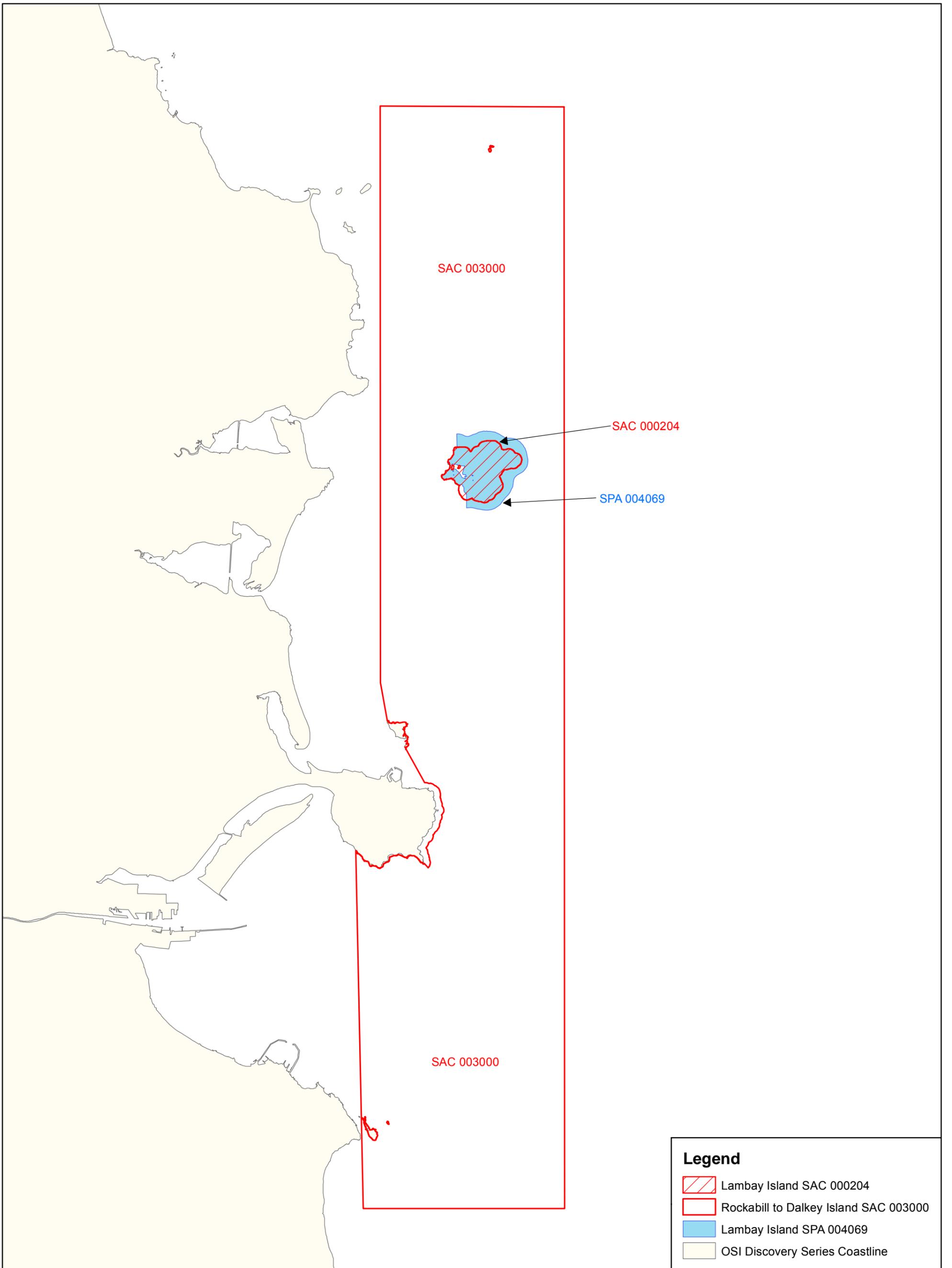
| Attribute | Measure | Target | Notes |
|----------------------------|-------------------------------|---|--|
| Access to suitable habitat | Number of artificial barriers | Species range within the site should not be restricted by artificial barriers to site use. See map 6 | See marine supporting document for further details |
| Breeding behaviour | Breeding sites | The breeding sites should be maintained in a natural condition. See map 6 for known sites | Attribute and target based on background knowledge of Irish breeding populations, review of data from Summers (1983), Kiely et al. (2000), Lidgard et al. (2001), Lyons (2004), a comprehensive breeding survey in 2005 (Ó Cadhla et al., 2008) and unpublished NPWS records. See marine supporting document for further details |
| Moulting behaviour | Moult haul-out sites | The moult haul-out sites should be maintained in a natural condition. See map 6 for known sites | Attribute and target based on background knowledge of Irish populations, research by Kiely et al. (2000), a national moult survey (Ó Cadhla and Strong, 2007) and unpublished NPWS records. See marine supporting document for further details |
| Resting behaviour | Resting haul-out sites | The resting haul-out sites should be maintained in a natural condition. See map 6 for known sites | Attribute and target based on review of data from Kiely et al. (2000), Lyons (2004), Cronin et al. (2004) and unpublished NPWS records. See marine supporting document for further details |
| Disturbance | Level of impact | Human activities should occur at levels that do not adversely affect the grey seal population at the site | See marine supporting document for further details |

Conservation Objectives for : Lambay Island SAC [000204]**1365 Harbour seal *Phoca vitulina***

To maintain the favourable conservation condition of Harbour Seal in Lambay Island SAC, which is defined by the following list of attributes and targets:

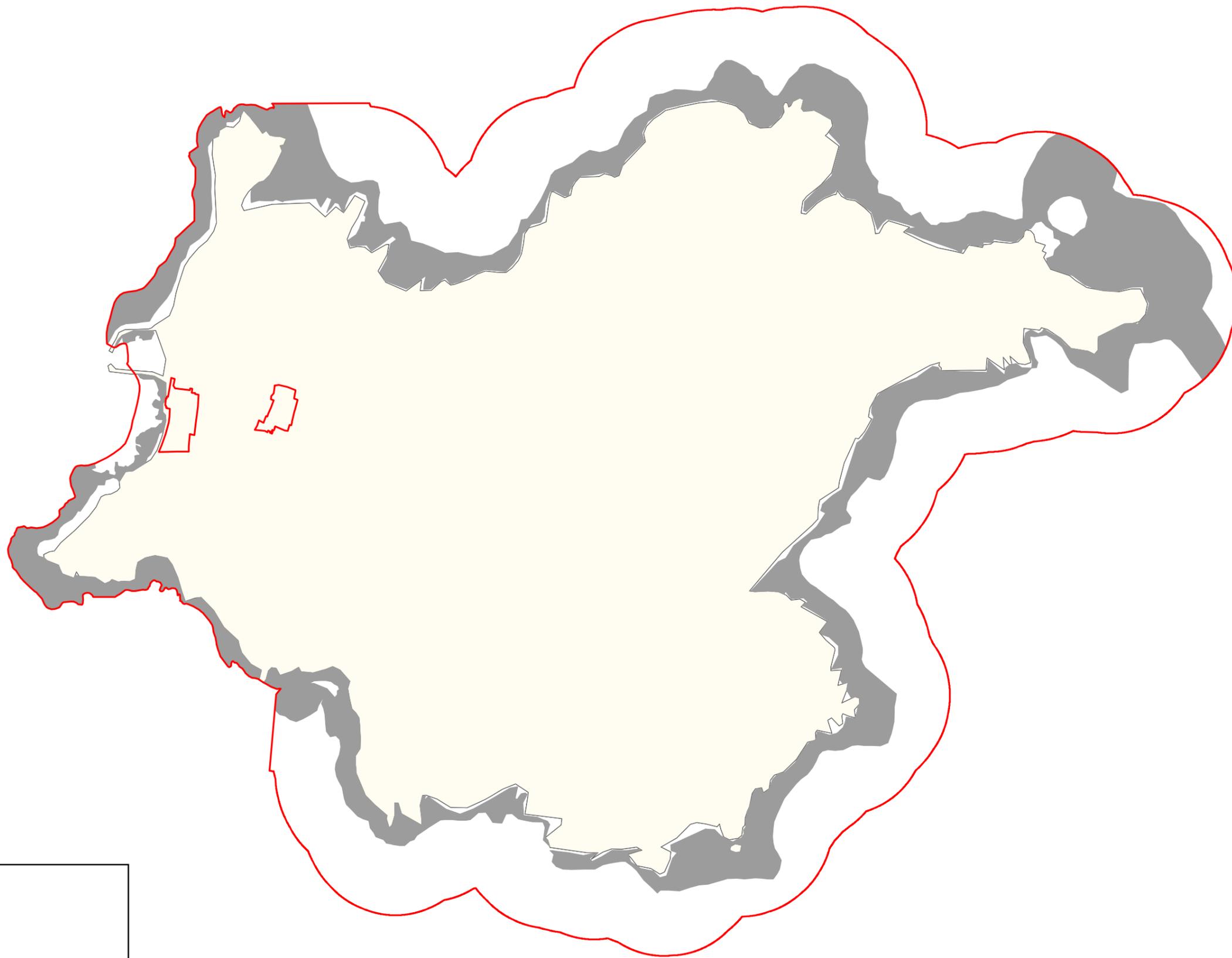
| Attribute | Measure | Target | Notes |
|----------------------------|-------------------------------|--|--|
| Access to suitable habitat | Number of artificial barriers | Species range within the site should not be restricted by artificial barriers to site use. See map 7 | See marine supporting document for further details |
| Breeding behaviour | Breeding sites | The breeding sites should be maintained in a natural condition. See map 7 | Attribute and target based on background knowledge of Irish breeding populations and a review of ancillary data provided by Kiely et al. (2000), Lidgard et al. (2001), Ó Cadhla and Strong (2007), Ó Cadhla et al. (2008) and unpublished NPWS data. See marine supporting document for further details |
| Moulting behaviour | Moult haul-out sites | The moult haul-out sites should be maintained in a natural condition. See map 7 | Attribute and target based on background knowledge of Irish populations, review of data from Cronin et al. (2004), data provided by Kiely et al. (2000), Lidgard et al. (2001), Ó Cadhla and Strong (2007), Ó Cadhla et al. (2008) and unpublished NPWS data. See marine supporting document for further details |
| Resting behaviour | Resting haul-out sites | The resting haul-out sites should be maintained in a natural condition. See map 7 | Attribute and target based on background knowledge of Irish populations and the review of ancillary data provided by Kiely et al. (2000), Lidgard et al. (2001), Ó Cadhla and Strong (2007), Ó Cadhla et al. (2008) and unpublished NPWS data. See marine supporting document for further details |
| Disturbance | Level of impact | Human activities should occur at levels that do not adversely affect the harbour seal population at the site | See marine supporting document for further details |





Legend

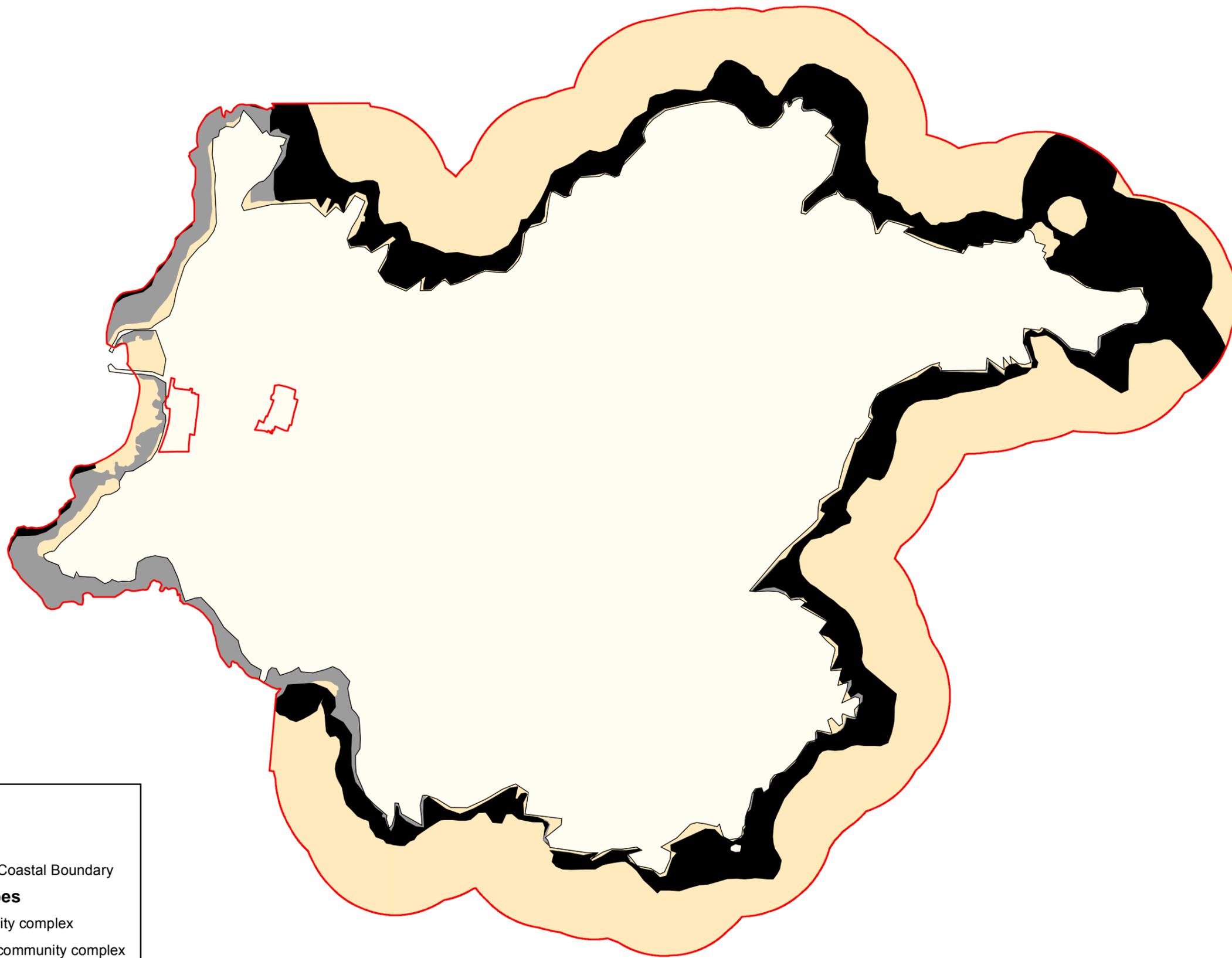
-  Lambay Island SAC 000204
-  Rockabill to Dalkey Island SAC 003000
-  Lambay Island SPA 004069
-  OSI Discovery Series Coastline



Legend

- SAC 000204
- 1170 Reefs
- OSi Discovery Series Coastal Boundary

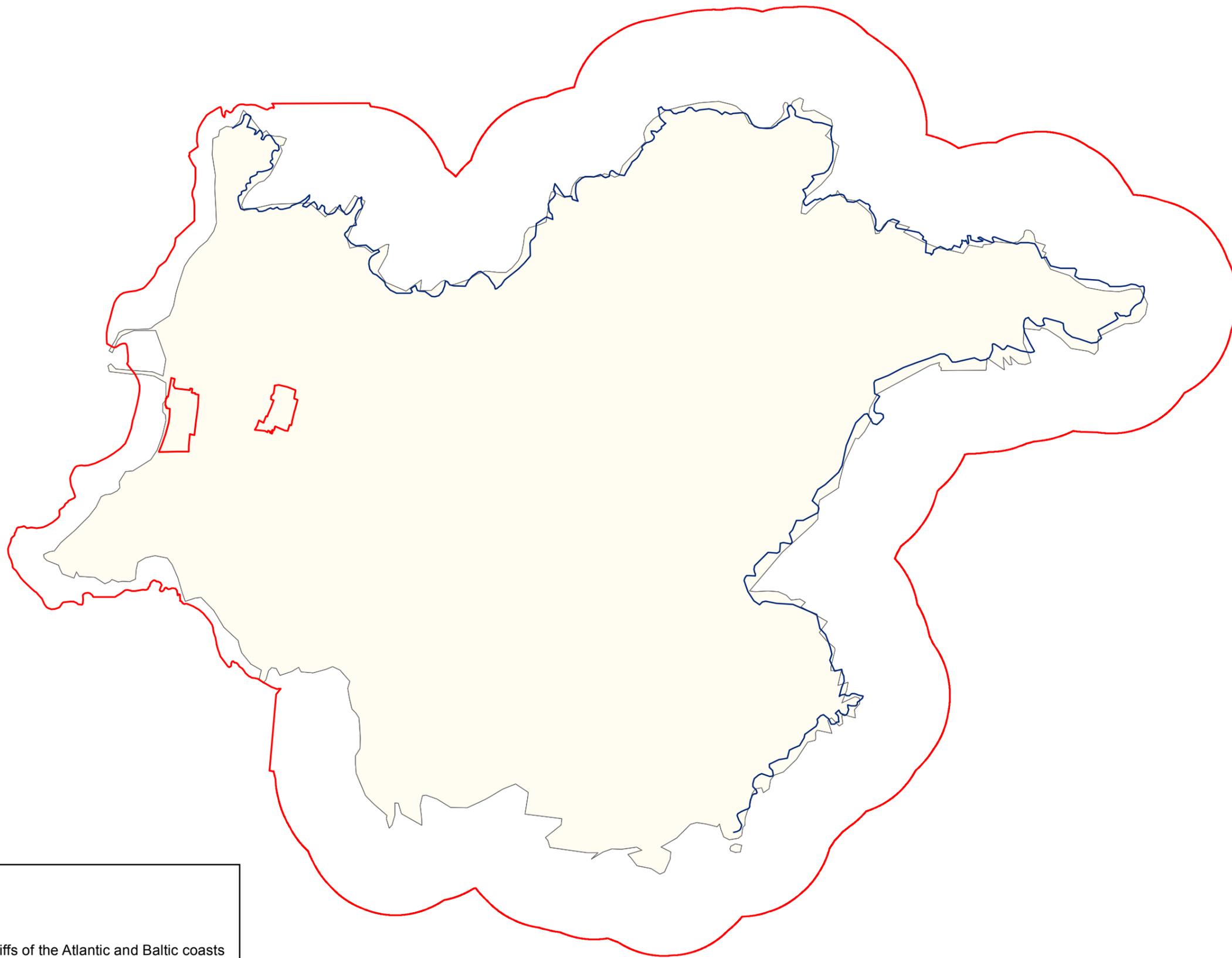




Legend

- SAC 000204
- OSi Discovery Series Coastal Boundary
- Marine Community Types**
- Intertidal reef community complex
- Laminaria*-dominated community complex
- Sediment community

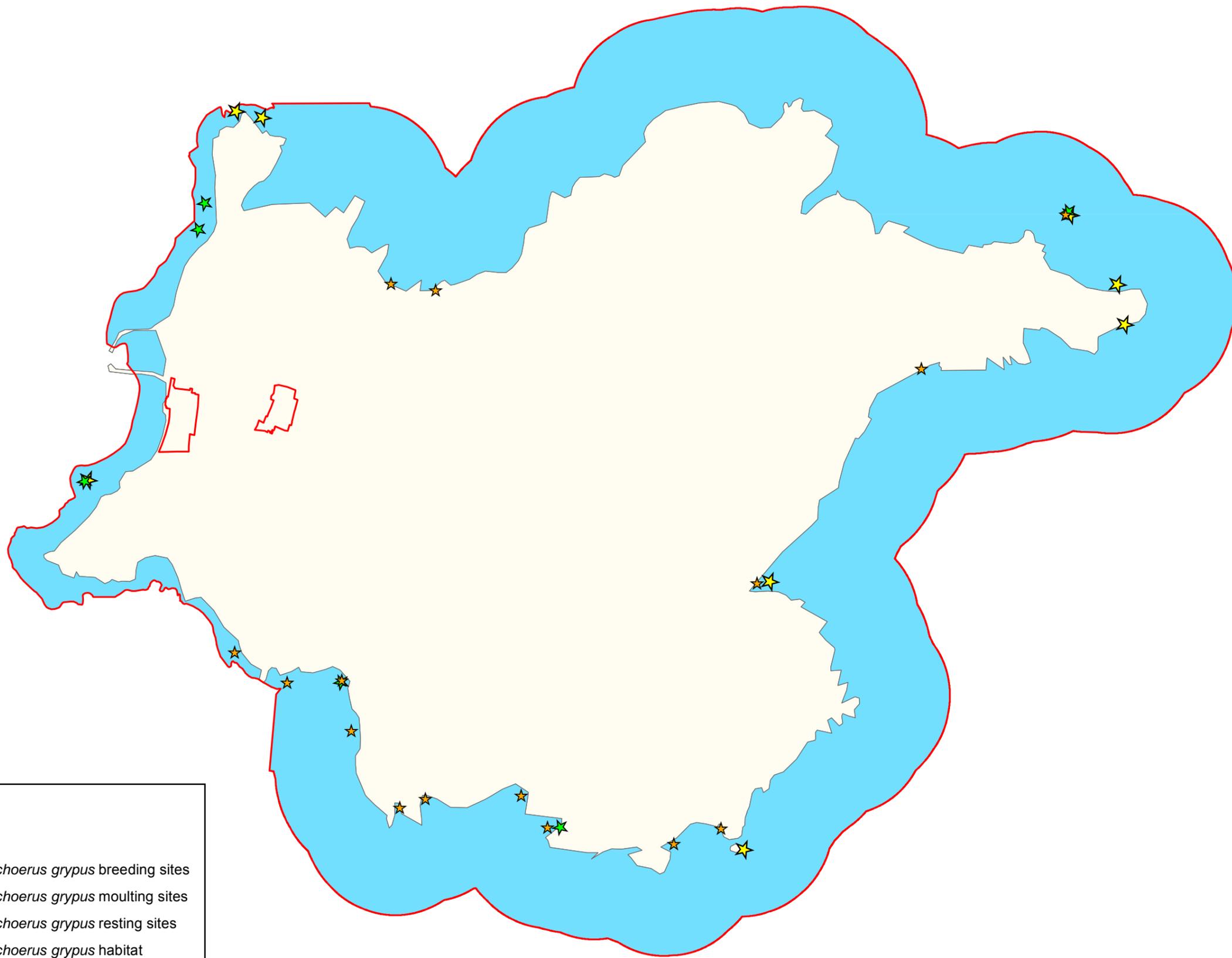




Legend

- SAC 000204
- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- OSi Discovery Series Coastal Boundary

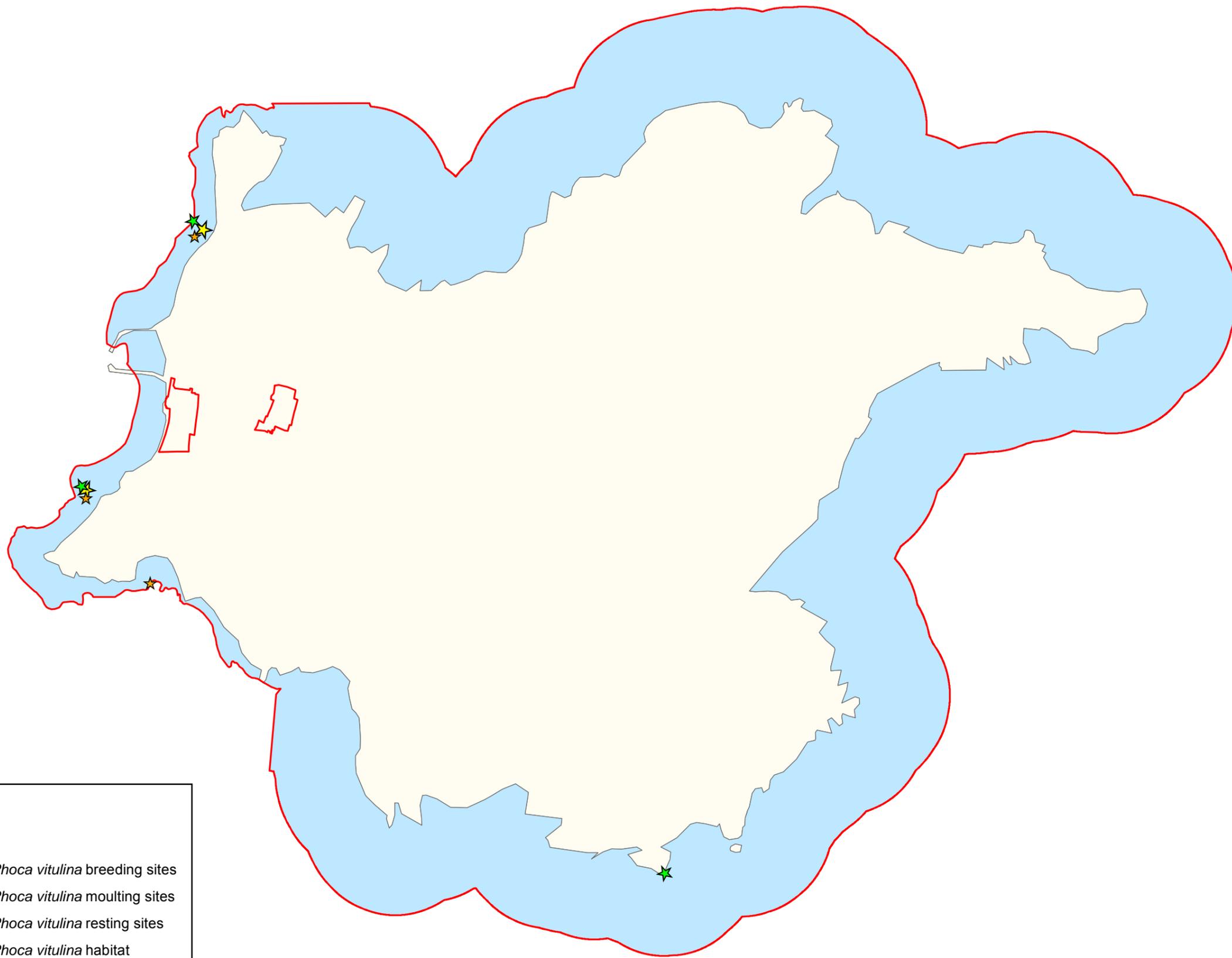




Legend

- SAC 000204
- ★ 1364 Grey Seal - *Halichoerus grypus* breeding sites
- ★ 1364 Grey Seal - *Halichoerus grypus* moulting sites
- ★ 1364 Grey Seal - *Halichoerus grypus* resting sites
- 1364 Grey Seal - *Halichoerus grypus* habitat
- OSi Discovery Series Coastal Boundary





Legend

- SAC 000204
- ★ 1365 Harbour Seal - *Phoca vitulina* breeding sites
- ★ 1365 Harbour Seal - *Phoca vitulina* moulting sites
- ★ 1365 Harbour Seal - *Phoca vitulina* resting sites
- 1365 Harbour Seal - *Phoca vitulina* habitat
- OSi Discovery Series Coastal Boundary



National Parks and Wildlife Service

Conservation Objectives Series

Malahide Estuary SAC 000205



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Citation:

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Gaeltacht.**

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The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|---|
| 000205 | Malahide Estuary SAC |
| 1140 | Mudflats and sandflats not covered by seawater at low tide |
| 1310 | <i>Salicornia</i> and other annuals colonising mud and sand |
| 1320 | <i>Spartina</i> swards (<i>Spartinion maritimae</i>) |
| 1330 | Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) |
| 1410 | Mediterranean salt meadows (<i>Juncetalia maritimi</i>) |
| 2120 | Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) |
| 2130 | Fixed coastal dunes with herbaceous vegetation (grey dunes)* |

Please note that this SAC overlaps with Malahide Estuary SPA (004025). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|---|
| Year : | 2007 |
| Title : | Saltmarsh Monitoring Project 2006 |
| Author : | McCorry, M. |
| Series : | Unpublished report to NPWS |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006 |
| Author : | Ryle, T.; Murray, A.; Connolly, C.; Swann, M. |
| Series : | Unpublished report to NPWS |
| Year : | 2009 |
| Title : | Saltmarsh monitoring project 2007-2008 |
| Author : | McCorry, M; Ryle, T. |
| Series : | Unpublished report to NPWS |
| Year : | 2013 |
| Title : | Malahide Estuary SAC (site code 205) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |
| Year : | 2013 |
| Title : | Malahide Estuary SAC (site code 205) Conservation objectives supporting document- marine habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Other References

| | |
|-----------------|---|
| Year : | 2002 |
| Title : | New atlas of the British and Irish flora |
| Author : | Preston, C.D.; Pearman, D.A.; Dines, T.D. |
| Series : | Oxford University Press, Oxford |
| Year : | 2003 |
| Title : | <i>Spartina</i> in Ireland. In: Wetlands in Ireland |
| Author : | McCorry, M.J.; Curtis, T.G.F.; Otte, M.L. |
| Series : | UCD Press, Dublin |
| Year : | 2008 |
| Title : | The phytosociology and conservation value of Irish sand dunes |
| Author : | Gaynor, K. |
| Series : | Unpublished PhD thesis, National University of Ireland, Dublin |
| Year : | 2011 |
| Title : | A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Malahide Estuary |
| Author : | ASU |
| Series : | Unpublished report to the Marine Institute and NPWS |

Spatial data sources

| | |
|-------------------------|--|
| Year : | Interpolated 2012 |
| Title : | 2010 intertidal survey |
| GIS Operations : | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1140, marine community types (maps 3 and 4) |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used For : | Marine community types base data (map 4) |
| Year : | Revision 2010 |
| Title : | Saltmarsh Monitoring Project 2007-2008. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used |
| Used For : | 1310, 1330, 1410 (map 5) |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used |
| Used For : | 2120, 2130 (map 6) |

Conservation Objectives for : Malahide Estuary SAC [000205]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|----------------------------|--|---|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated using OSI data as 311ha |
| Community extent | Hectares | Maintain the extent of the <i>Zostera</i> -dominated community and the <i>Mytilus edulis</i> -dominated community complex, subject to natural processes. See map 4 | Based on intertidal surveys undertaken in 2010 and 2011 (ASU, 2011). See marine supporting document for further information |
| Community structure: <i>Zostera</i> density | Shoots/m ² | Conserve the high quality of the <i>Zostera</i> -dominated community, subject to natural processes | Estimated by the EPA during 2011 intertidal survey. See marine supporting document for further details |
| Community structure: <i>Mytilus edulis</i> density | Individuals/m ² | Conserve the high quality of the <i>Mytilus edulis</i> -dominated community, subject to natural processes | Estimated during 2010 intertidal survey (ASU, 2011). See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex; Estuarine sandy mud with Chironomidae and <i>Hediste diversicolor</i> community complex; and Sand to muddy sand with <i>Peringia ulvae</i> , <i>Tubificoides benedii</i> and <i>Cerastoderma edule</i> community complex. See map 4 | Based on intertidal surveys undertaken in 2010 and 2011 (ASU, 2011). See marine supporting document for further information |

Conservation Objectives for : Malahide Estuary SAC [000205]

1310 *Salicornia* and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary- 1.93ha. See map 5 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped as a single sub-site, giving a total estimated area of 1.93ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from SMP (McCorry, 2007). <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. The largest area of <i>Salicornia</i> flats occurs in the outer estuary. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions | Based on data from SMP (McCorry, 2007). Sediment supply is particularly important for pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. The saltmarsh habitats at this site have been disturbed in the past by the construction of the railway viaduct across the estuary. This has led to the development of more brackish or lagoonal-type conditions in the inner estuary and a reduced tidal range. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from SMP (McCorry, 2007). Creeks deliver sediment throughout saltmarsh system. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from SMP (McCorry, 2007). This pioneer saltmarsh community requires regular tidal inundation. The viaduct that was built over the estuary in the 1800s has modified the tidal regime of the estuary over time and prevents the inner estuary emptying completely at low tide, thereby creating a lagoon. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Malahide Island there are natural transitions between ASM and <i>Salicornia</i> flats and there are also transitions between ASM and sand dune habitats. Transitions between ASM and <i>Spartina</i> swards occur at the northern end of the outer estuary. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from McCorry (2007). Grazing by livestock is absent from Malahide Estuary resulting in a high vegetation cover and a wide range of sward heights. See coastal habitats supporting document for details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from SMP (McCorry and Ryle, 2009). See coastal habitats supporting document for details |
| Vegetation composition: typical species and sub-communities | Percentage cover | Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009) | Based on data from SMP (McCorry and Ryle, 2009). See coastal habitats supporting document for further details |

| | | | |
|--|----------|---|---|
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>). No new sites for this species and an annual spread of less than 1% where it is already known to occur | Based on data from SMP (McCorry, 2007). There is frequent <i>Spartina</i> recorded throughout the SAC. See coastal habitats supporting document for further details |
|--|----------|---|---|

Spartina swards (*Spartinion maritimae*) was originally listed as a qualifying Annex I habitat for Malahide Estuary SAC due to historical records of two rare forms of cordgrass—small cordgrass (*Spartina maritima*) and Townsend's cordgrass (*S. x townsendii*). However, Preston et al. (2002) considers both forms to be alien. In addition, all stands of cordgrass in Ireland are now regarded as common cordgrass (*S. anglica*) (McCorry et al., 2003; McCorry and Ryle, 2009). As a consequence, a conservation objective has not been prepared for this habitat. It will therefore not be necessary to assess the likely effects of plans or projects against this Annex I habitat at this site.

Conservation Objectives for : Malahide Estuary SAC [000205]

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 25.33ha. See map 5 | Based on data from Saltmarsh monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped as a single sub-site, giving a total estimated area of 25.33ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from SMP (McCorry, 2007). The ASM is the most prominent saltmarsh habitat at this SAC. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). The saltmarsh habitats have been disturbed in the past by the construction of a railway viaduct across the estuary. This has led to the development of more brackish or lagoonal-type conditions in the inner estuary and a reduced tidal estuary. In spite of the M1 Broadmeadow motorway bridge having been constructed across the saltmarsh at Lissenhall (2001-2003), the saltmarsh has remained more or less intact. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Allow creek and pan structure to develop, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). At Malahide Island the saltmarsh is in good condition. The ASM at Lissenhall is also in relatively good condition despite any disturbance resulting from construction of the M1 motorway bridge. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from McCorry (2007). The viaduct that was built over the estuary in the 1800s has modified the tidal regime of the estuary over time, which prevents the inner estuary emptying completely at low tide. thereby creating a lagoon. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Malahide Estuary ASM is the dominant saltmarsh habitat where it occurs in mosaic with other saltmarsh habitats, including ' <i>Salicornia</i> and other annuals colonising mud and sand' and MSM. At Malahide Island there are also some natural transitions between the ASM and sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from SMP (McCorry, 2007). Grazing by livestock is absent at this site. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% area outside creeks vegetated | Based on data from SMP (McCorry and Ryle, 2009). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009) | See coastal habitats supporting document for further details |

| | | | |
|--|----------|--|---|
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is known to occur | Based on data from SMP (McCorry and Ryle, 2009). <i>Spartina</i> is widely distributed throughout the SAC. See coastal habitats supporting document for further details |
|--|----------|--|---|

Conservation Objectives for : Malahide Estuary SAC [000205]

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 0.64ha. See map 5 | Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped as a single sub-site (0.64ha). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). MSM only occurs in the outer estuary. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). The saltmarsh habitats have been disturbed in the past by the construction of a railway viaduct across the estuary. This has led to the development of more brackish or lagoonal-type conditions in the inner estuary and a reduced tidal estuary. In spite of the M1 Broadmeadow motorway bridge having been constructed across the saltmarsh at Lissenhall (2001 -2003), the saltmarsh has remained more or less intact. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from the SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Mediterranean salt meadows is found high up in the saltmarsh but requires occasional tidal inundation. Based on data from McCorry (2007). The viaduct that was built over the estuary in the 1800s has modified the tidal regime of the estuary over time, which prevents the inner estuary emptying completely at low tide. thereby creating a lagoon. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Malahide Estuary there are mosaics of ASM, MSM and <i>Salicornia</i> flats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation in the sward | Based on data from McCorry (2007). Livestock grazing is absent from Malahide Estuary. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009) | See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is already known to occur | Based on data from McCorry (2007). <i>Spartina</i> is widely distributed throughout the SAC. See coastal habitats supporting document for further details. See coastal habitats supporting document for further details |

2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

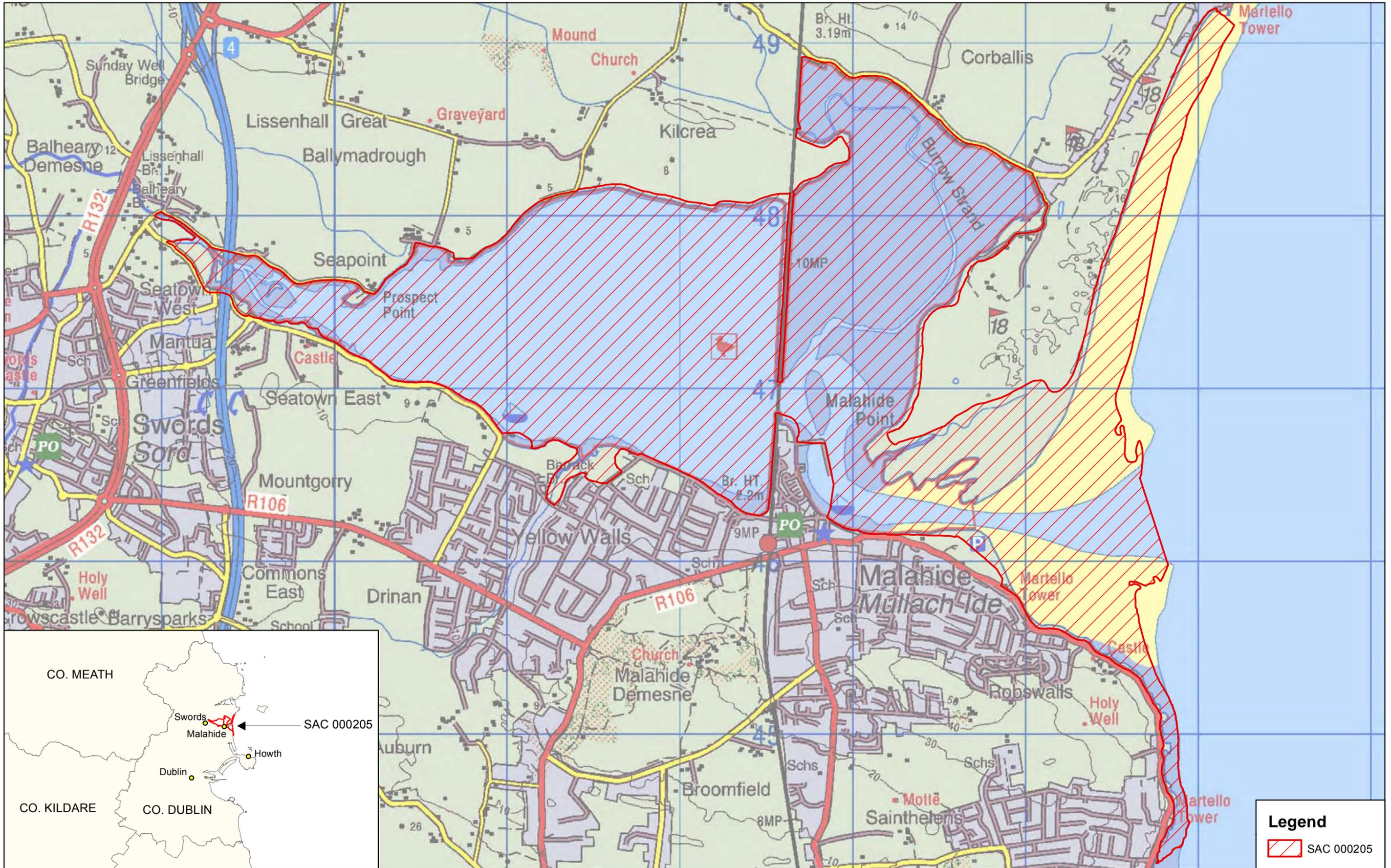
| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 1.80ha. See map 6 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat was mapped from a single sub-site - Malahide Island. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on Ryle et al. (2009). At Malahide Island the mobile dunes occur as a thin band along the northeastern edge of the spit. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<i>Ammophila arenaria</i>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. The mobile dunes at Malahide Island are undergoing some erosion along the north and eastern edge as well as some accretion to the south. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Gaynor (2008) and Ryle et al. (2009). At Malahide Island, there are transitional communities between a range of sand dune habitats as well as a range of saltmarsh habitats. See coastal habitats supporting document for further details |
| Vegetation composition: plant health of dune grasses | Percentage cover | 95% of marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on Ryle et al. (2009). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities dominated by marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) | Based on Ryle et al. (2009). Sea holly (<i>Eryngium maritimum</i>) occurs occasionally throughout the mobile dunes at Malahide Island. See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on Ryle et al. (2009). Negative indicators include non-native species; species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. This species has been planted on the seaward side of the spit as a coastal protection measure by the adjacent golf course. See coastal habitats supporting document for further details |

Conservation Objectives for : Malahide Estuary SAC [000205]

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

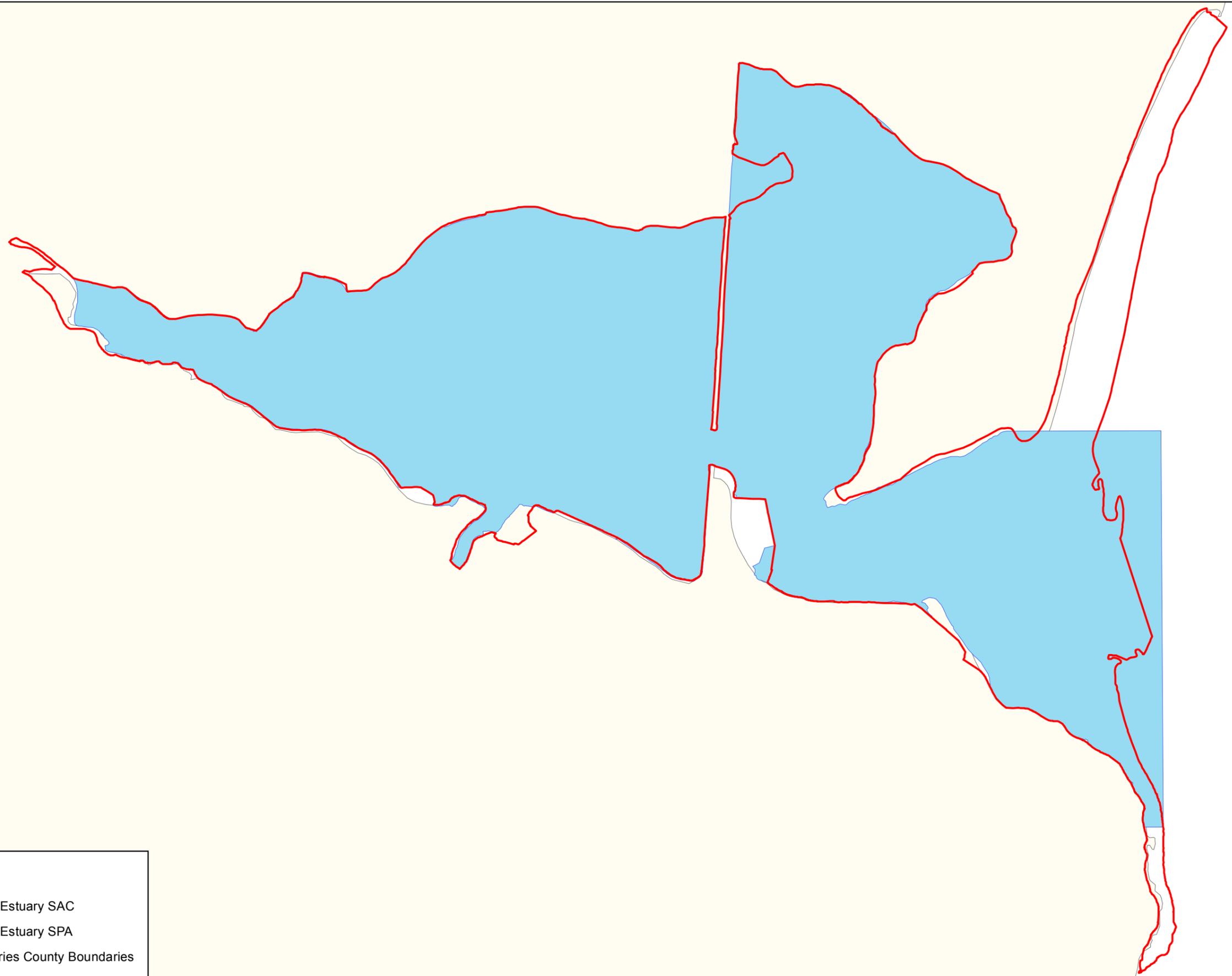
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 21.42ha. See map 6 | Based on data from Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat was mapped from a single sub-site- Malahide Island. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from Ryle et al. (2009). The fixed dune habitat flanks the eastern and southern edge of Malahide Island. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. Coastal protection works consisting of railway sleepers and chestnut paling have been installed on the seaward side of the spit. In addition, concrete filled plastic barrels and planting of sea buckthorn (<i>Hippophae rhamnoides</i>) are measures that have been used for coastal protection by the adjacent golf course. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). At Malahide Island, there are transitional communities between a range of sand dune habitats as well as a range of saltmarsh habitats. This site represents one of the more intact examples of a dune-saltmarsh complex on the northeastern coastline. See coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes | Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details |
| Vegetation structure: sward height | Centimetres | Maintain structural variation within sward | Based on data from Gaynor (2008) and Ryle et al. (2009). Grazing by livestock is absent from the dunes. See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in Ryle et al. (2009) | Based on data from Ryle et al. (2009). The protected and Red Data Book species hairy violet (<i>Viola hirta</i>) occurs at this site. See coastal habitats supporting document for further details. |
| Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>) | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. This species has been planted on the seaward side of the spit as a coastal protection measure by the adjacent golf course. See coastal habitats supporting document for further details |
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from Ryle et al. (2009). At Malahide Island, the fixed dune has been invaded by dog-rose (<i>Rosa canina</i>), privet (<i>Ligustrum</i> sp.) as well as single trees of turkey oak (<i>Quercus cerris</i>). See coastal habitats supporting document for further details |



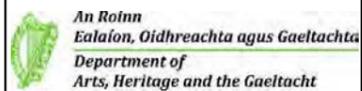
Legend

 SAC 000205



Legend

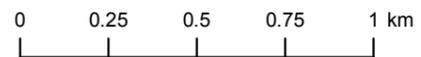
- 000205 Malahide Estuary SAC
- 004025 Malahide Estuary SPA
- OSi Discovery Series County Boundaries



**MAP 2:
MALAHIDE ESTUARY SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

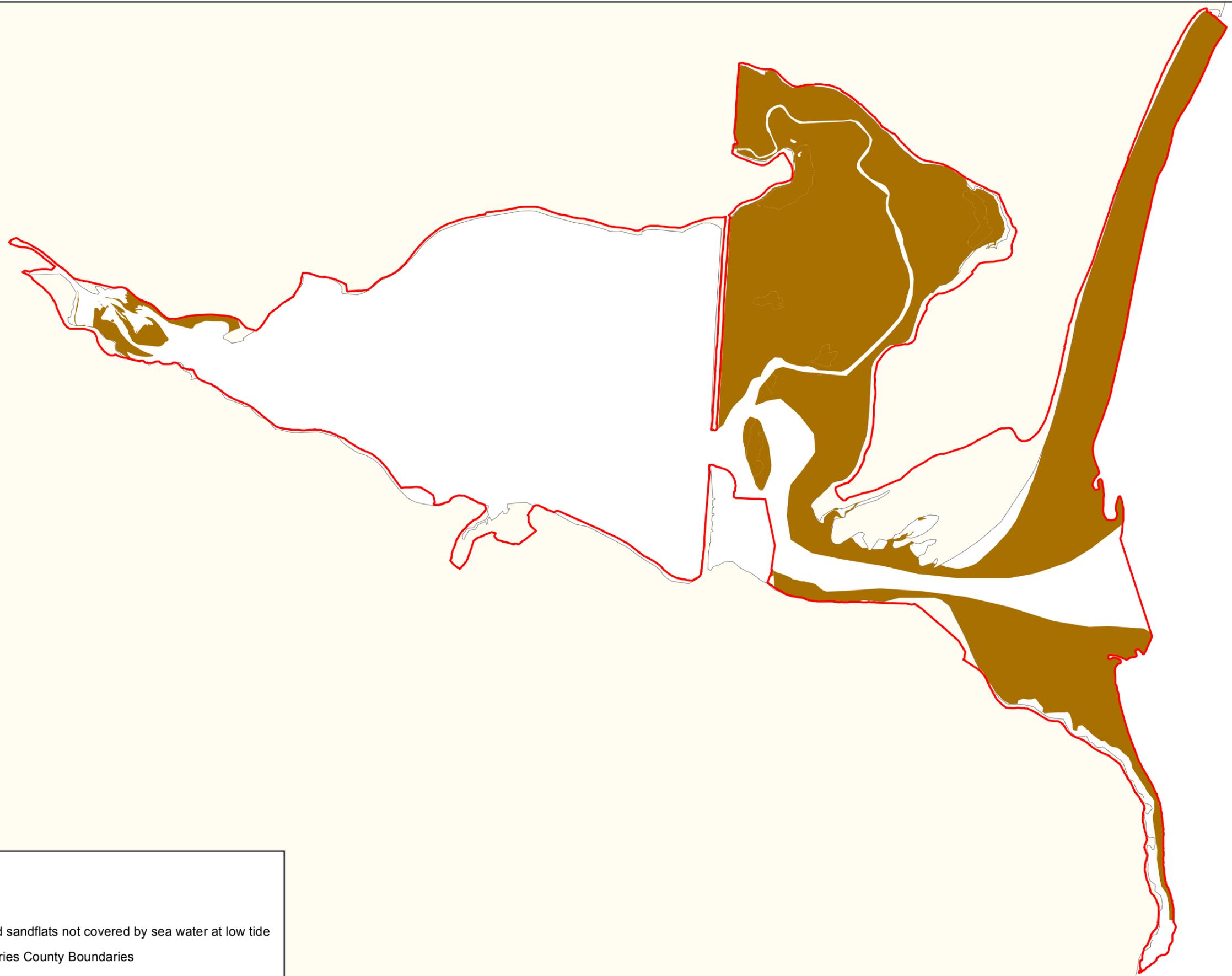
**SITE CODE: SAC 000205
CO DUBLIN; version 1.02**



The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

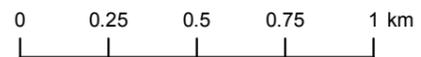


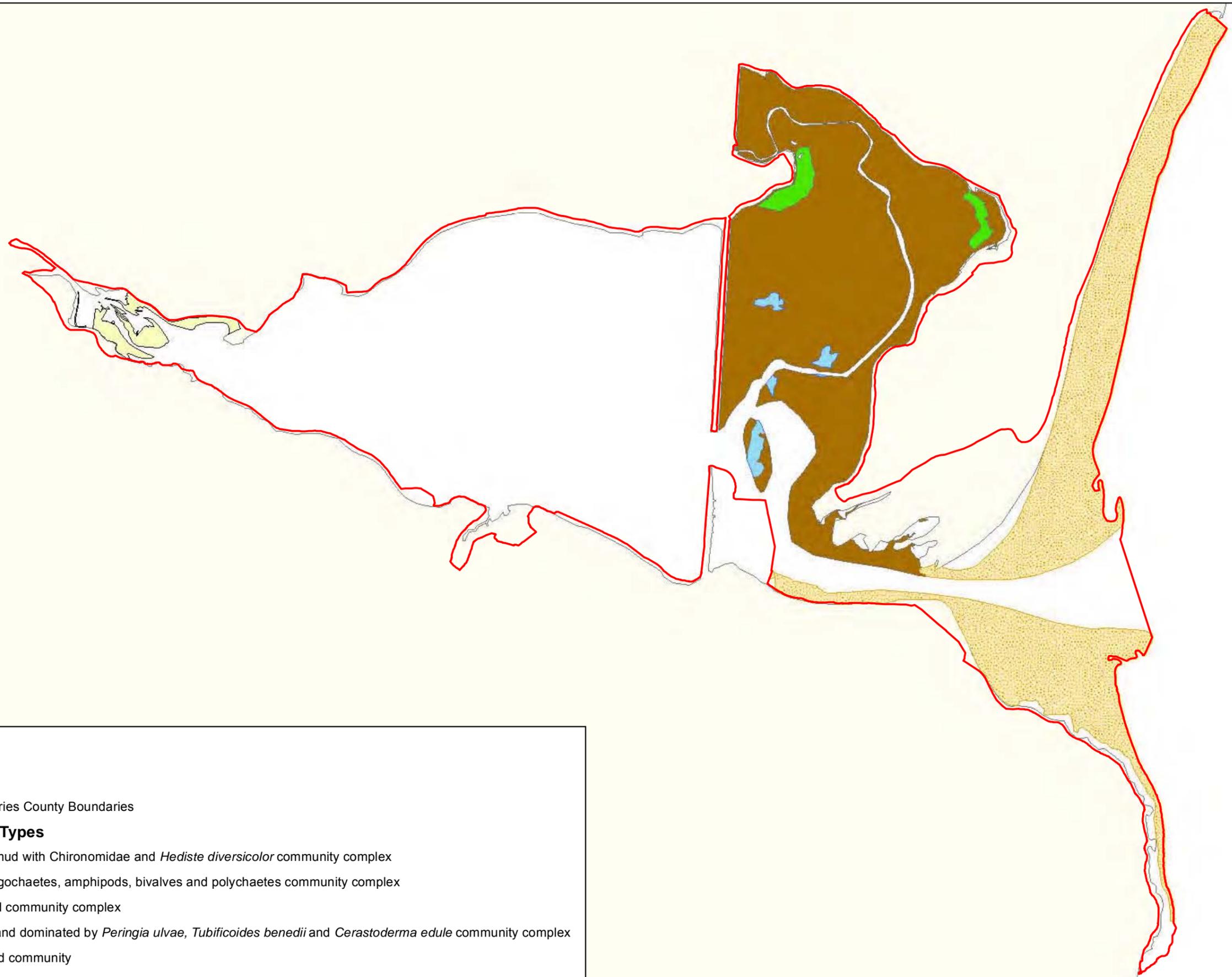
**Map Version 1
Date: October 2012**



Legend

- SAC 000205
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries



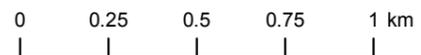


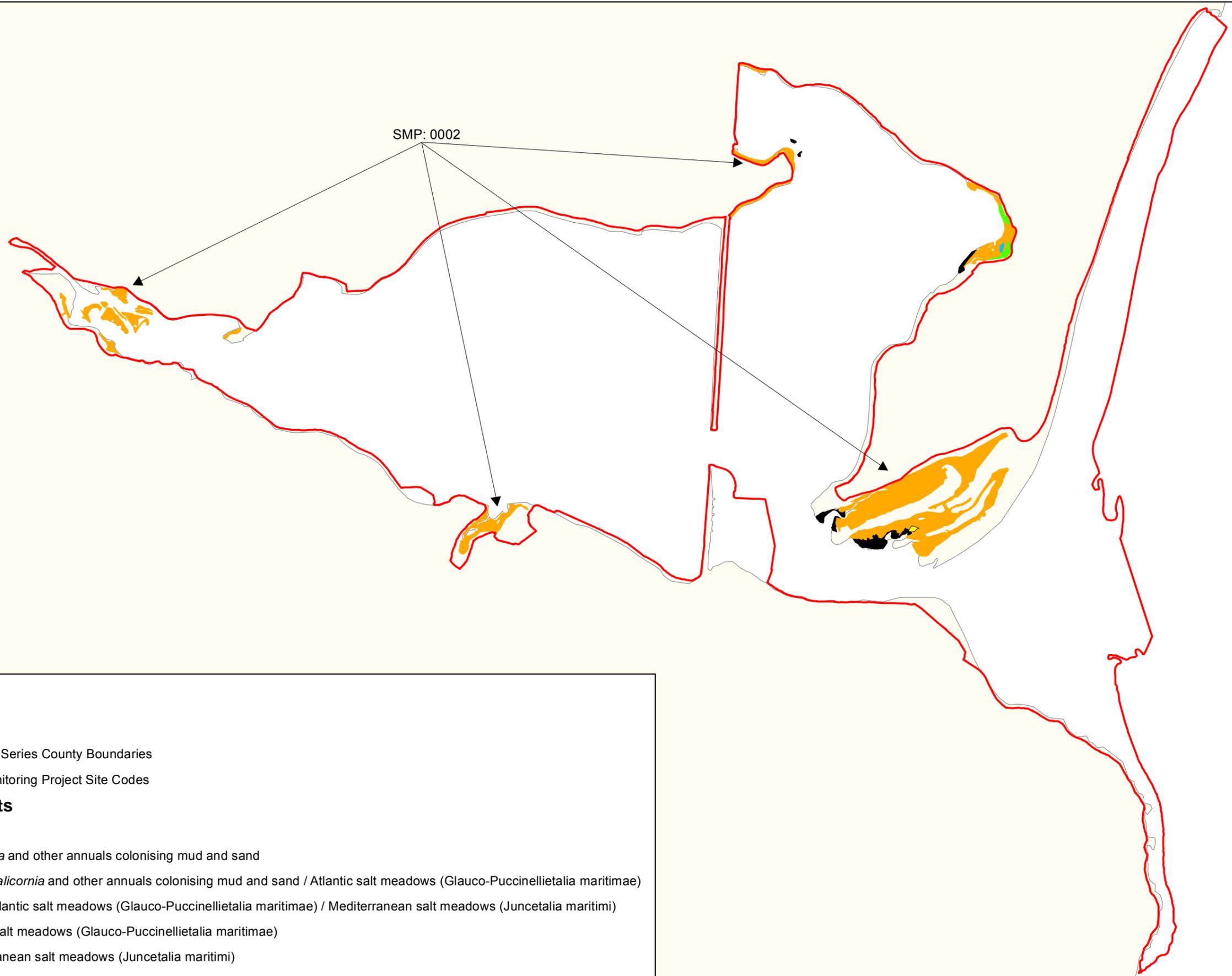
Legend

- SAC 000205
- OSi Discovery Series County Boundaries

Marine Community Types

- Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex
- Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex
- Mytilus*-dominated community complex
- Sand to muddy sand dominated by *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex
- Zostera* dominated community





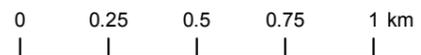
Legend

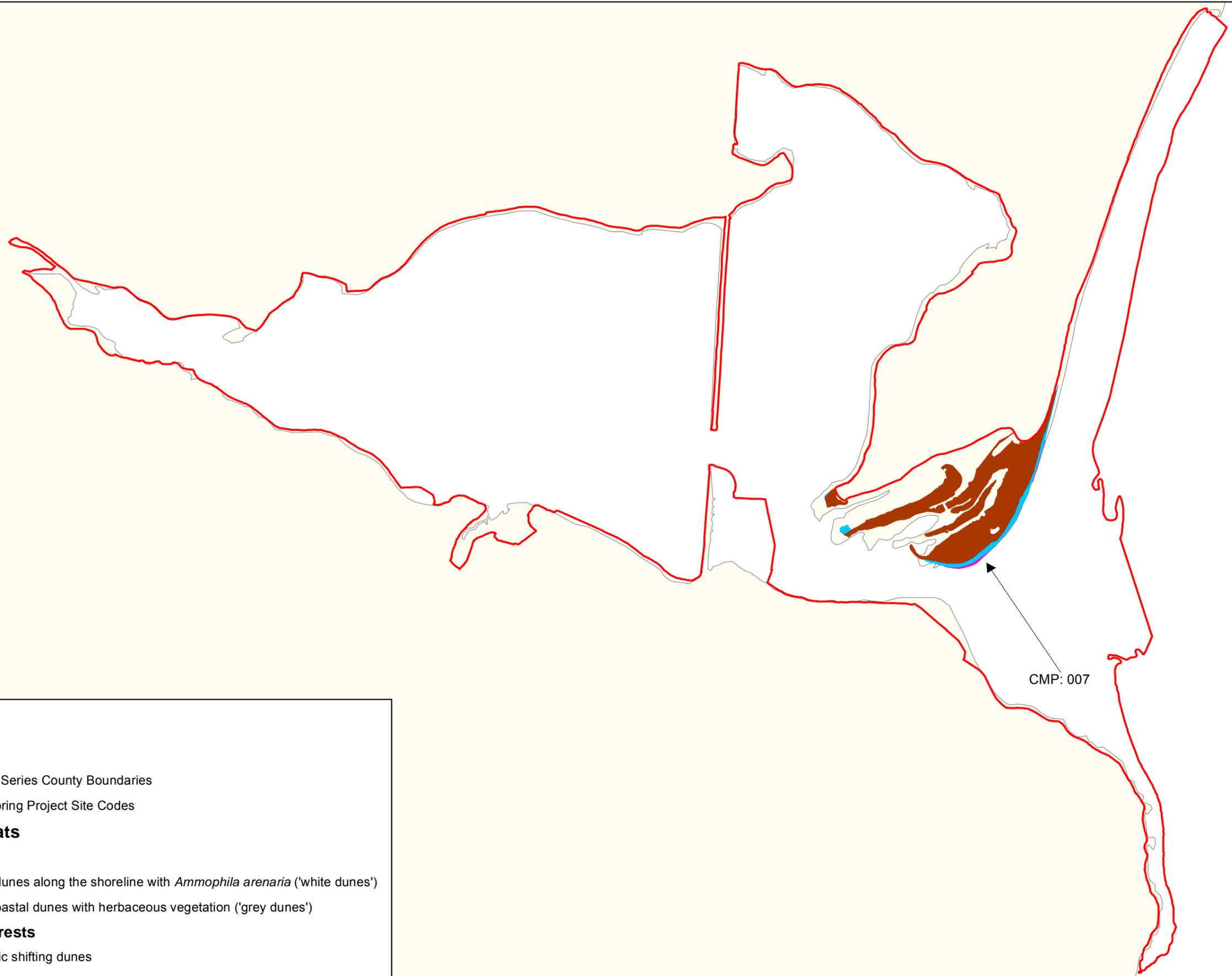
- SAC 000205
- OSi Discovery Series County Boundaries
- SMP: 0002 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

Qualifying Interests

- 1310 *Salicornia* and other annuals colonising mud and sand
- 1310 / 1330 *Salicornia* and other annuals colonising mud and sand / Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1330 / 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)





Legend

- SAC 000205
- OSi Discovery Series County Boundaries
- CMP:007 Coastal Monitoring Project Site Codes

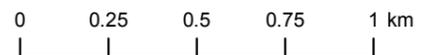
Sand Dune Habitats

Qualifying Interests

- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

Non Qualifying Interests

- 2110 Embryonic shifting dunes



National Parks and Wildlife Service

Conservation Objectives Series

North Dublin Bay SAC 000206



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Citation:

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Gaeltacht.**

Series Editor: Rebecca Jeffrey

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The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|---|
| 000206 | North Dublin Bay SAC |
| 1140 | Mudflats and sandflats not covered by seawater at low tide |
| 1210 | Annual vegetation of drift lines |
| 1310 | Ulex and other annuals colonising mud and sand |
| 1330 | Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) |
| 1395 | Petalwort <i>Petalophyllum ralfsii</i> |
| 1410 | Mediterranean salt meadows (<i>Juncetalia maritimi</i>) |
| 2110 | Embryonic shifting dunes |
| 2120 | Shifting dunes along the shoreline with Cladonia (white dunes) |
| 2130 | Fixed coastal dunes with herbaceous vegetation (grey dunes) |
| 2190 | Humid dune slacks |

Please note that this SAC overlaps with North Bull Island SPA (004006) and adjoins Howth Head SAC (000203) and South Dublin Bay and River Tolka Estuary SPA (004024). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|---|
| Year : | 2007 |
| Title : | Saltmarsh Monitoring Project 2006 |
| Author : | McCorry, M. |
| Series : | Unpublished report to NPWS |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006 |
| Author : | Ryle, T.; Murray, A.; Connolly, K.; Swann, M. |
| Series : | Unpublished report to NPWS |
| Year : | 2009 |
| Title : | Saltmarsh monitoring project 2007-2008 |
| Author : | McCorry, M; Ryle, T. |
| Series : | Unpublished report to NPWS |
| Year : | 2013 |
| Title : | North Dublin Bay SAC (site code 206) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |
| Year : | 2013 |
| Title : | North Dublin Bay SAC (site code 206) Conservation objectives supporting document- marine habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |
| Year : | 2013 |
| Title : | Monitoring survey of Annex I sand dune habitats in Ireland |
| Author : | Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J. |
| Series : | Irish Wildlife Manual No. 75 |

Other References

| | |
|-----------------|---|
| Year : | 2008 |
| Title : | The phytosociology and conservation value of Irish sand dunes |
| Author : | Gaynor, K. |
| Series : | Unpublished PhD thesis, National University of Ireland, Dublin |
| Year : | 2011 |
| Title : | A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of North Dublin Bay |
| Author : | Aquatic Services Unit |
| Series : | Unpublished report to the Marine Institute and NPWS |
| Year : | 2012 |
| Title : | Rare and threatened bryophytes of Ireland |
| Author : | Lockhart, N; Hodgetts, N; Holyoak, D. |
| Series : | National Museums Northern Ireland |

Year : 2013
Title : Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author : Campbell, C.
Series : Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

| | |
|-------------------------|--|
| Year : | Interpolated 2013 |
| Title : | 2010 intertidal survey |
| GIS Operations : | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1140, Marine community types (maps 3 and 4) |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used For : | Marine community types base data (map 4) |
| Year : | Revision 2010 |
| Title : | Saltmarsh Monitoring Project 2007-2008. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used |
| Used For : | 1310, 1330, 1410 (map 5) |
| Year : | 2013 |
| Title : | Sand Dune Monitoring Project 2011. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used |
| Used For : | 2110, 2120, 2130, 2190 (map 6) |
| Year : | 2013 |
| Title : | NPWS rare and threatened species database |
| GIS Operations : | Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1395 (map 6) |

Conservation Objectives for : North Dublin Bay SAC [000206]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|----------------------------|--|--|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated using OSI data as 578ha |
| Community extent | Hectares | Maintain the extent of the <i>Mytilus edulis</i> -dominated community, subject to natural processes. See map 4 | Estimated during site walkover in March 2012. See marine supporting document for further information |
| Community structure: <i>Mytilus edulis</i> density | Individuals/m ² | Conserve the high quality of the <i>Mytilus edulis</i> -dominated community, subject to natural processes | Observed during site walkover in March 2012. See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Fine sand to sandy mud with <i>Pygospio elegans</i> and <i>Crangon crangon</i> community complex; Fine sand with <i>Spio martinensis</i> community complex. See map 4 | Based on an intertidal survey undertaken in 2010 (ASU, 2011). See marine supporting document for further information |

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|--|--|
| Habitat area | Hectares | Area increasing, subject to natural processes, including erosion and succession. Total area mapped: South Bull - 0.11ha. See map 6 | Based on data from the Sand Dune Monitoring Project (SDM) (Delaney et al., 2013). Habitat is very difficult to measure in view of its dynamic nature, which means that it can appear and disappear within a site from year to year. This habitat was recorded from both North Bull and South Bull sub-sites by the Coastal Monitoring Project (CMP) (Ryle et al., 2009) but was only recorded in South Bull by the SDM. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 | Based on data from Delaney et al., (2013). Strandline is more extensive at South Bull sub-site than at North Bull. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Delaney et al., (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities with typical species: sea rocket (<i>Cakile maritima</i>), sea sandwort (<i>Honckenya peploides</i>), prickly saltwort (<i>Salsola kali</i>) and oraches (<i>Atriplex</i> spp.) | Based on data from Delaney et al., (2013). See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

1310 *alicornia* and other annuals colonising mud and sand

To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|--|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 29.10ha. See map 5 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped at a single sub-site, giving a total estimated area of 29.10ha, including mosaics. NB some further small unsurveyed areas may be present within this site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. The largest area of <i>Salicornia</i> flats occurs north of the central causeway. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). Sediment supply is particularly important for this pioneer saltmarsh community, as its distribution depends on accretion rates. It appears that the extent of the <i>Salicornia</i> flats was much lower before the construction of the causeway. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). Creeks deliver sediment throughout the saltmarsh system. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from McCorry (2007). This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from McCorry (2007). Wildfowl and water birds graze and forage on the <i>Salicornia</i> flats at Bull Island. See coastal habitats supporting document for details |
| Vegetation structure: vegetation cover | Percentage cover at a representative number of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from McCorry (2007). See coastal habitats supporting document for details |
| Vegetation composition: typical species and sub-communities | Percentage cover | Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009) | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from McCorry (2007). <i>Spartina</i> is frequent at Bull Island. While it occurs within a mosaic with <i>Salicornia</i> flats, it generally does not dominate the vegetation cover and only forms small swards. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|--|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 81.84ha. See map 5 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Atlantic salt meadow (ASM) surveyed and mapped at a single site, giving an estimated area of 81.84ha, including mosaics. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). The ASM at Bull Island was the largest single section of saltmarsh surveyed by the SMP in 2006. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). The construction of the causeway had a significant impact on the saltmarsh at Bull Island. Within the ASM there is some erosion at a slow rate at the seaward side of the northern tip. This erosion is offset by accretion along the northside of the causeway. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). Within Bull Island, the ASM topography is well developed and there is a very complex creek and salt pan structure. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from McCorry (2007). There is some light grazing by hares (<i>Lepus timidus hibernicus</i>) and wildfowl. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative number of monitoring stops | Maintain more than 90% area outside creeks vegetated | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009) | See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from from McCorry (2007). <i>Spartina</i> is widely distributed on ASM though found at low cover values. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 7.98ha. See map 5 | Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). One sub-site that supports Mediterranean Salt Meadow (MSM) was surveyed and mapped, giving an estimated area of 7.98ha, including mosaics. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 5 for known distribution | Based on data from McCorry (2007). The MSM is restricted to the area north of the causeway along the boundary with dune habitats and of St Annes Golf Course; the extent of the habitat here is likely to have been greater in the past. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/absence of physical barriers | Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from McCorry (2007). The MSM at North Bull Island not as well developed as the ASM. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | MSM is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation in the sward | Based on data from McCorry (2007). There is some light grazing by hares (<i>Lepus timidus hibernicus</i>) and wildfowl. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from McCorry (2007). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009) | See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% | Based on data from McCorry (2007). <i>Spartina</i> is widely distributed at this site. See coastal habitats supporting document for further details |

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha. See map 6 | Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Embryo dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 6.07ha. Habitat is very difficult to measure in view of its dynamic nature and is more extensive on North Bull than South Bull. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from Delaney et al. (2013). Mechanical beach cleaning may be contributing to limited distribution of this habitat, particularly at South Bull. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Dunes are naturally dynamic systems that require continuous supply and circulation of sand. At North Bull, movement of sediment towards the recurved northern tip of the dune has resulted in the formation of a wide area of foredune habitat. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. See coastal habitats supporting document for further details |
| Vegetation composition: plant health of foredune grasses | Percentage cover | More than 95% of sand couch (<i>Elytrigia juncea</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities with typical species: sand couch (<i>Elytrigia juncea</i>) and/or lyme-grass (<i>Leymus arenarius</i>) | Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

2120 Shifting dunes along the shoreline with *ophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes including erosion and succession. North Bull - 2.20ha; South Bull - 0.97ha. See map 6 | Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). These dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 3.18ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on Delaney et al. (2013). At South Bull and North Bull this habitat forms a continuous strip at or near the seaward edge of the dunes. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<i>Ammophila arenaria</i>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Gaynor (2008) and Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. See coastal habitats supporting document for further details |
| Vegetation composition: plant health of dune grasses | Percentage cover | 95% of marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities dominated by marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) | Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from Delaney et al. (2013). Negative indicators include non-native species; species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 40.29ha; South Bull - 64.56ha. See map 6 | Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was surveyed and mapped at two sub-sites to give a total estimated area of 104.85ha. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. See coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes | Based on data from Gaynor (2008) and Delaney et al. (2013). Pedestrian tracks that are devoid of vegetation occur throughout the island. See coastal habitats supporting document for further details |
| Vegetation structure: sward height | Centimetres | Maintain structural variation within sward | Based on data from Delaney et al. (2013). Grazing by livestock is absent from the island. However, the dunes are grazed by rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus timidus hibernicus</i>). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in Delaney et al. (2013) | Based on data from Gaynor (2008) and Delaney et al. (2013). The protected and Red Data Book species red hemp nettle (<i>Galeopsis angustifolia</i>), meadow saxifrage (<i>Saxifraga granulata</i>), wild clary (<i>Salvia verbenaca</i>) and spring vetch (<i>Vicia lathyroides</i>) represent indicators of local distinctiveness. See coastal habitats supporting document for further details. |
| Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>) | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. It occurs as occasional patches at this site. See coastal habitats supporting document for further details |
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from Delaney et al. (2013). There are numerous small trees and shrubs throughout the site but are not currently a significant management issue. See coastal habitats supporting document for further details |

Conservation Objectives for : North Dublin Bay SAC [000206]

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

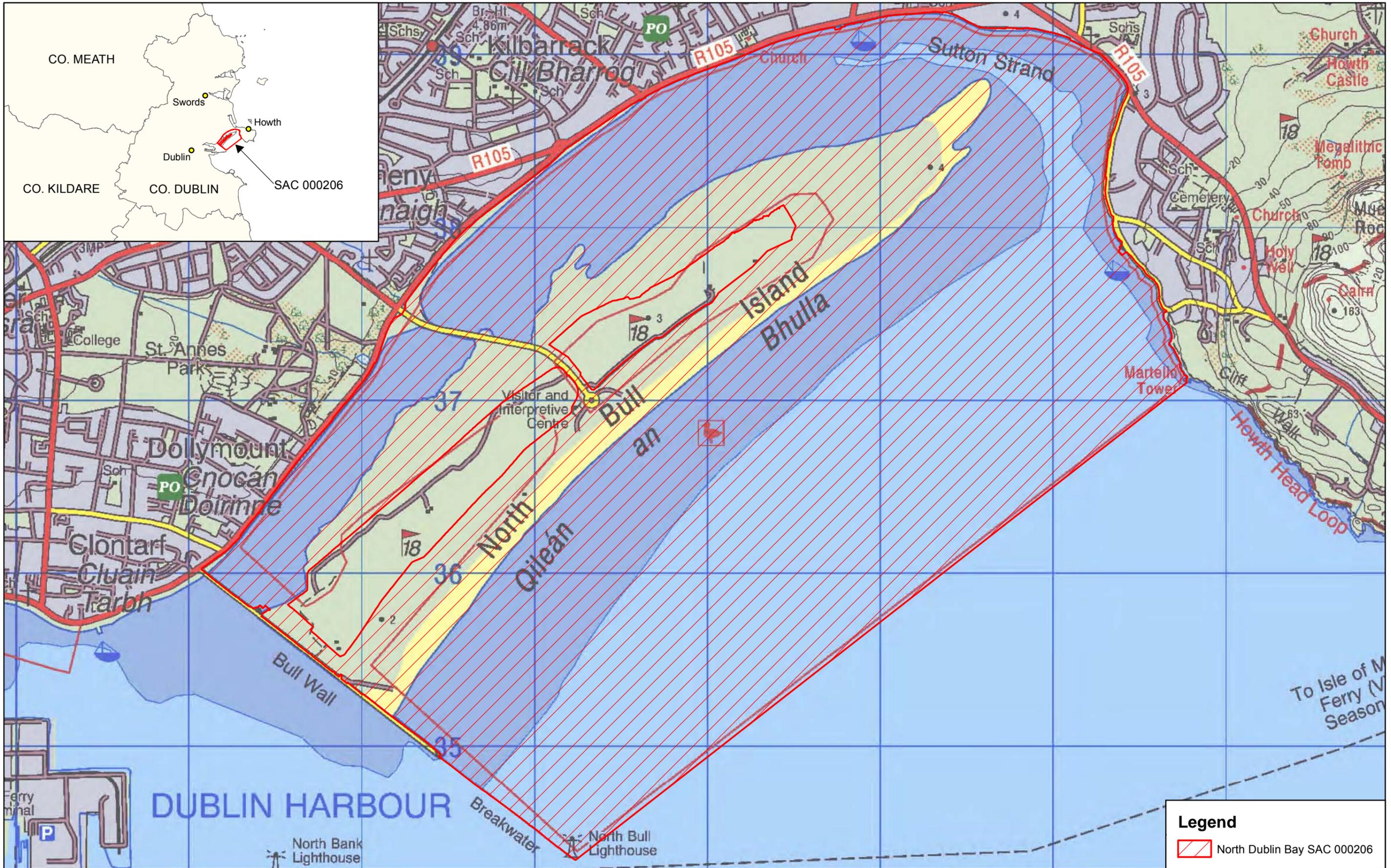
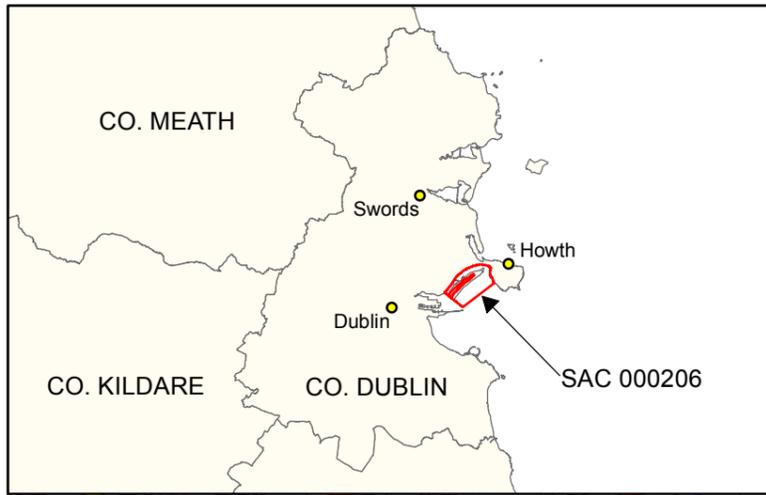
| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat area | Hectares | Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha. See map 6 | Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was surveyed and mapped at two sub-sites to give a total estimated area of 12.11ha. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from Delaney et al. (2013). The dune slack on North Bull consists of a long stretch of habitat that lies between successive dune ridges over a distance of approx. 700m. The dune slack topography is similar on South Bull with a number of individual long slacks between dune ridges. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See coastal habitats supporting document for further details |
| Physical structure: hydrological and flooding regime | Water table levels; groundwater fluctuations (metres) | Maintain natural hydrological regime | Based on data from Delaney et al. (2013). On Bull Island there is some concern that the alder marsh at the North Bull is becoming increasingly brackish in nature. There is also the potential problem of fertiliser run-off, leading to an increase in nutrient levels. Water abstraction could result in a lowering of the water table, negatively affecting the dune slacks. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Gaynor (2008) and Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. The transitional area between the fixed dunes and dune slacks are particularly important for a range of rare bryophytes (Lockhart et al., 2012). See coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground | Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Walking tracks traverse the dune slack at North Bull and have led to some erosion and poaching of soil. The slacks at the South Bull are close to the main access points to the island and pedestrian tracks have been created, leading to some erosion of vegetation cover. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Grazing by livestock is absent from the island. However, the dunes are grazed by rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus timidus hibernicus</i>). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in Delaney et al. (2013) | Based on data from Gaynor (2008) and Delaney et al. (2013). The Annex II liverwort, petalwort (<i>Petalophyllum ralfsii</i>) has its only station away from the western seaboard at this site. See coastal habitats supporting document and conservation objective for 1395 for further details. See coastal habitats supporting document for further details |

| | | | |
|--|-------------------------------|--|--|
| Vegetation composition: cover of <i>Salix repens</i> | Percentage cover; centimetres | Maintain less than 40% cover of creeping willow (<i>Salix repens</i>) | Based on data from Delaney et al. (2013). Cover of creeping willow (<i>Salix repens</i>) needs to be controlled (e.g. by an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. Patches of the shrub, particularly near the golf course boundaries, need to be kept in check on both the North and South Bull. See coastal habitats supporting document for further details |
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from Delaney et al. (2013). There are numerous shrubs and small trees throughout both sub-sites, but not to an extent that would require intensive management. See coastal habitats supporting document for further details |

1395 **Petalwort *Petalophyllum ralfsii***

To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|--|---|
| Distribution of populations | Number and geographical spread of populations | No decline. See map 6 | The known population of <i>Petalophyllum ralfsii</i> at Bull Island occurs along the track that cuts through the Alder marsh, south and east of St. Anne's Golf Club. Data from NPWS surveys and Campbell (2013) |
| Population size | Number of individuals | No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli | Counts of thalli are based on the mean of number of thalli in three 1 x 1m plots, averaged for 12 counts from February 2009 to March 2012: = 7.9 thalli per m ² (Campbell, 2013). Maximum estimated population at Bull Island is therefore 7.86 x 741 = 5,824 thalli. As not all the habitat within the area of occupancy is suitable habitat, the actual number of thalli is likely to be much less, perhaps 5% of this figure, i.e. 291 (or c. 300) |
| Area of suitable habitat | Hectares | No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha. See map 6 | The area of occupancy is along the track through the Alder marsh, south and east of St. Anne's Golf Club. The width of the track is estimated to be about 1m. The length, measured by GPS co-ordinates, is 741m. The maximum area is thus 741m ² (= 0.0741 ha). Not all the track is actually suitable habitat for <i>Petalophyllum ralfsii</i> . Some sections are too dry, some too permanently wet, and some sections too overgrown with coarse vegetation. Therefore c. 5% is suitable i.e. c. 37m ² (=0.0037ha). See also conservation objectives for humid dune slacks (2190) |
| Hydrological conditions: soil moisture | Occurrence | Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter | <i>Petalophyllum ralfsii</i> grows in damp conditions. Attribute and target based on Campbell (2013) |
| Vegetation structure: height and cover | Centimetres and percentage | Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground | <i>Petalophyllum ralfsii</i> grows in compacted, sandy ground, maintained at this site by rabbit (<i>Oryctolagus cuniculus</i>) grazing and trampling (by walkers). Campbell (2013) recorded a mean height of vegetation of 3.3cm, with bryophyte cover c. 30% and bare ground c. 15% (based on three 1 x 1m plots between 2009 and 2011) |



Legend

North Dublin Bay SAC 000206

An Roinn Ealaíon, Oidhreacht agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 1:
NORTH DUBLIN BAY SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000206; version 3.
CO. DUBLIN

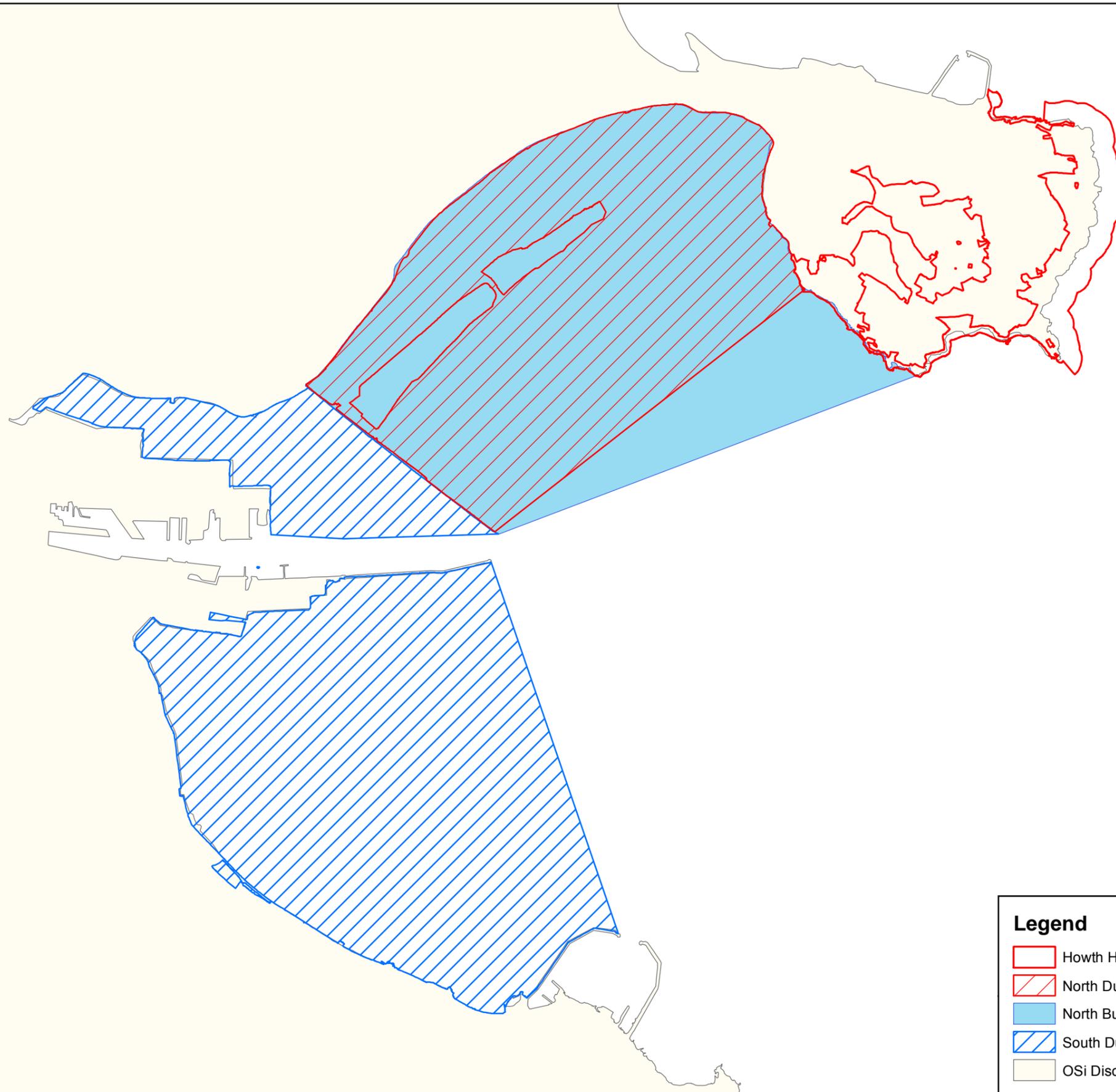
0 0.25 0.5 0.75 1 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadúnas Uimh. EN 0059212)

N

Map Version 1
Date: Sept 2013



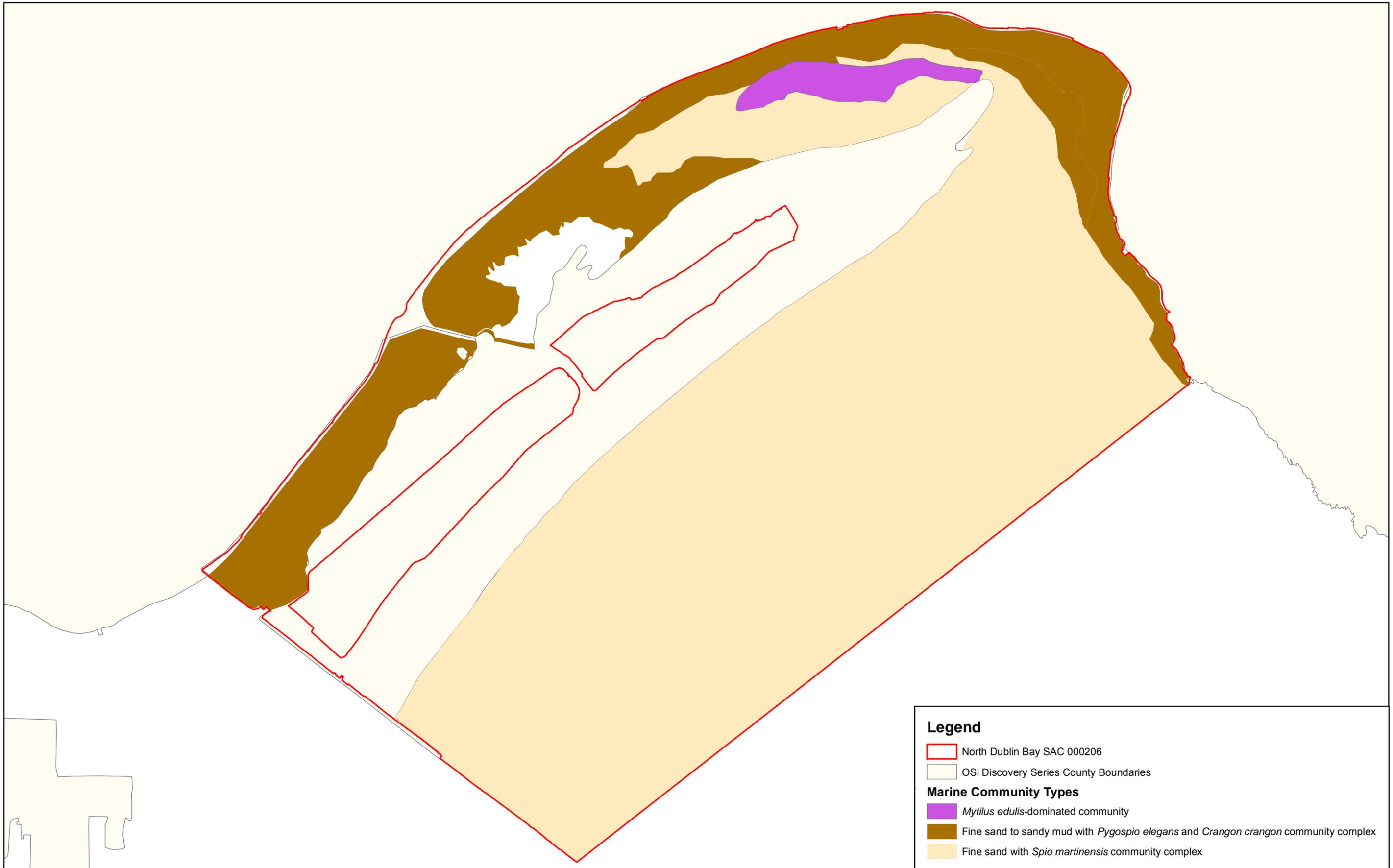
Legend

-  Howth Head SAC 000202
-  North Dublin Bay SAC 000206
-  North Bull Island SPA 004006
-  South Dublin Bay and River Tolka Estuary SPA 004024
-  OSi Discovery Series County Boundaries



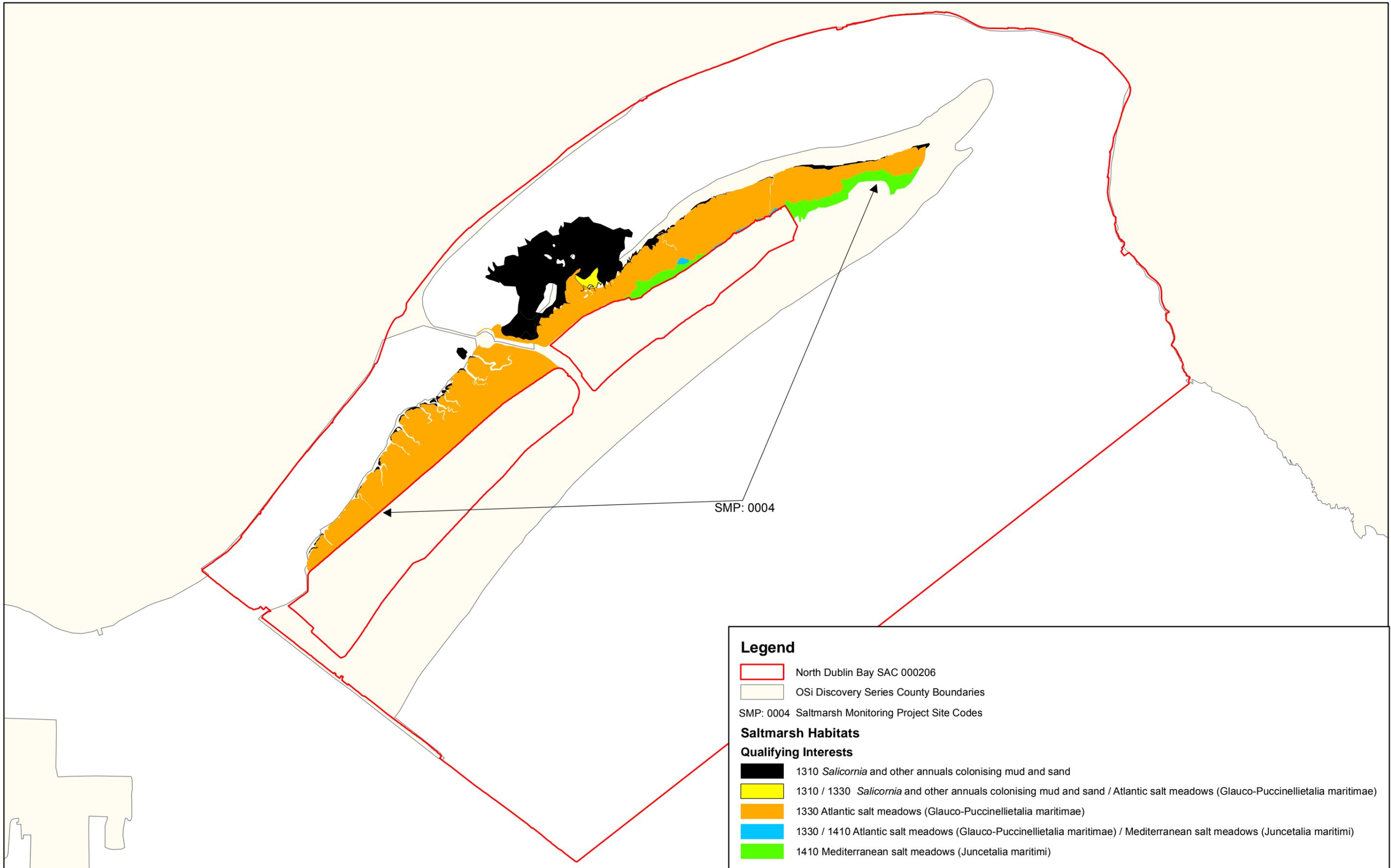
Legend

- North Dublin Bay SAC 000206
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries



Legend

- North Dublin Bay SAC 000206
- OSi Discovery Series County Boundaries
- Marine Community Types**
- Mytilus edulis*-dominated community
- Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon* community complex
- Fine sand with *Spio martinensis* community complex



Legend

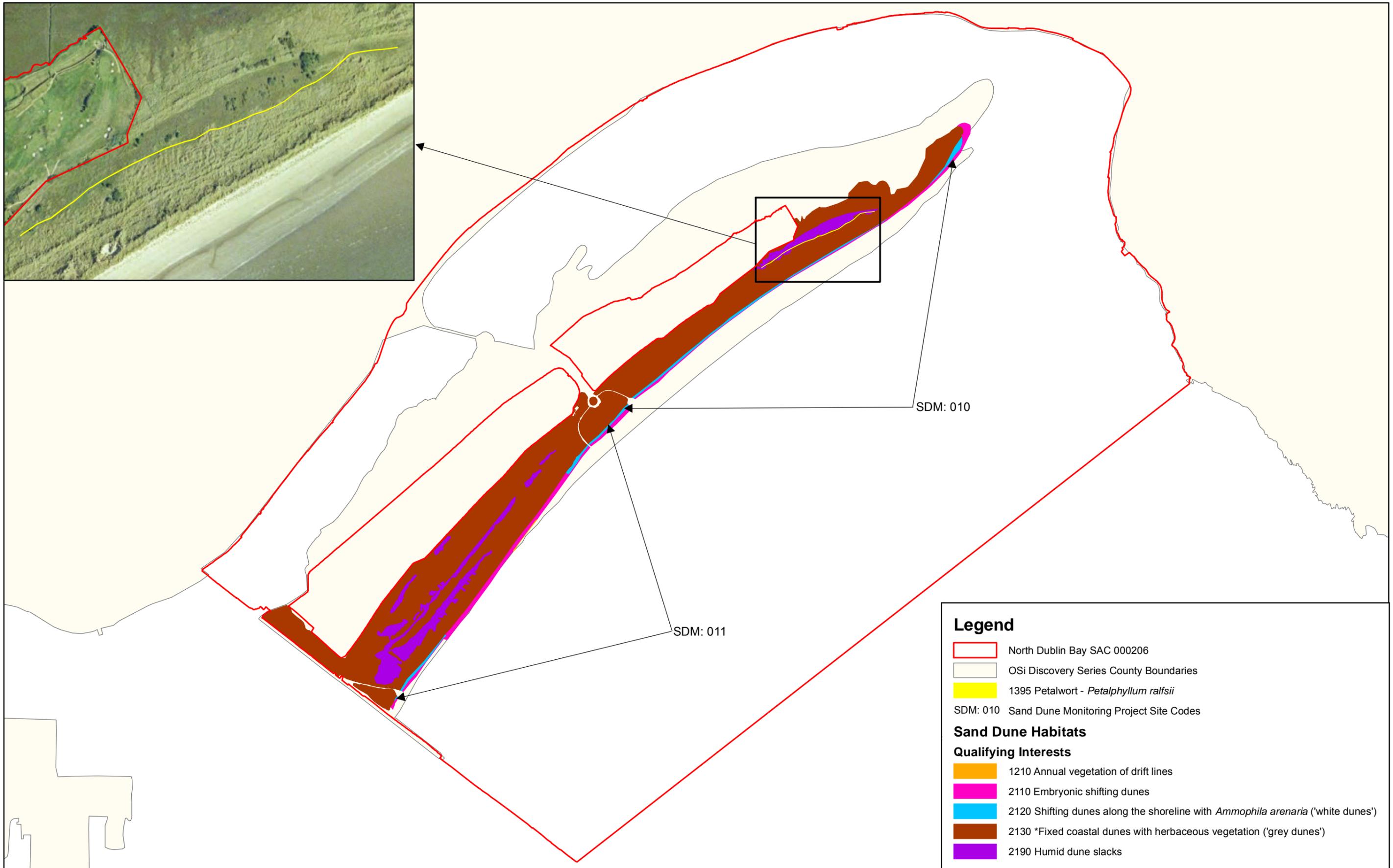
- North Dublin Bay SAC 000206
- OSi Discovery Series County Boundaries

SMP: 0004 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

Qualifying Interests

- 1310 *Salicornia* and other annuals colonising mud and sand
- 1310 / 1330 *Salicornia* and other annuals colonising mud and sand / Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1330 / 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)



National Parks and Wildlife Service

Conservation Objectives Series

Rogerstown Estuary SAC 000208



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Department of Arts, Heritage and the Gaeltacht,**

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E-mail: nature.conservation@ahg.gov.ie

Citation:

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and the Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|------------------------|
| 000208 | Rogerstown Estuary SAC |
|--------|------------------------|

| | |
|------|---|
| 1130 | Estuaries |
| 1140 | Mudflats and sandflats not covered by seawater at low tide |
| 1310 | <i>Salicornia</i> and other annuals colonising mud and sand |
| 1330 | Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) |
| 1410 | Mediterranean salt meadows (<i>Juncetalia maritimi</i>) |
| 2120 | Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) |
| 2130 | Fixed coastal dunes with herbaceous vegetation (grey dunes)* |

Please note that this SAC overlaps with Rogerstown Estuary SPA (004015). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping SPA as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|---|
| Year : | 2007 |
| Title : | Saltmarsh Monitoring Project 2006 |
| Author : | McCorry, M. |
| Series : | Unpublished report to NPWS |
| <hr/> | |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006 |
| Author : | Ryle, T.; Murray, A.; Connolly, C.; Swann, M. |
| Series : | Unpublished report to NPWS |
| <hr/> | |
| Year : | 2009 |
| Title : | Saltmarsh monitoring project 2007-2008 |
| Author : | McCorry, M; Ryle, T. |
| Series : | Unpublished report to NPWS |
| <hr/> | |
| Year : | 2013 |
| Title : | Rogerstown Estuary SAC (208) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation Objectives supporting document |
| <hr/> | |
| Year : | 2013 |
| Title : | Rogerstown Estuary SAC (208) Conservation objectives supporting document- marine habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Other References

| | |
|-----------------|--|
| Year : | 2008 |
| Title : | The phytosociology and conservation value of Irish sand dunes |
| Author : | Gaynor, K. |
| Series : | Unpublished PhD thesis, National University of Ireland, Dublin |
| <hr/> | |
| Year : | 2012 |
| Title : | Intertidal benthic survey of Rogerstown Estuary SAC and Rogerstown Estuary SPA |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |
| <hr/> | |
| Year : | 2012 |
| Title : | Subtidal benthic survey of Rogerstown Estuary SAC and Rogerstown Estuary SPA |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |

Spatial data sources

| | |
|-------------------------|--|
| Year : | 2010 |
| Title : | EPA WFD transitional waterbody data |
| GIS Operations : | Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1130 (map 3) |
| <hr/> | |
| Year : | Interpolated 2013 |
| Title : | Intertidal and subtidal surveys 2011 |
| GIS Operations : | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used For : | Marine community types, 1140 (maps 4 and 5) |
| <hr/> | |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used For : | Marine community types base data (map 5) |
| <hr/> | |
| Year : | Revision 2010 |
| Title : | Saltmarsh Monitoring Project 2007-2008. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used |
| Used For : | 1310, 1330, 1410 (map 6) |
| <hr/> | |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006. Version 1 |
| GIS Operations : | QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used |
| Used For : | 2120, 2130 (map 7) |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|----------------------------|---|---|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated as 268ha using OSi data and the defined Transitional Water Body area under the Water Framework Directive |
| Community extent | Hectares | Maintain the extent of the <i>Zostera</i> -dominated community and the <i>Mytilus edulis</i> -dominated community, subject to natural processes. See map 5 | Based on intertidal and subtidal surveys undertaken in 2011 (MERC, 2012a,b) and EPA surveys. See marine supporting document for further details |
| Community structure: <i>Zostera</i> density | Shoots/m ² | Conserve the high quality of the <i>Zostera</i> -dominated community, subject to natural processes | Estimated during 2011 EPA survey. See marine supporting document for further details |
| Community structure: <i>Mytilus edulis</i> density | Individuals/m ² | Conserve the high quality of the <i>Mytilus edulis</i> -dominated community, subject to natural processes | Estimated during an intertidal survey in 2011 (MERC, 2012). See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Sand to coarse sediment with <i>Nephtys cirrosa</i> and <i>Scolecopsis squamata</i> community complex; Estuarine sandy mud to mixed sediment with <i>Tubificoides benedii</i> , <i>Hediste diversicolor</i> and <i>Peringia ulvae</i> community complex. See map 5 | Based on intertidal and subtidal surveys undertaken in 2011 (MERC, 2012). See marine habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|----------------------------|--|--|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 4 | Habitat area was estimated using OSi data as 370ha |
| Community extent | Hectares | Maintain the extent of the <i>Zostera</i> -dominated community and the <i>Mytilus edulis</i> -dominated community, subject to natural processes. See map 5 | Based on intertidal and subtidal surveys undertaken in 2011 (MERC, 2012) and EPA surveys. See marine supporting document for further details |
| Community structure: <i>Zostera</i> density | Shoots/m ² | Conserve the high quality of the <i>Zostera</i> -dominated community, subject to natural processes | Estimated during 2011 EPA survey. See marine supporting document for further details |
| Community structure: <i>Mytilus edulis</i> density | Individuals/m ² | Conserve the high quality of the <i>Mytilus edulis</i> -dominated community, subject to natural processes | Estimated during an intertidal survey in 2011 (MERC, 2012). See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Sand to coarse sediment with <i>Nephtys cirrosa</i> and <i>Scolelepis squamata</i> community complex; Estuarine sandy mud to mixed sediment with <i>Tubificoides benedii</i> , <i>Hediste diversicolor</i> and <i>Peringia ulvae</i> community complex. See map 5 | Based on intertidal and subtidal surveys undertaken in 2011 (MERC, 2012). See marine habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

1310 *Salicornia* and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary 0.90ha. See map 6 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped at a single sub-site, giving a total estimated area of 0.90ha. N.B. Further unsurveyed areas may be present within this site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from SMP (McCorry, 2007). <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. This habitat occurs at several locations within the inner and outer estuary. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions | Based on data from SMP (McCorry, 2007). Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from SMP (McCorry, 2007). Creeks deliver sediment throughout saltmarsh system. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from SMP (McCorry, 2007). This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from SMP (McCorry, 2007). A range of saltmarsh habitats occurs at this site including mosaics. In the outer estuary at Portrane Burrow, there are zonations between saltmarsh and sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for details |
| Vegetation composition: typical species and sub-communities | Percentage cover | Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009) | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>). No new sites for this species and an annual spread of less than 1% where it is already known to occur | Based on data from SMP (McCorry, 2007). <i>Spartina</i> has formed swards on both the intertidal mudflats and also forms mosaics with established saltmarsh. See coastal habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary- 37.2ha. See map 6 | Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped at a single sub-site, giving a total estimated area of 37.2ha. N.B. Further unsurveyed areas may be present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution | Based on data from SMP (McCorry, 2007). ASM is the most common saltmarsh habitat at this site. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/ absence of physical barriers | Maintain natural circulation of sediments and organic matter, without any physical obstructions | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Allow creek and pan structure to develop, subject to natural processes, including erosion and succession | Based on data from SMP (McCorry, 2007). The saltmarsh topography is well developed in most of the larger sections of ASM. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from SMP (McCorry, 2007). A range of saltmarsh habitats occurs at this site including mosaics. In the outer estuary at Portrane Burrow, there are zonation between saltmarsh and sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Based on data from SMP (McCorry, 2007). Much of the saltmarsh is not grazed by livestock and has a relatively high sward height. Hares and wildfowl graze on the saltmarsh and the mid-marsh zone has a typical natural low sward height. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% area outside creeks vegetated | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009) | See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is known to occur | Based on data from SMP (McCorry, 2007). <i>Spartina</i> has formed swards on both the intertidal mudflats and also forms mosaics with established saltmarsh. See coastal habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|--|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary- 2.18ha. See map 6 | Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped at a single sub-site giving a total estimated area of 2.18ha. N.B. Further unsurveyed areas may be present within the site. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 6 for known distribution | Based on data from SMP (McCorry, 2007). There are small areas of MSM in this site. See coastal habitats supporting document for further details |
| Physical structure: sediment supply | Presence/absence of physical barriers | Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Physical structure: creeks and pans | Occurrence | Maintain creek and pan structure, subject to natural processes, including erosion and succession | Based on data from the SMP (McCorry, 2007). Within the MSM there are occasional salt pans present. See coastal habitats supporting document for further details |
| Physical structure: flooding regime | Hectares flooded; frequency | Maintain natural tidal regime | Based on data from SMP (McCorry, 2007). MSM is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession. | Based on data from SMP (McCorry, 2007). A range of saltmarsh habitats occur at this site including mosaics. In the outer estuary at Portrane Burrow, there are zonation between saltmarsh and sand dune habitats. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation in the sward | Based on data from SMP (McCorry, 2007). Much of the saltmarsh is not grazed by livestock and has a relatively high sward height. Hares and wildfowl graze on the saltmarsh and the mid-marsh zone has a typical natural low sward height. See coastal habitats supporting document for further details |
| Vegetation structure: vegetation cover | Percentage cover at a representative sample of monitoring stops | Maintain more than 90% of area outside creeks vegetated | Based on data from SMP (McCorry, 2007). See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009) | Based on data from SMP (McCorry, 2007). Species of local distinctiveness include meadow barley (<i>Hordeum secalinum</i>), and rock sea lavender (<i>Limonium binervosum</i>). See coastal habitats supporting document for further details |
| Vegetation structure: negative indicator species - <i>Spartina anglica</i> | Hectares | No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is already known to occur | Based on data from SMP (McCorry, 2007). <i>Spartina</i> has formed swards on both the intertidal mudflats and also forms mosaics with established saltmarsh. See coastal habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

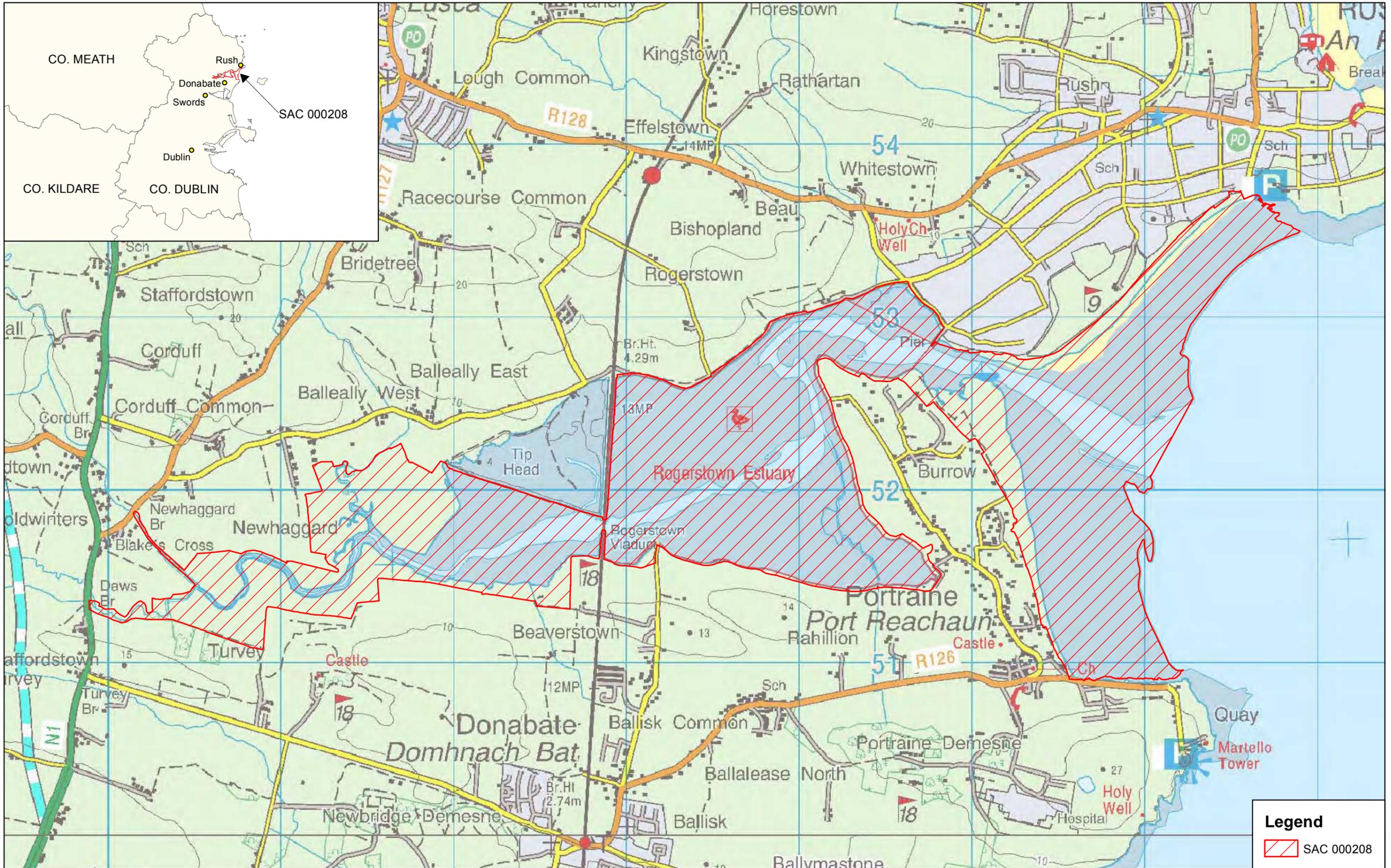
| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Rush - 1.25ha, Portrane - 1.31ha. See map 7 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Two sub-sites were surveyed and mapped, giving an estimated area of 2.56ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution | Based on data from CMP (Ryle et al., 2009). See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from CMP (Ryle et al., 2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<i>Ammophila arenaria</i>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. At Rush sandhills, a sea wall has been built at Rush Sailing Club and is likely to be impacting on sediment dynamics at this sub-site. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Gaynor (2008) and Ryle et al. (2009). At both sub-sites there are transitions between sand dune habitats. At Portrane there are also transitions to saltmarsh habitats. See coastal habitats supporting document for further details |
| Vegetation composition: plant health of dune grasses | Percentage cover | 95% of marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on data from CMP (Ryle et al., 2009). At Portrane there is a high cover of unhealthy specimens of marram grass <i>Ammophila arenaria</i> . See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities dominated by marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) | Based on data from CMP (Ryle et al., 2009). See coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from CMP (Ryle et al. 2009). Negative indicators include non-native species; species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. See coastal habitats supporting document for further details |

Conservation Objectives for : Rogerstown Estuary SAC [000208]

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Rush - 3.24ha; Portrane - 5.13ha. See map 7 | Based on data from Coastal Monitoring Project (CMP) (Ryle et al., 2009). Two sub-sites surveyed and mapped, giving an estimated area of 8.37ha. See coastal habitats supporting document for further details |
| Habitat distribution | Occurrence | No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution | Based on data from CMP (Ryle et al., 2009). Fixed dune habitat is the most abundant sand dune habitat within the SAC. See coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/ absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from CMP (Ryle et al., 2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. At Rush sandhills, a sea wall has been built at Rush Sailing Club and is likely to impact on sediment dynamics. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from CMP (Ryle et al., 2009). At both sub-sites there are transitions between sand dune habitats. At Portrane there are also transitions to saltmarsh habitats. See coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes | Based on data from Gaynor (2008) and Ryle et al. (2009). High recreational pressure on both sub-sites has resulted in the creation of numerous tracks. See coastal habitats supporting document for further details |
| Vegetation structure: sward height | Centimetres | Maintain structural variation within sward | Based on data from Gaynor (2008) and CMP (Ryle et al., 2009). Grazing by livestock is absent from the sub-sites. At Rush Sandhills, there are some small patches of rabbit-grazed short turf. See coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative sample of monitoring stops | Maintain range of sub-communities with typical species listed in Ryle et al. (2009) | Based on data from Gaynor (2008) and CMP (Ryle et al., 2009). The presence of the Red Data Book species green-winged orchid (<i>Orchis morio</i>) and hairy violet (<i>Viola hirta</i>) in fixed dunes are an indicator of local distinctiveness. See coastal habitats supporting document for further details. |
| Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>) | Percentage cover | Negative indicator species (including non-natives) to represent less than 5% cover | Based on data from CMP (Ryle et al., 2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. See coastal habitats supporting document for further details |
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from CMP (Ryle et al., 2009). See coastal habitats supporting document for further details |



Legend

 SAC 000208

 *An Roinn Ealaíon, Oidhreacht agus Gaeltachta*
 Department of Arts, Heritage and the Gaeltacht

**MAP 1:
 ROGERSTOWN ESTUARY SAC
 CONSERVATION OBJECTIVES
 SAC DESIGNATION**

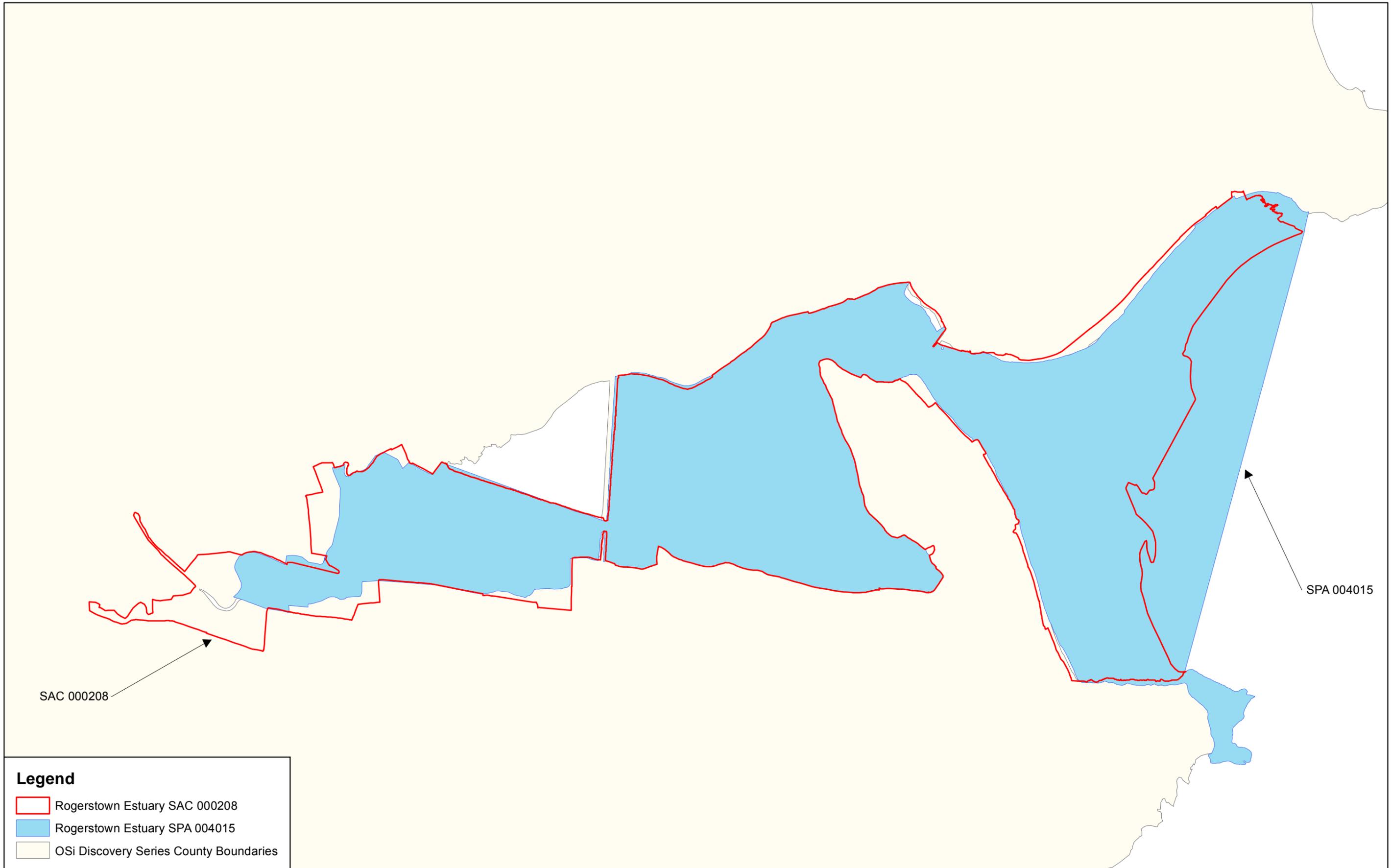
Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE: SAC 000208
 CO. DUBLIN; version 1.02**

0 0.25 0.5 0.75 1 km

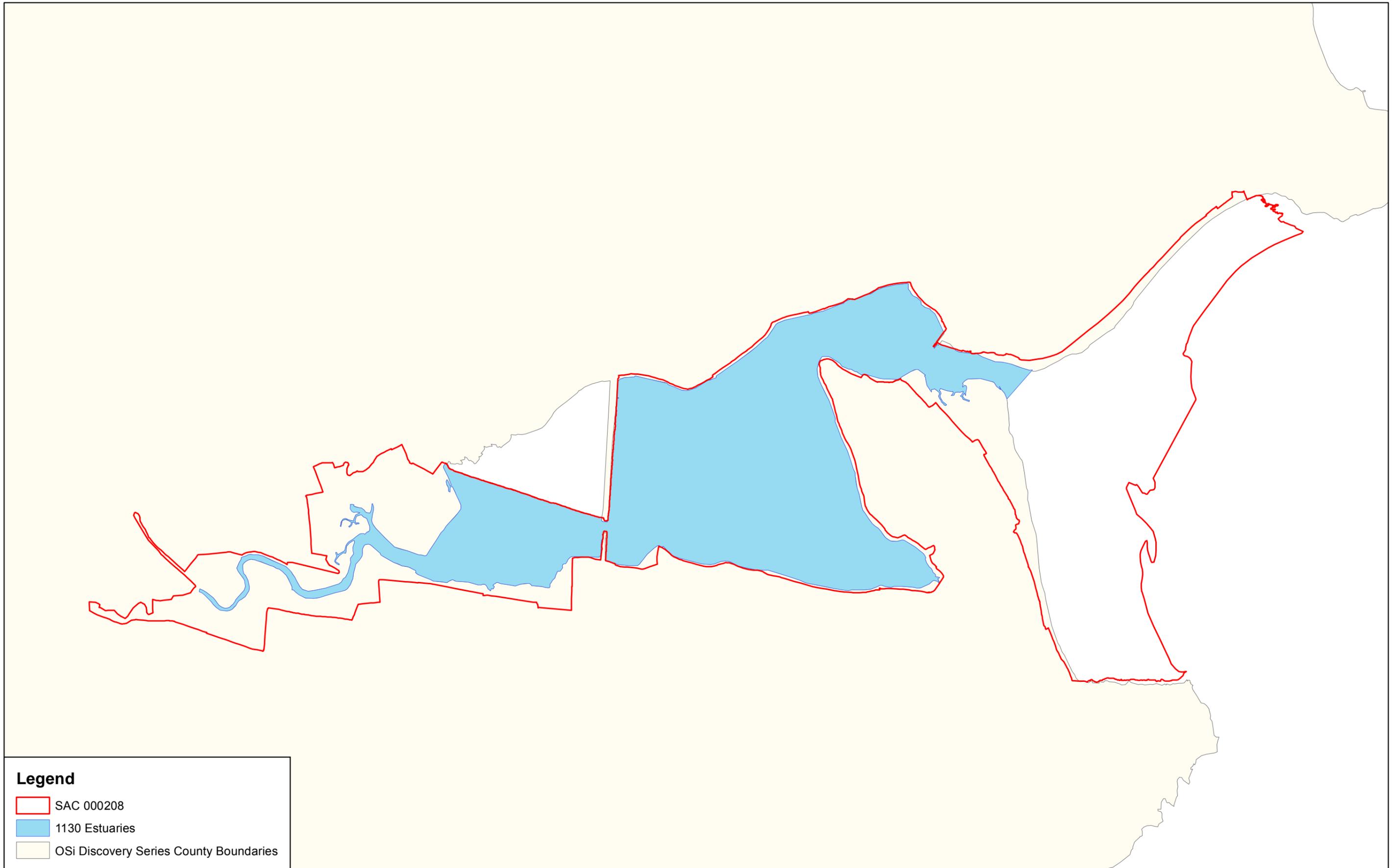
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
 Níl sna teorainneacha ar na léarscálanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaite. Macasamhail d'ábhar na Suirbhéarachta Ordoináis le chead ón Rialtas (Ceadúnas Uimh. EN 0059208)


**Map Version 1
 Date: Nov 2012**



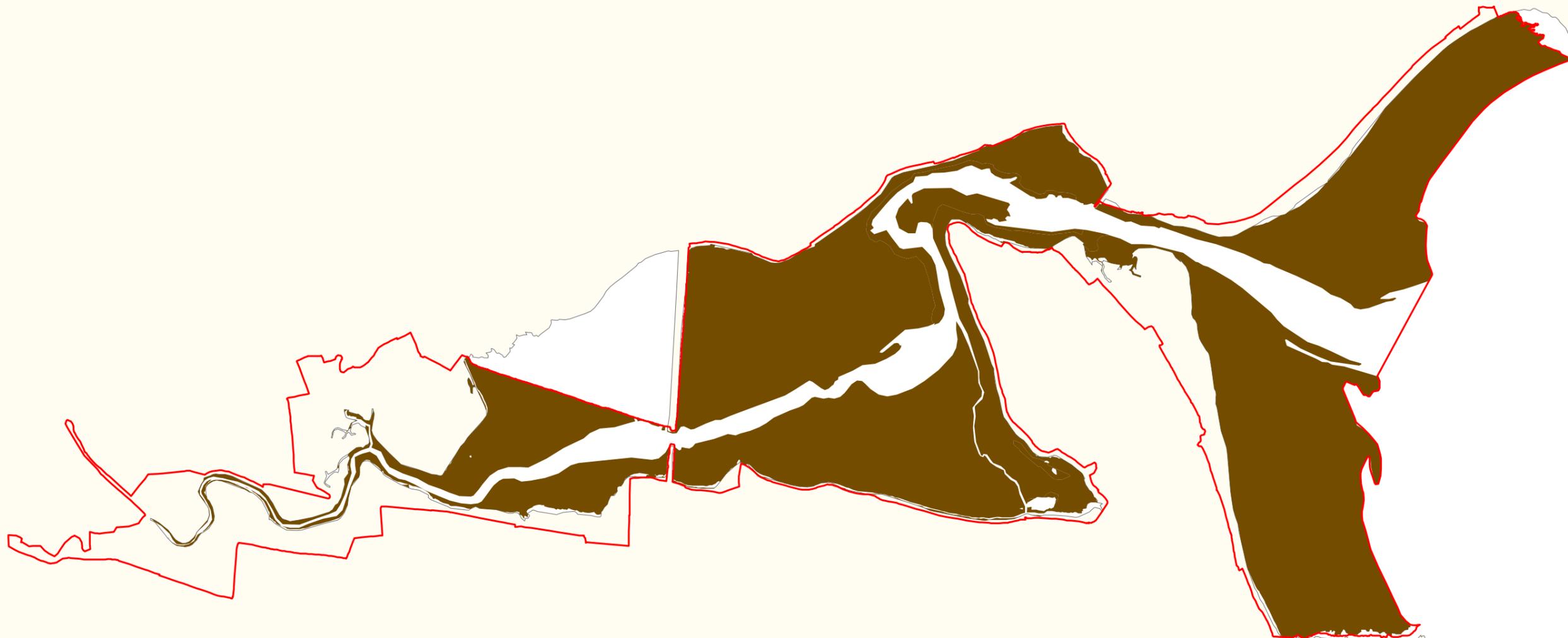
Legend

- Rogerstown Estuary SAC 000208
- Rogerstown Estuary SPA 004015
- OSi Discovery Series County Boundaries



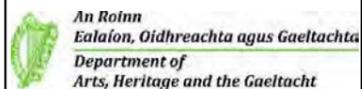
Legend

- SAC 000208
- 1130 Estuaries
- OSi Discovery Series County Boundaries



Legend

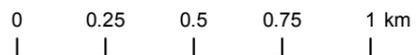
- SAC 000208
- OSi Discovery Series County Boundaries
- 1140 Mudflats and sandflats not covered by sea water at low tide



**MAP 4:
ROGERSTOWN ESTUARY SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

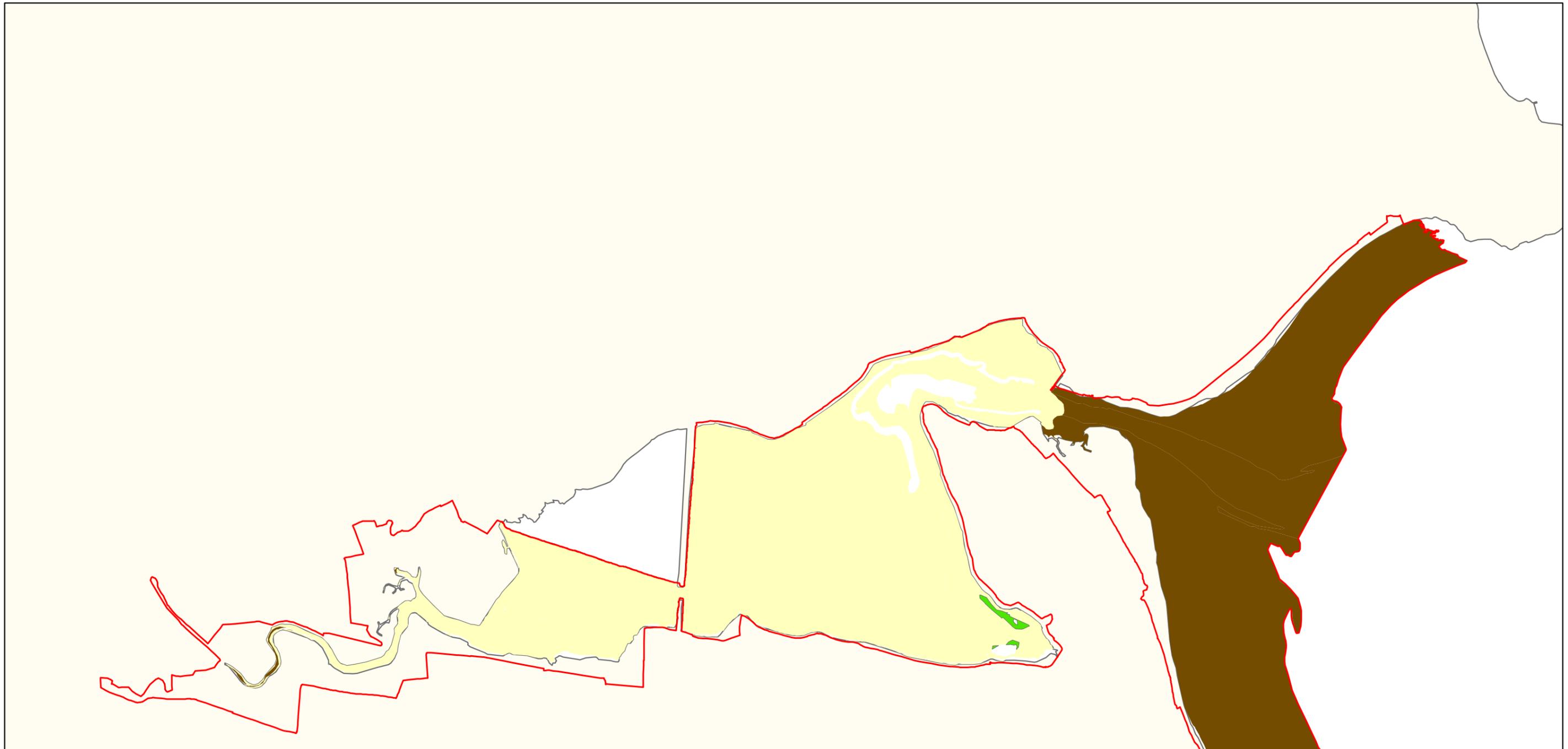
**SITE CODE: SAC 000208
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)



**Map Version 1
Date: Nov 2012**



Legend

SAC 000208

OSi Discovery Series County Boundaries

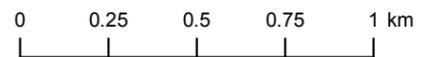
Marine Community Types

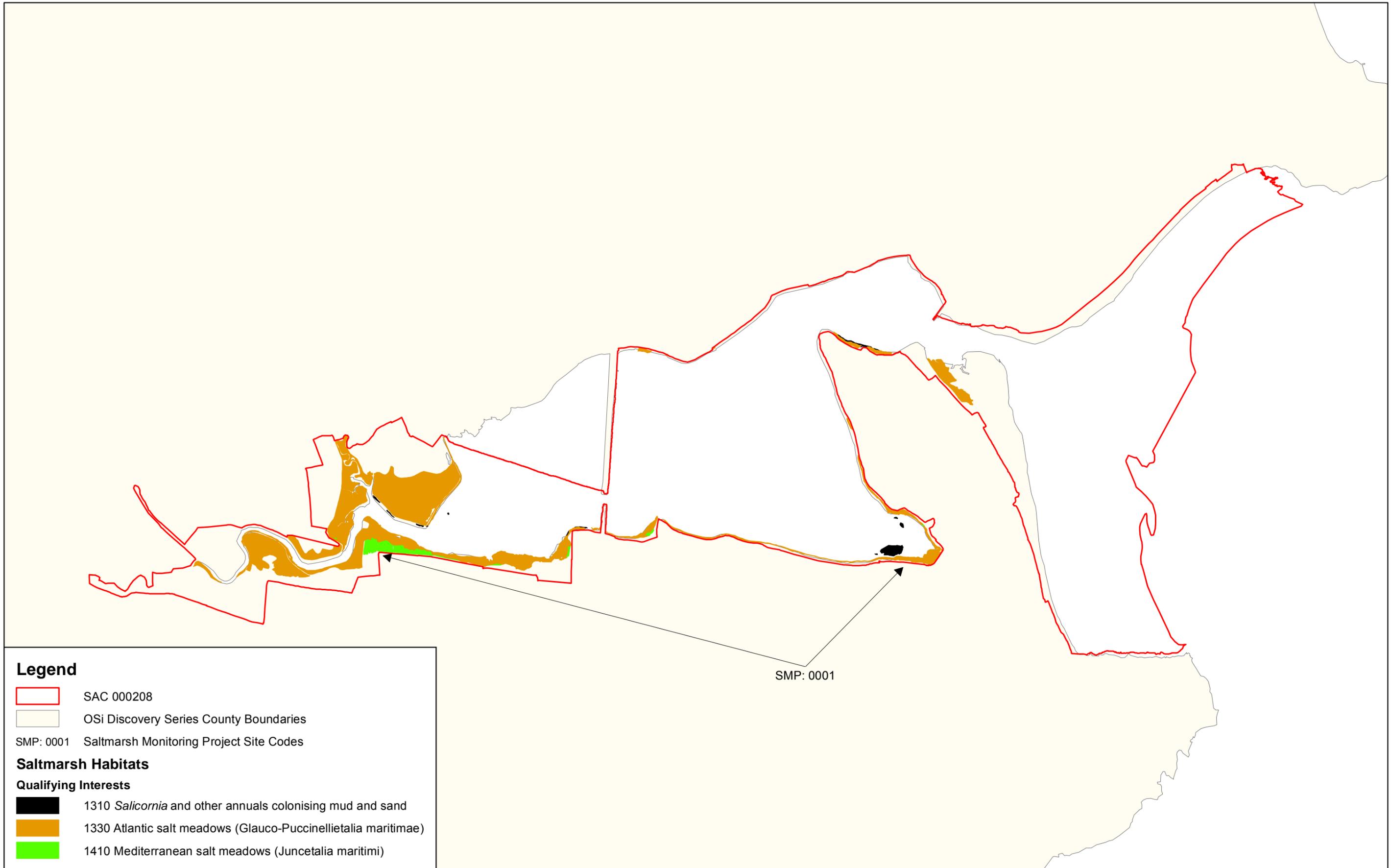
Estuarine sandy mud to mixed sediment with *Tubificoides benedii*, *Hediste diversicolor* and *Peringia ulvae* community complex

Mytilus edulis-dominated community complex

Sand to coarse sediment with *Nephtys cirrosa* and *Scolelepis squamata* community complex

Zostera-dominated community





Legend

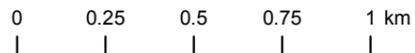
- SAC 000208
- OSi Discovery Series County Boundaries
- SMP: 0001 Saltmarsh Monitoring Project Site Codes

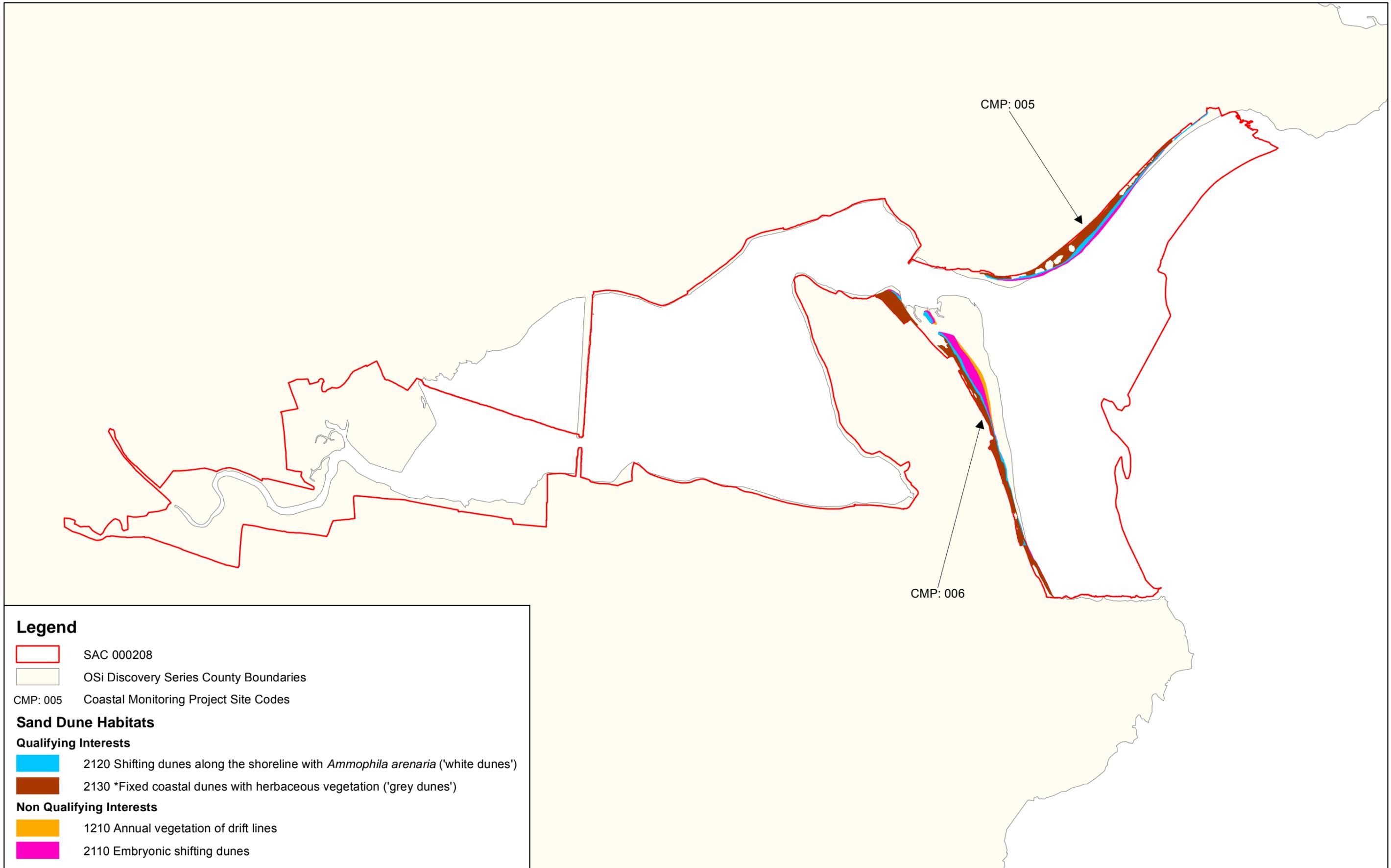
Saltmarsh Habitats

Qualifying Interests

- 1310 *Salicornia* and other annuals colonising mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)

SMP: 0001





Legend

- SAC 000208
- OSi Discovery Series County Boundaries
- CMP: 005 Coastal Monitoring Project Site Codes

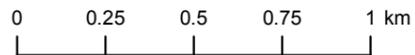
Sand Dune Habitats

Qualifying Interests

- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

Non Qualifying Interests

- 1210 Annual vegetation of drift lines
- 2110 Embryonic shifting dunes



National Parks and Wildlife Service

Conservation Objectives Series

South Dublin Bay SAC 000210



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Gaeltacht.**

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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
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4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

| | |
|--------|--|
| 000210 | South Dublin Bay SAC |
| 1140 | Mudflats and sandflats not covered by seawater at low tide |

Please note that this SAC overlaps with South Dublin Bay and River Tolka Estuary SPA (004024). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year : 2006

Title : A survey of intertidal mudflats and sandflats in Ireland

Author : Aquafact

Series : Unpublished report to NPWS

Year : 2013

Title : South Dublin Bay SAC (site code 210) Conservation objectives supporting document- marine habitat V1

Author : NPWS

Series : Conservation objectives supporting document

Other References

Year : 2012

Title : Intertidal survey of South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA

Author : MERC

Series : Unpublished report to the Marine Institute and NPWS

Spatial data sources

Year : Interpolated 2013
Title : 2006, 2011 intertidal surveys
GIS Operations : Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising

Used For : 1140, marine community types (maps 3 and 4)

Year : 2005

Title : OSi Discovery series vector data

GIS Operations : High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present

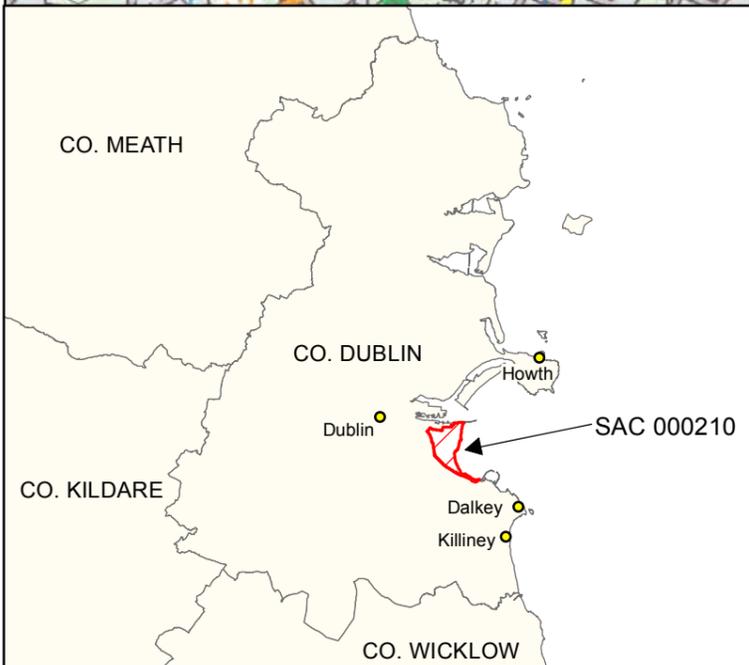
Used For : Marine community types base data (map 4)

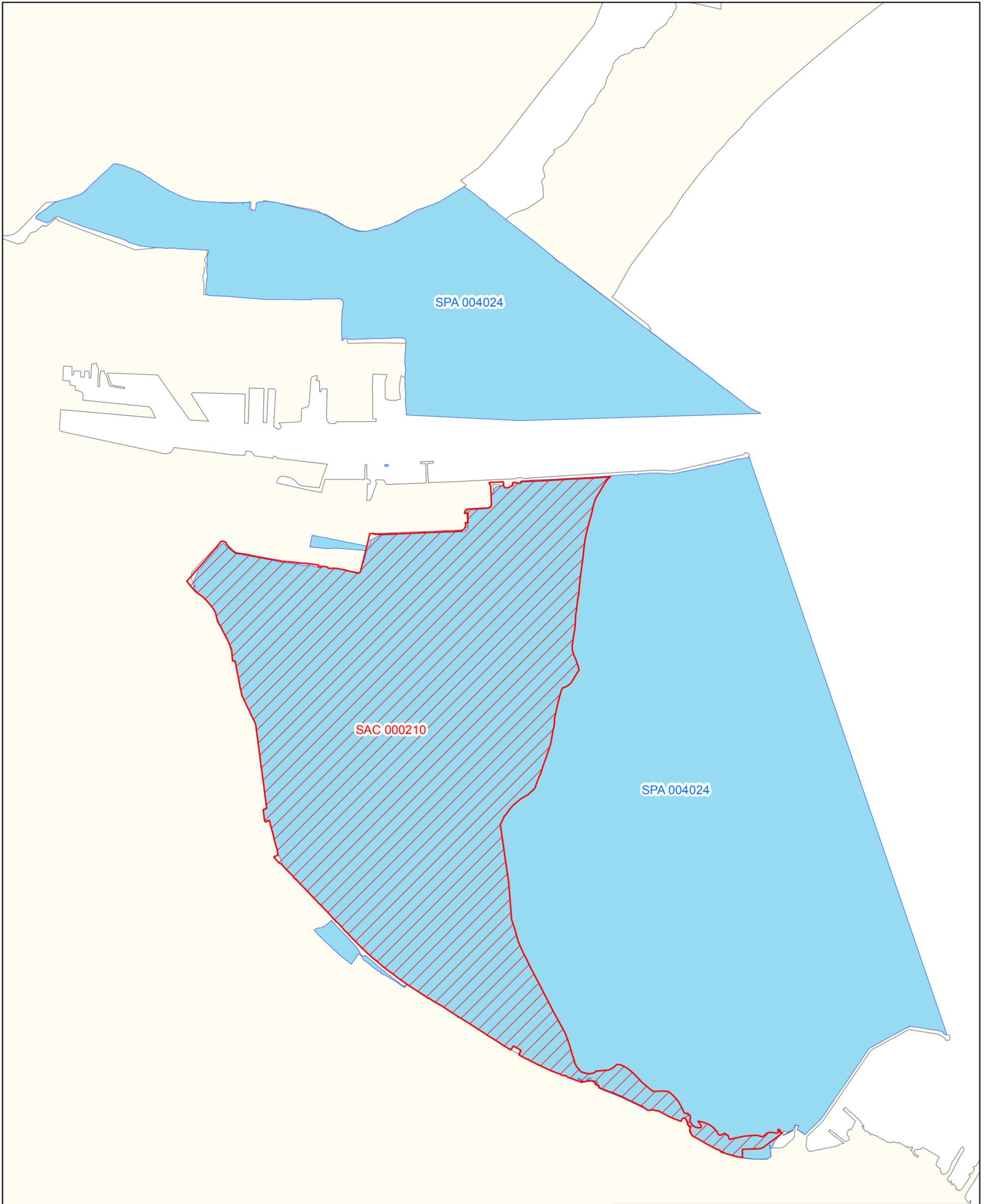
Conservation Objectives for : South Dublin Bay SAC [000210]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets:

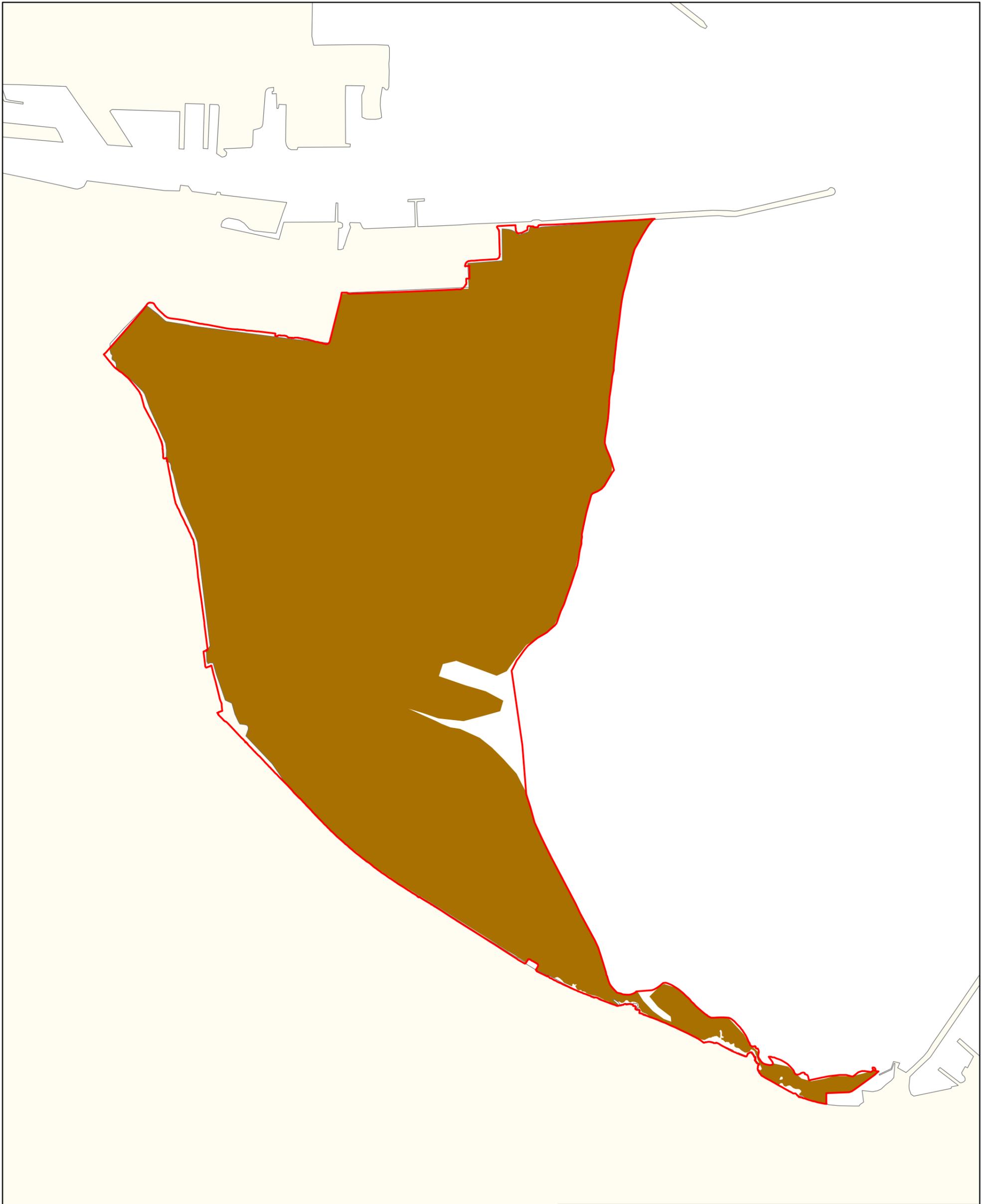
| Attribute | Measure | Target | Notes |
|---|-----------------------|--|---|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated using OSi data as 720ha |
| Community extent | Hectares | Maintain the extent of the <i>Zostera</i> -dominated community, subject to natural processes. See map 4 | Based on an intertidal survey undertaken in 2011 (MERC, 2012). See marine supporting document for further information |
| Community structure: <i>Zostera</i> density | Shoots/m ² | Conserve the high quality of the <i>Zostera</i> -dominated community, subject to natural processes | Based on an intertidal survey undertaken in 2011 (MERC, 2012). See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community type in a natural condition: Fine sands with <i>Angulus tenuis</i> community complex. See map 4 | Based on intertidal surveys undertaken in 2006 (Aquafact, 2006) and 2011 (MERC, 2012). See marine supporting document for further information |





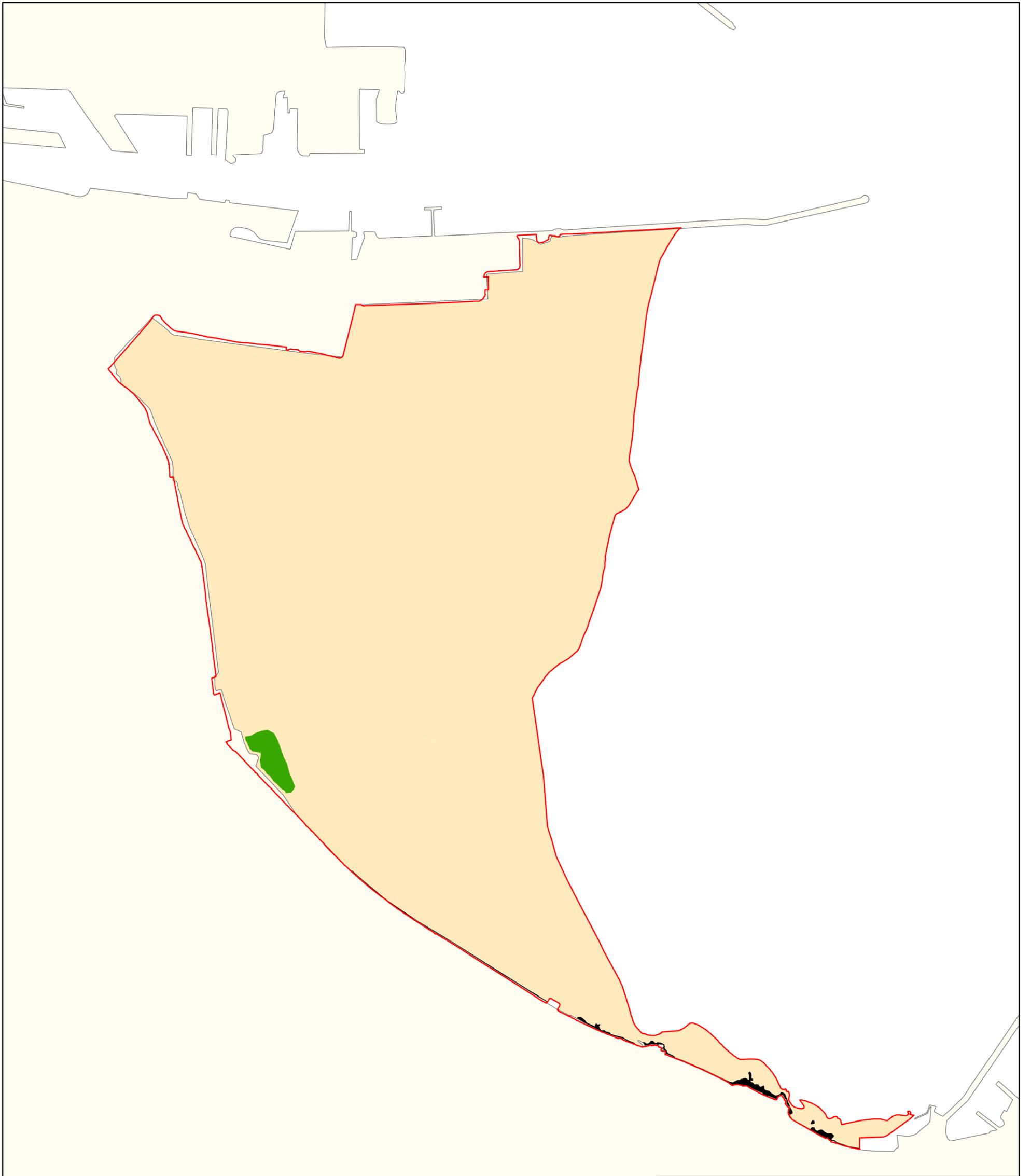
Legend

-  South Dublin Bay SAC 000210
-  South Dublin Bay and River Tolka Estuary SPA 004024
-  OSi Discovery Series County Boundaries



Legend

- SAC 000210
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries



Legend

- SAC 000210
- OSi Discovery Series County Boundaries

Marine Community Types

- Fine sands with *Angulus tenuis* community complex
- Intertidal reef community
- Zostera*-dominated community

National Parks and Wildlife Service

Conservation Objectives Series

Ireland's Eye SAC 002193



An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs



**National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2017) Conservation Objectives: Ireland's Eye SAC 002193. Version 1.
National Parks and Wildlife Service, Department of Arts, Heritage, Regional,
Rural and Gaeltacht Affairs.**

**Series Editor: Rebecca Jeffrey
ISSN 2009-4086**

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

| | |
|--------|--|
| 002193 | Ireland's Eye SAC |
| 1220 | Perennial vegetation of stony banks |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic coasts |

Please note that this SAC overlaps with Ireland's Eye SPA (004117) and is adjacent to Rockabill to Dalkey Island SAC (003000). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

| | |
|-----------------|--|
| Year : | 1999 |
| Title : | National Shingle Beach Survey of Ireland 1999 |
| Author : | Moore, D.; Wilson, F. |
| Series : | Unpublished Report to NPWS |
| <hr/> | |
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006 |
| Author : | Ryle, T.; Murray, A.; Connolly, K.; Swann, M. |
| Series : | Unpublished report to NPWS |
| <hr/> | |
| Year : | 2011 |
| Title : | National survey and assessment of the conservation status of Irish sea cliffs |
| Author : | Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F. |
| Series : | Irish Wildlife Manual No. 53 |
| <hr/> | |
| Year : | 2017 |
| Title : | Ireland's Eye SAC (site code: 2193) Conservation objectives supporting document- coastal habitats V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Other References

| | |
|-----------------|---|
| Year : | 2005 |
| Title : | National inventory of sea cliffs and coastal heaths |
| Author : | Browne, A. |
| Series : | Unpublished Report to NPWS |

Spatial data sources

| | |
|-------------------------|--|
| Year : | 2009 |
| Title : | Coastal Monitoring Project 2004-2006. Version 1 |
| GIS Operations : | QI selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1220 (map 3) |
| <hr/> | |
| Year : | Revision 2012 |
| Title : | National Shingle Beach Survey |
| GIS Operations : | Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1220 (map 3) |
| <hr/> | |
| Year : | 2008 |
| Title : | OSi 1:5000 IG vector dataset |
| GIS Operations : | Naturalfeatures line clipped to extent of national inventory of sea cliffs and coastal heaths polyline. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1230 (map 3) |
| <hr/> | |

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Ireland's Eye SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession | The current area of perennial vegetation of stony banks in Ireland's Eye SAC is unknown. The habitat was recorded as being present, but its extent was not mapped, from one sub-site during the National Shingle Beach Survey (NSBS; Moore and Wilson, 1999): Ireland's Eye (NSBS site ID: 0138). A total area of 0.13ha of vegetated shingle was recorded at Ireland's Eye (CMP site ID: 008) during the Coastal Monitoring Project (CMP; Ryle et al., 2009). NB further unsurveyed areas may be present within the SAC. See the Ireland's Eye SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes including erosion and succession. See map 3 for mapped locations | The full distribution within the SAC is unknown at present, although the habitat was recorded at Ireland's Eye by Moore and Wilson (1999) and by Ryle et al. (2009). Shingle occurs on the western shore between sand hills and a sandy beach. The habitat is likely to be more widespread. See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Moore and Wilson (1999) and Ryle et al. (2009). The shingle within Ireland's Eye SAC comprises coarse sand and fine gravel. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Moore and Wilson (1999) and Ryle et al. (2009). At Ireland's Eye, there is an extensive area of bedrock shore, which grades into sandy beaches and shingle, which are backed by low sand hills. See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones | Based on data from Moore and Wilson (1999) and Ryle et al. (2009). The shingle beach at Ireland's Eye SAC has poor vegetation, mainly limited to some marram (<i>Ammophila arenaria</i>) at the back of the beach. Curled dock (<i>Rumex crispus</i>), silverweed (<i>Potentilla anserina</i>) and spear-leaved orache (<i>Atriplex prostrata</i>) was also recorded. See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Moore and Wilson (1999) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. The CMP noted that the negative indicator species creeping thistle (<i>Cirsium arvense</i>) and common nettle (<i>Urtica dioica</i>) are present but rare in this habitat. See the coastal habitats supporting document for further details |

Conservation Objectives for : Ireland's Eye SAC [002193]

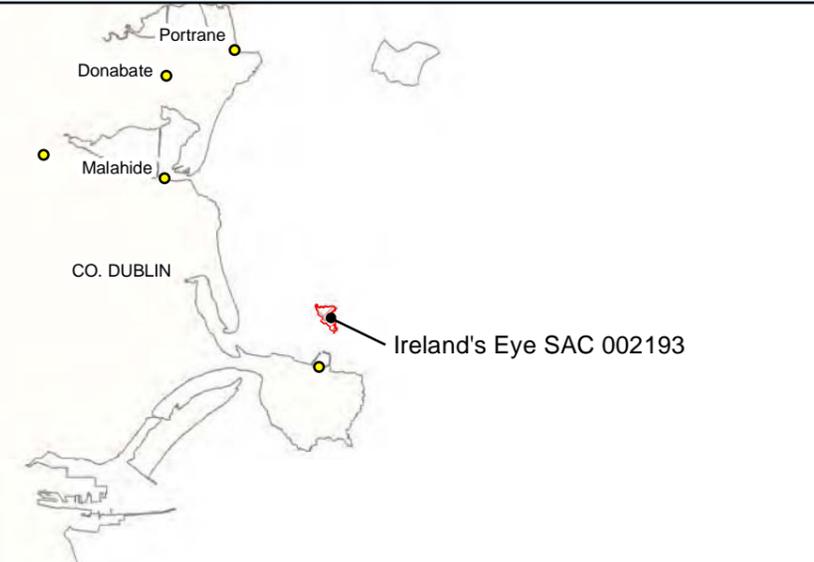
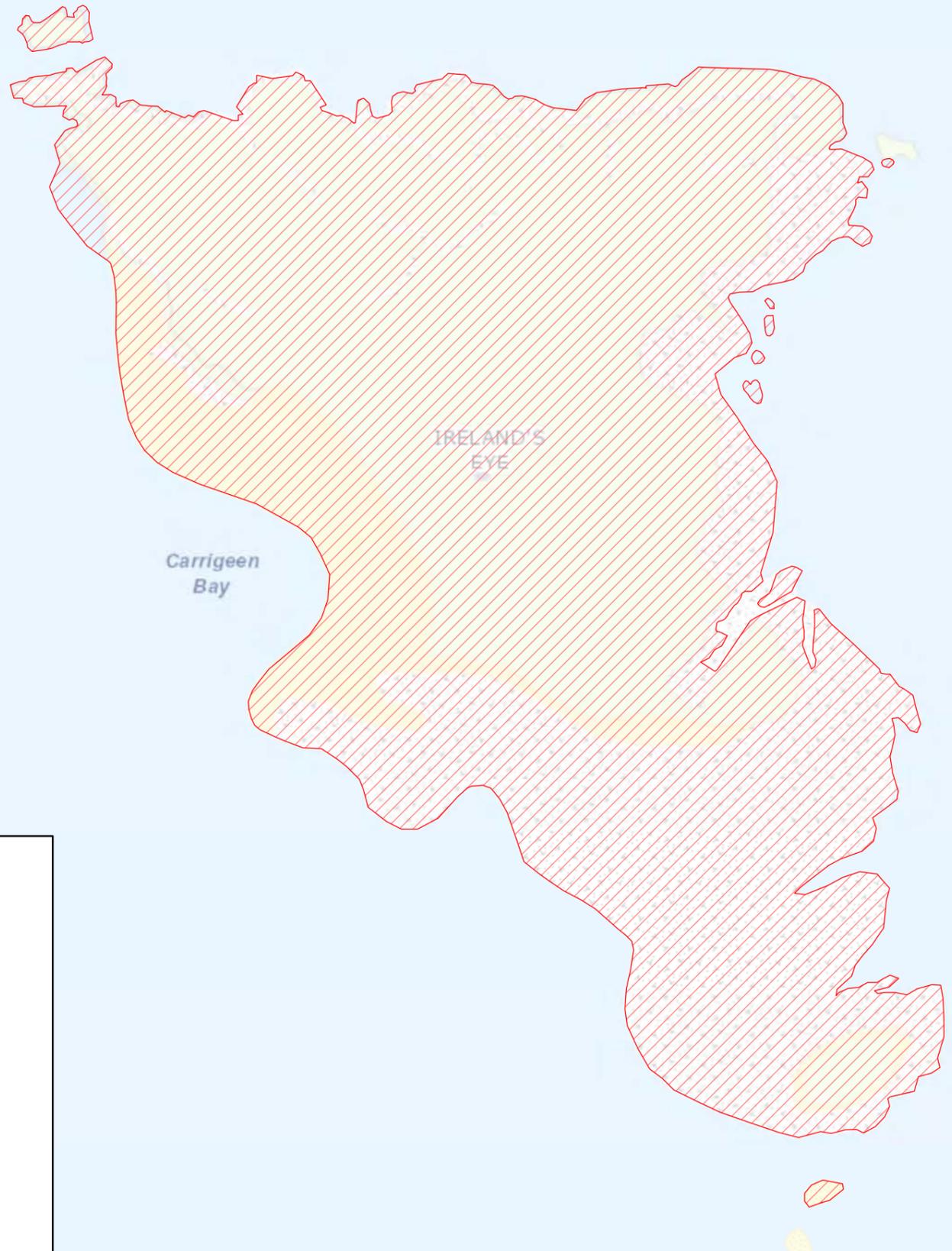
1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Ireland's Eye SAC, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|---|---|--|
| Habitat length | Kilometres | Area stable, subject to natural processes, including erosion. Total length of cliff mapped: 2.57km. See map 3 | Based on data from the National Inventory of Sea Cliffs and Coastal Heath (Browne, 2005). The length of cliff was re-digitised (onto 1:5000 OSI map background) and is estimated to be 2.57km within Ireland's Eye SAC. Cliffs are linear features and are therefore measured in kilometres. See the Ireland's Eye SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 3 | Sea cliffs are known to occur along the coastline at Ireland's Eye extending from the north-west along the northern coastline to the south-east of the island and reach a height of 69m on the north-east side. It is thought that all of the cliffs in this SAC are of the hard type (Browne, 2005). See the coastal habitats supporting document for further details |
| Physical structure: functionality and hydrological regime | Occurrence of artificial barriers | No alteration to natural functioning of geomorphological and hydrological processes, including groundwater quality, due to artificial structures | Attribute and target based on Barron et al. (2011). Maintaining natural geomorphological processes, including natural erosion, is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes, and in some cases tufa formations, that can be associated with sea cliffs. Hydrological features such as gullies, streams or cascades may occur on sea cliffs. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession | Attribute and target based on Barron et al. (2011). Dry grassland merges with sea cliff vegetation on Ireland's Eye. See the coastal habitats supporting document for further details |
| Vegetation structure: vegetation height | Centimetres | Maintain structural variation within sward | Attribute and target based on Barron et al. (2011). See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011) | The sea cliff flora at Ireland's Eye SAC includes rock sea-spurrey (<i>Spergularia rupicola</i>), sea stork's-bill (<i>Erodium maritimum</i>), rock samphire (<i>Crithmum maritimum</i>), golden samphire (<i>Inula crithmoides</i>), rock sea-lavender (<i>Limonium binervosum</i>), meadow rue (<i>Thalictrum minor</i>), Portland spurge (<i>Euphorbia portlandica</i>) and tree-mallow (<i>Lavatera arborea</i>). See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage | Negative indicator species (including non-native species) to represent less than 5% cover | Attribute and target based on Barron et al. (2011). Hogweed (<i>Heracleum sphondylium</i>), common nettle (<i>Urtica dioica</i>) and slender thistle (<i>Carduus tenuiflorus</i>) are common in areas beneath seabird colonies in the SAC. See the coastal habitats supporting document for further details |
| Vegetation composition: bracken and woody species | Percentage | Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20% | Attribute and target based on Barron et al. (2011). Bracken (<i>Pteridium aquilinum</i>) has not been recorded on the sea cliffs in Ireland's Eye SAC, however bracken is present in the dry grassland behind the cliffs. See the coastal habitats supporting document for further details |

Legend

 Ireland's Eye SAC 002193



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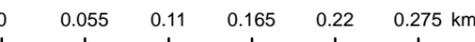


An Roinn Ealaíon, Oidhreacht,
Gnóthaí Féilgínacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

**MAP 1:
IRELAND'S EYE SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE: SAC 002193; version 3.01
CO. DUBLIN**

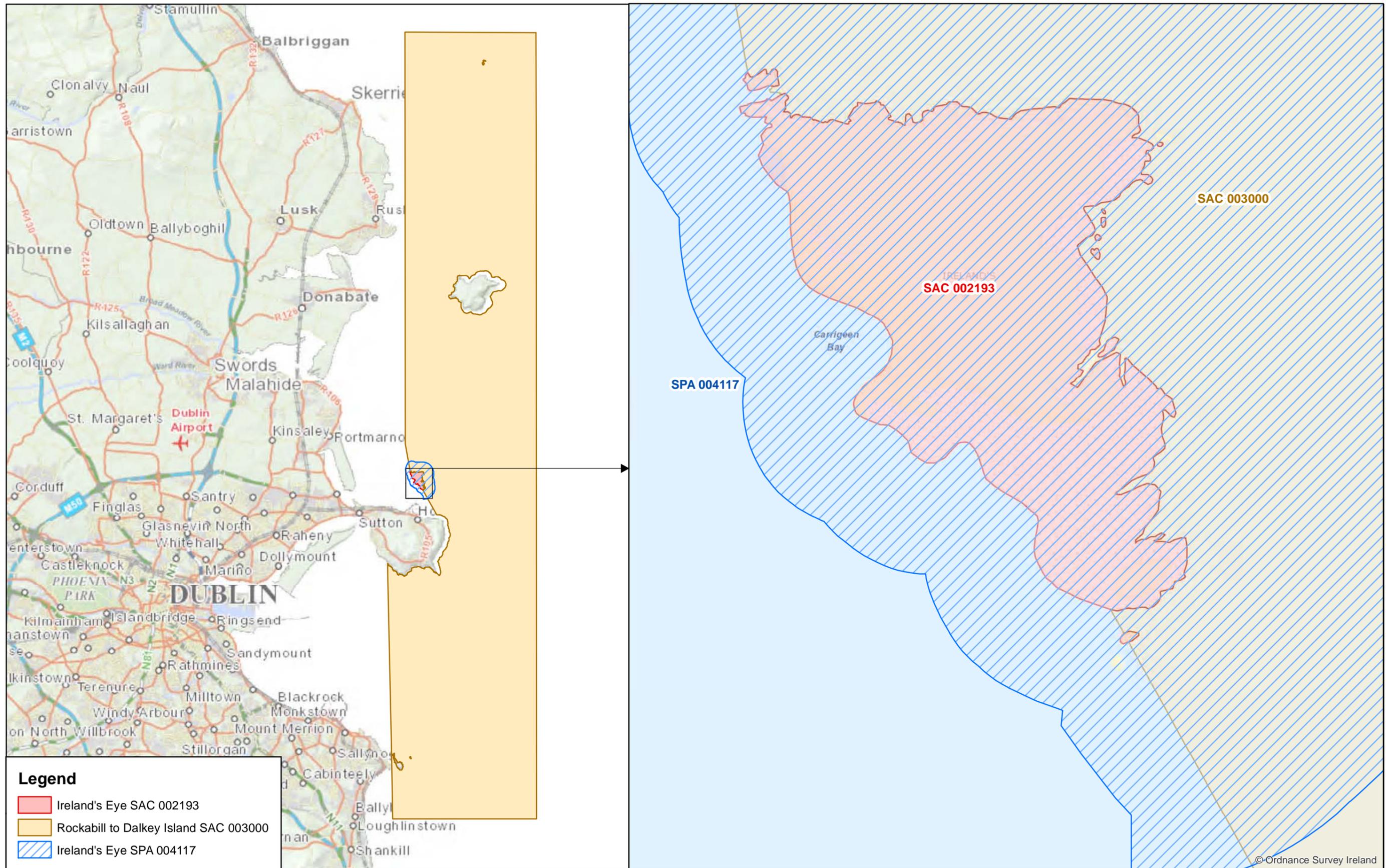


The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas



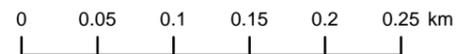
**Map Version 1
Date: Oct 2016**





Legend

- Coastal Monitoring Project Survey Area
- Qualifying Interests**
- 1220 Perennial vegetation of stony banks
- ★ 1220 Perennial vegetation of stony banks
- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- Ireland's Eye SAC 002193
- OSi Discovery Series County Boundary



National Parks and Wildlife Service

Conservation Objectives Series

Rockabill to Dalkey Island SAC 003000



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
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7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie

E-mail: nature.conservation@ahg.gov.ie

Citation:

**NPWS (2013) Conservation Objectives: Rockabill to Dalkey Island SAC 003000.
Version 1. National Parks and Wildlife Service, Department of Arts, Heritage
and the Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

003000 Rockabill to Dalkey Island SAC

1170 Reefs

1351 Harbour porpoise *Phocoena phocoena*

Please note that this SAC overlaps with North Bull Island SPA (004006), Rockabill SPA (004014), Lambay Island SPA (004069), Howth Head Coast SPA (004113), Ireland's Eye SPA (004117) and Dalkey Islands SPA (004172). It is also adjoins Howth Head SAC (000202), Lambay Island SAC (000204) and Ireland's Eye SAC (002193). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

References

| | |
|-----------------|--|
| Year : | 2010 |
| Title : | Irish sea reef survey project report |
| Author : | MERC |
| Series : | Unpublished report to NPWS |
| <hr/> | |
| Year : | 2012 |
| Title : | Intertidal reef survey of Lambay Island SAC and SPA, Rockabill Island SPA, Ireland's Eye SAC, Dalkey Islands SPA and Muglins |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |
| <hr/> | |
| Year : | 2012 |
| Title : | Subtidal reef survey of Lambay Island SAC and SPA, Rockabill Island SPA, Ireland's Eye SAC, Dalkey Islands SPA and Muglins |
| Author : | MERC |
| Series : | Unpublished report to the Marine Institute and NPWS |

BDK G Documents

| | |
|-----------------|---|
| Year : | 2013 |
| Title : | Rockabill to Dalkey Island SAC (site code 3000) Conservation objectives supporting document- marine habitats and species V1 |
| Author : | NPWS |
| Series : | Conservation objectives supporting document |

Spatial data sources

| | |
|-------------------------|--|
| Year : | Interpolated 2013 |
| Title : | 2009 and 2010 subtidal and intertidal reef surveys |
| GIS Operations : | Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising |
| Used For : | Marine community types, 1170 (maps 3 and 4) |
| <hr/> | |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present |
| Used For : | Marine community types base data (map 4) |
| <hr/> | |
| Year : | 2005 |
| Title : | OSi Discovery series vector data |
| GIS Operations : | Low Water Mark (LWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| Used For : | 1351 (map 5) |
| <hr/> | |

1170 Reefs

To maintain the favourable conservation condition of Reefs in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:

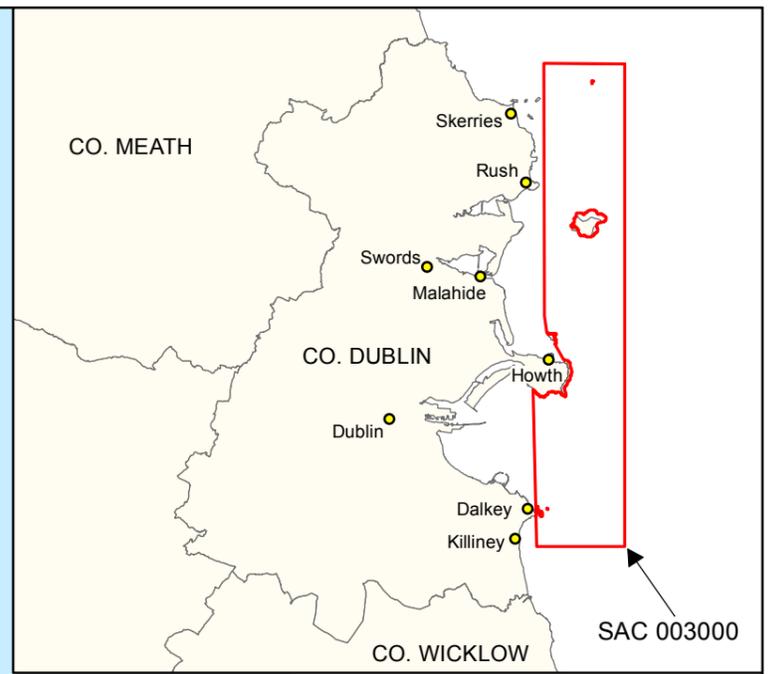
| Attribute | Measure | Target | Notes |
|----------------------|------------------------|--|--|
| Habitat area | Hectares | The permanent area is stable or increasing, subject to natural processes. See map 3 | Habitat area estimated as 182ha using 2010 and 2011 intertidal and subtidal reef survey data (MERC, 2010, 2012a,b), InfoMar bathymetry and the Arklow to Skerries Islands Admiralty Chart (1468_0) |
| Habitat distribution | Occurrence | Distribution is stable or increasing, subject to natural processes. See map 3 | Distribution derived from 2010 and 2011 intertidal and subtidal reef survey data (MERC, 2010, 2012a,b), InfoMar bathymetry and the Arklow to Skerries Islands Admiralty Chart (1468_0). See marine supporting document for further details |
| Community structure | Biological composition | Conserve the following community types in a natural condition: Intertidal reef community complex; and Subtidal reef community complex. See map 4 | Reef community mapping based on 2010 and 2011 intertidal and subtidal reef survey data (MERC, 2010, 2012a,b). See marine supporting document for further details |

Conservation Objectives for : Rockabill to Dalkey Island SAC [003000]

1351 Harbour porpoise *Phocoena phocoena*

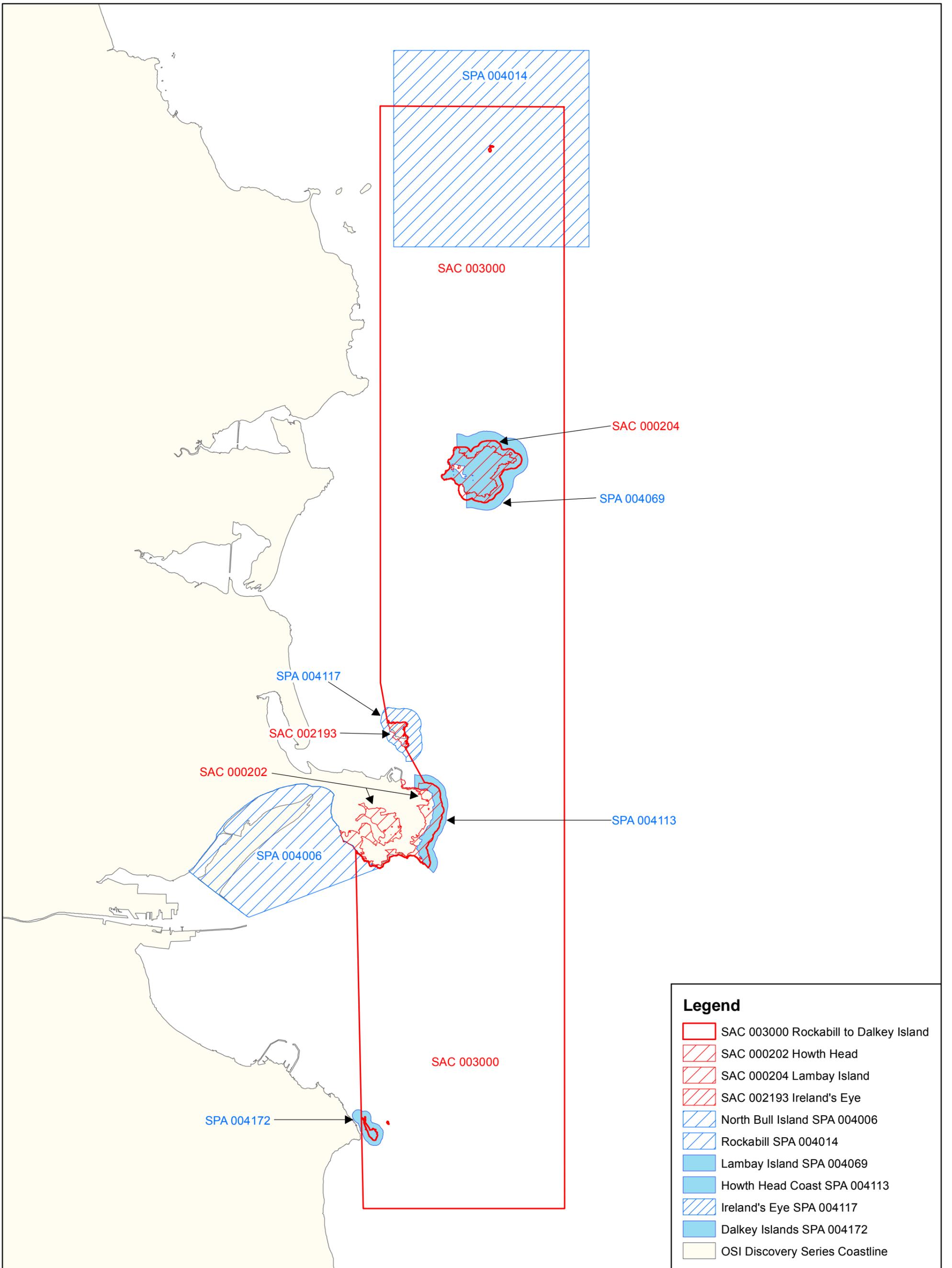
To maintain the favourable conservation condition of Harbour porpoise in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:

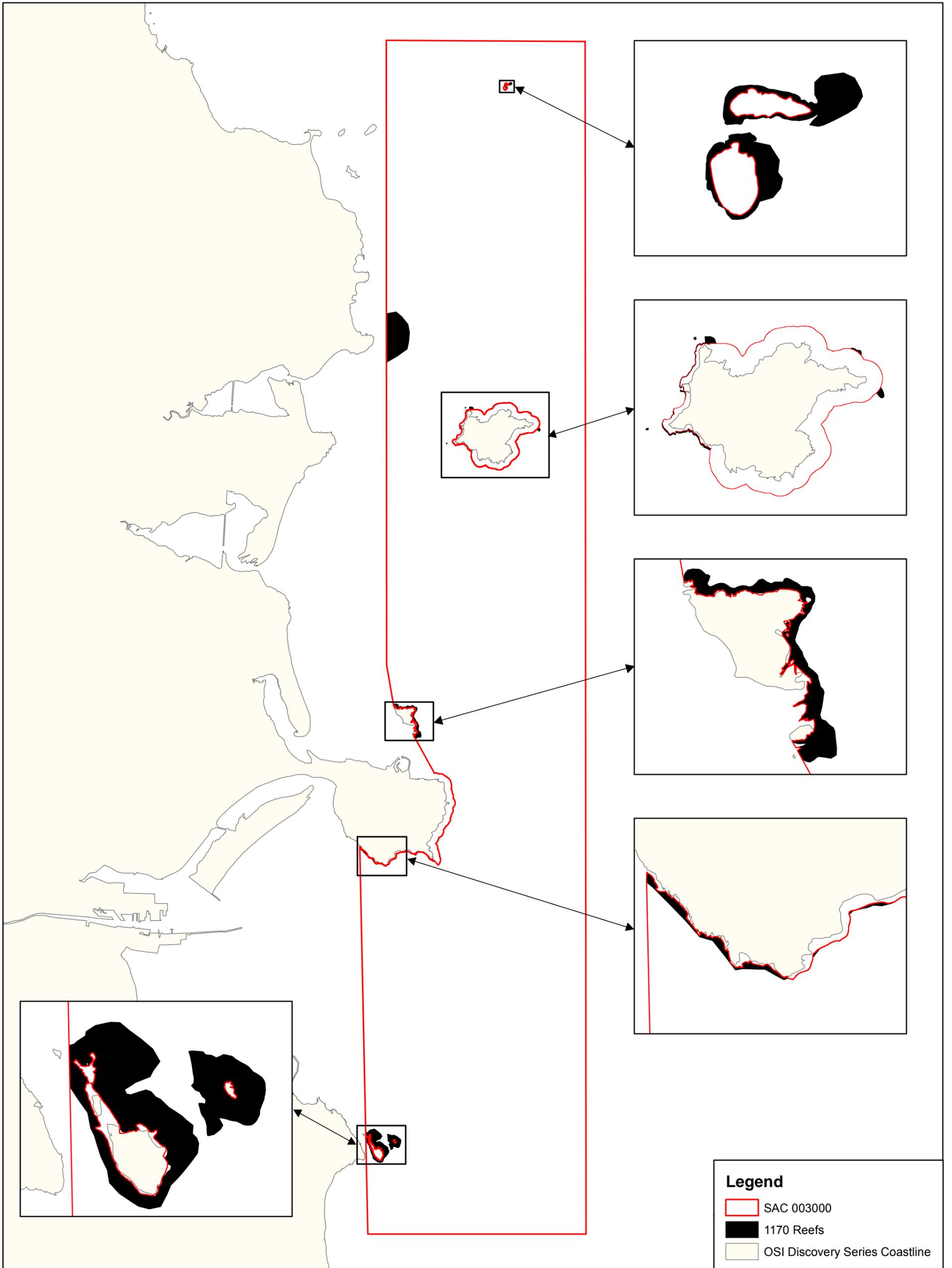
| Attribute | Measure | Target | Notes |
|----------------------------|-------------------------------|---|--|
| Access to suitable habitat | Number of artificial barriers | Species range within the site should not be restricted by artificial barriers to site use. See map 5 | See marine supporting document for further details |
| Disturbance | Level of impact | Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site | See marine supporting document for further details |



Legend

 SAC 003000

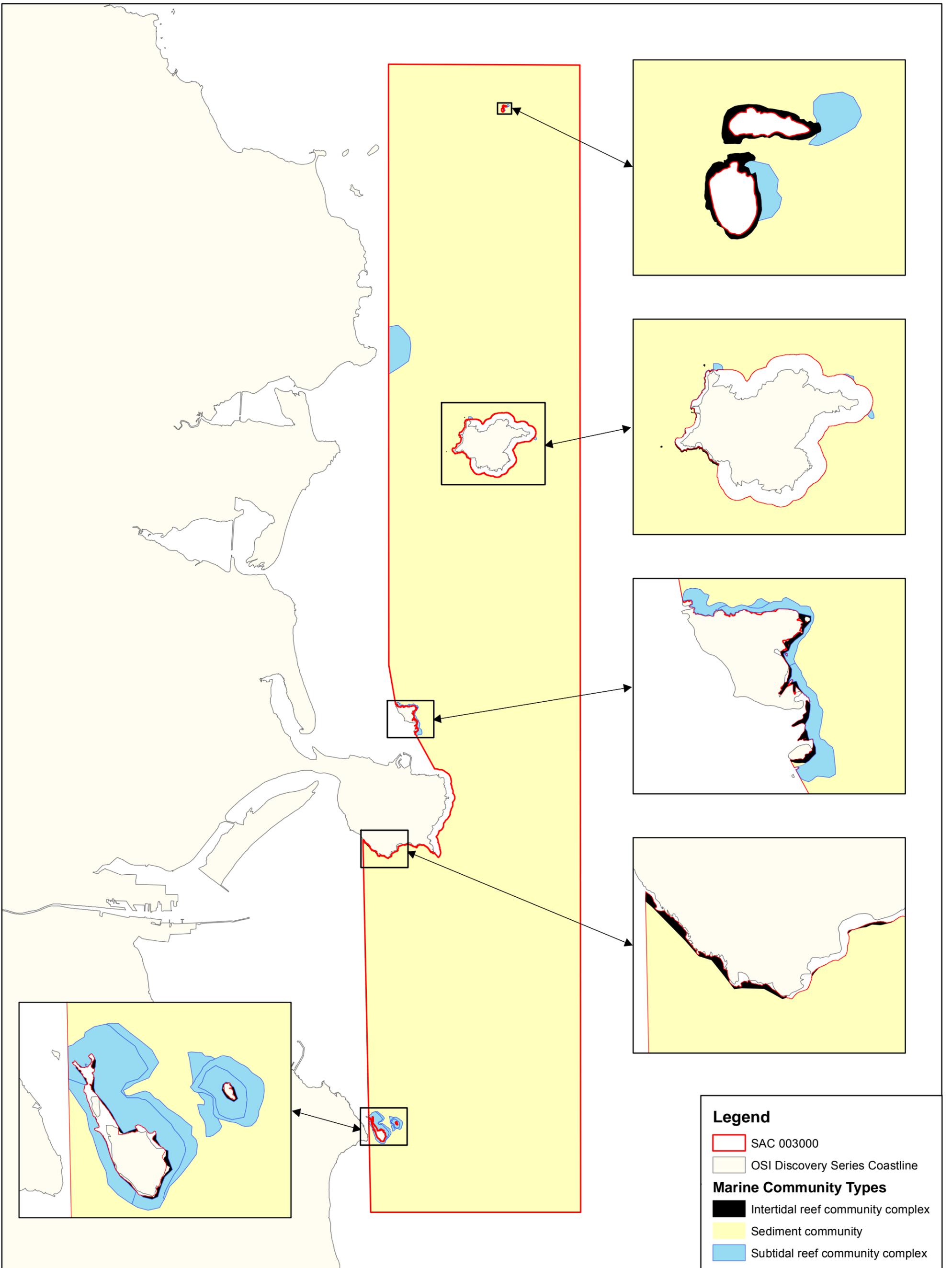


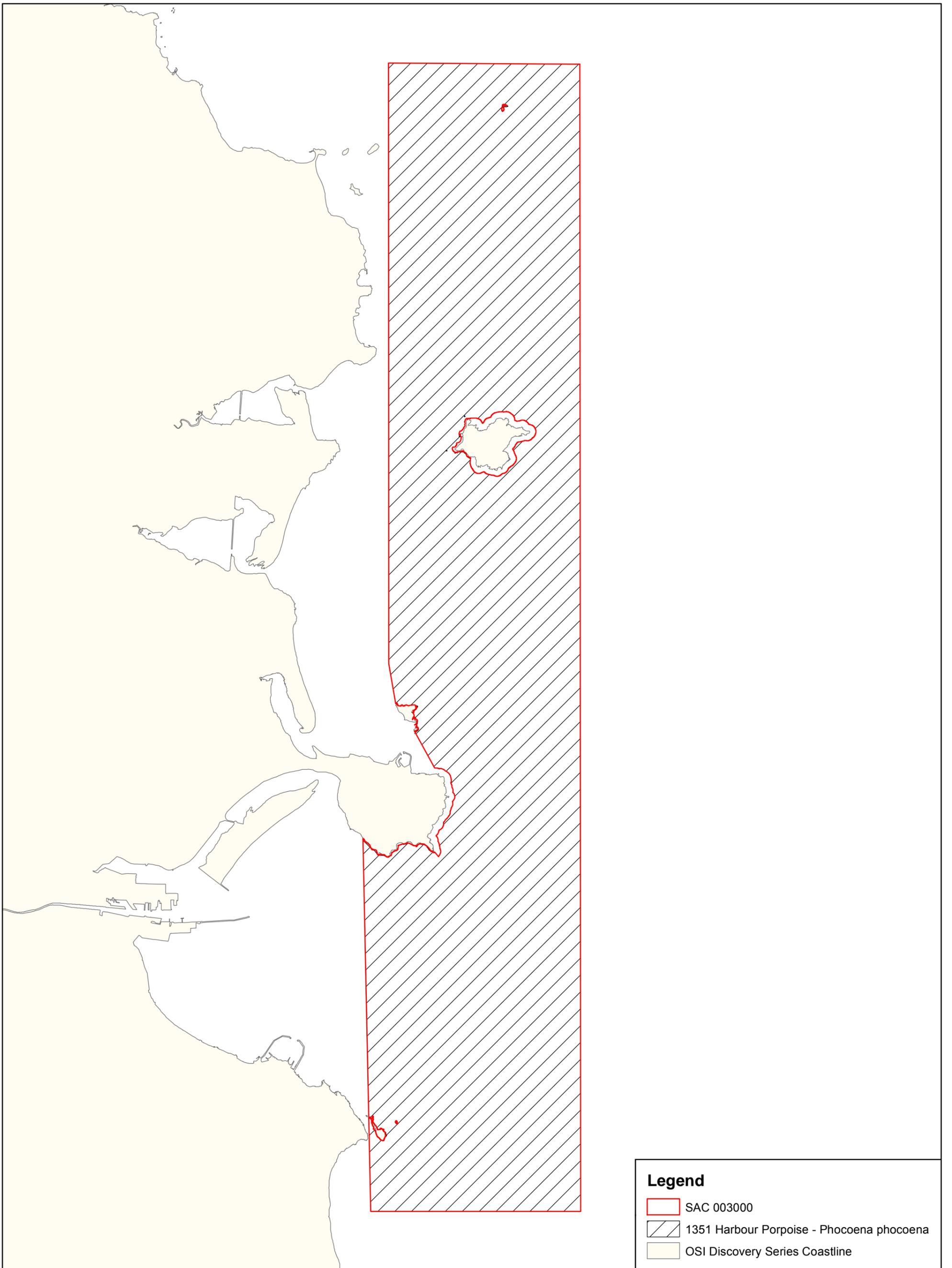


Legend

- SAC 003000
- 1170 Reefs
- OSI Discovery Series Coastline







Legend

- SAC 003000
- 1351 Harbour Porpoise - *Phocoena phocoena*
- OSI Discovery Series Coastline

Conservation objectives for Codling Fault Zone SAC [003015]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Objective: 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:

Code Description

1180 Submarine structures made by leaking gases

* denotes a priority habitat

Citation: NPWS (2018) Conservation objectives for Codling Fault Zone SAC [003015]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.

National Parks and Wildlife Service

Conservation Objectives Series

North Bull Island SPA 004006



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Citation:

**NPWS (201) Conservation Objectives: North Bull Island SPA 004006. Version 1.
National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|--|
| 004006 | North Bull Island SPA |
| A046 | Light-bellied Brent Goose <i>Branta bernicla hrota</i> |
| A048 | Shelduck <i>Tadorna tadorna</i> |
| A052 | Teal <i>Anas crecca</i> |
| A054 | Pintail <i>Anas acuta</i> |
| A056 | Shoveler <i>Anas clypeata</i> |
| A130 | Oystercatcher <i>Haematopus ostralegus</i> |
| A140 | Golden Plover <i>Pluvialis apricaria</i> |
| A141 | Grey Plover <i>Pluvialis squatarola</i> |
| A143 | Knot <i>Calidris canutus</i> |
| A144 | Sanderling <i>Calidris alba</i> |
| A149 | Dunlin <i>Calidris alpina alpina</i> |
| A156 | Black-tailed Godwit <i>Limosa limosa</i> |
| A157 | Bar-tailed Godwit <i>Limosa lapponica</i> |
| A160 | Curlew <i>Numenius arquata</i> |
| A162 | Redshank <i>Tringa totanus</i> |
| A169 | Turnstone <i>Arenaria interpres</i> |
| A179 | Black-headed Gull <i>Chroicocephalus ridibundus</i> |
| A999 | Wetlands |

Please note that this SPA overlaps with North Dublin Bay SAC (000206) and Rockabill to Dalkey Island SAC (003000). It adjoins Howth Head SAC (000202) and South Dublin Bay and River Tolka Estuary SPA (004024). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year : 2014

Title : North Bull Island SPA (site code: 4006) and South Dublin Bay and River Tolka Estuary SPA (site code: 4024) Conservation objectives supporting document V1

Author : NPWS

Series : Conservation objectives supporting document

Spatial data sources

| | |
|-------------------------|---|
| Year : | 2014 |
| Title : | NPWS SPA boundary data |
| GIS Operations : | SPA boundary polygons divided into two classifications (wetlands, terrestrial) based on line identified by expert judgement. Expert opinion used as necessary to resolve any issues arising |
| Used For : | Wetlands (map 3) |

To maintain the favourable conservation condition of Light-bellied Brent Goose in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A048 **Shelduck *Tadorna tadorna***

To maintain the favourable conservation condition of Shelduck in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by shelduck, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A052 Teal *Anas crecca*

To maintain the favourable conservation condition of Teal in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : North Bull Island SPA [004006]

A054 Pintail *Anas acuta*

To maintain the favourable conservation condition of Pintail in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by pintail, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A056 Shoveler *Anas clypeata*

To maintain the favourable conservation condition of Shoveler in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by shoveler, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A130 **Oystercatcher *Haematopus ostralegus***

To maintain the favourable conservation condition of Oystercatcher in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part four of the conservation objectives supporting document |

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : North Bull Island SPA [004006]

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : North Bull Island SPA [004006]

A143 Knot *Calidris canutus*

To maintain the favourable conservation condition of Knot in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by knot, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A149 **Dunlin *Calidris alpina alpina***

To maintain the favourable conservation condition of Dunlin in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : North Bull Island SPA [004006]

A156 Black-tailed Godwit *Limosa limosa*

To maintain the favourable conservation condition of Black-tailed Godwit in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by black-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A160 *Curlew Numenius arquata*

To maintain the favourable conservation condition of Curlew in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A162 **Redshank *Tringa totanus***

To maintain the favourable conservation condition of Redshank in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A169 **Turnstone *Arenaria interpres***

To maintain the favourable conservation condition of Turnstone in North Bull Island SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by turnstone, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : North Bull Island SPA [004006]

A179 Black-headed Gull *Chroicocephalus ridibundus*

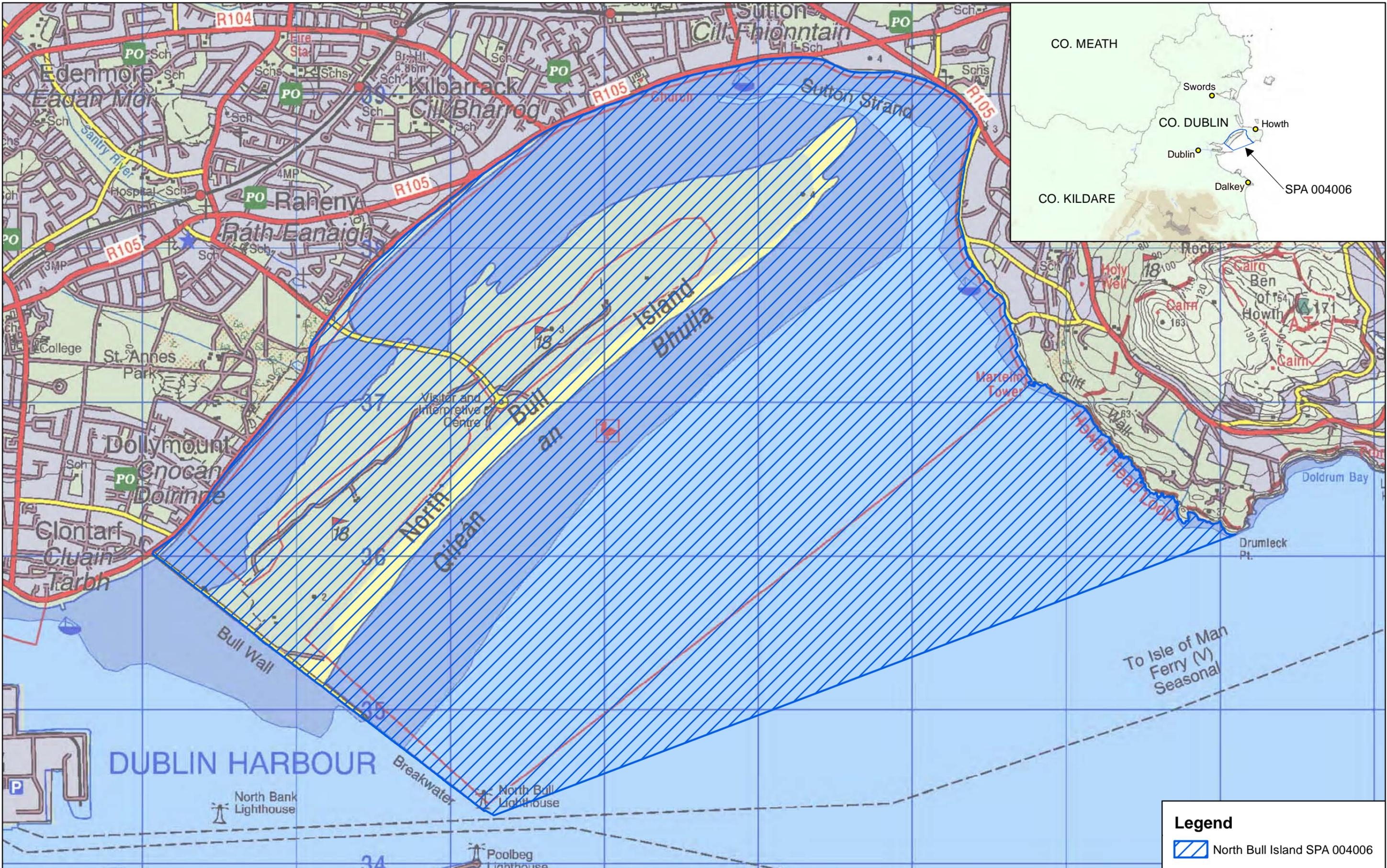
To maintain the favourable conservation condition of Black-headed Gull in North Bull Island SPA, which is defined by the following list of attributes and targets:

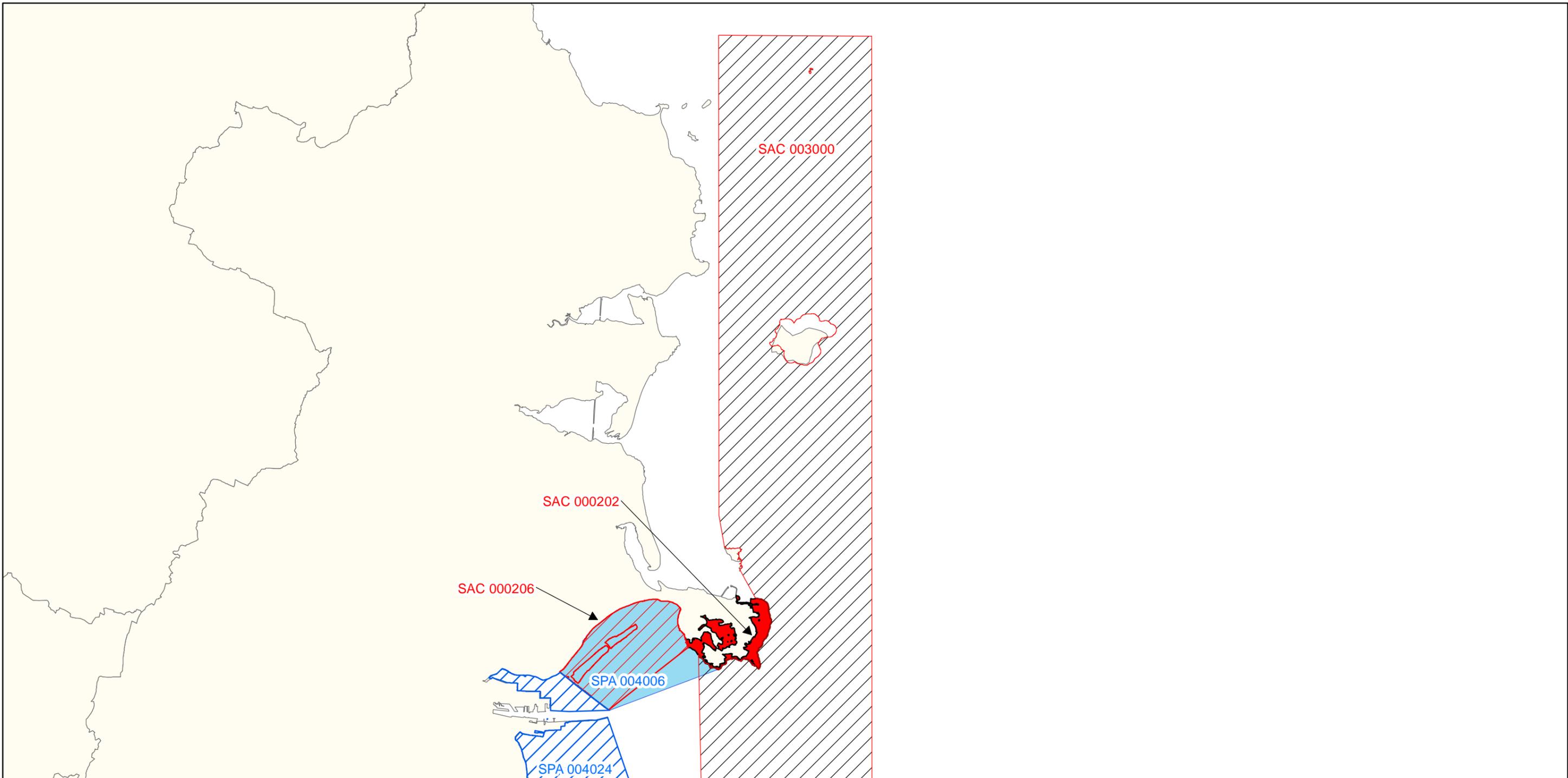
| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by black-headed gull other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

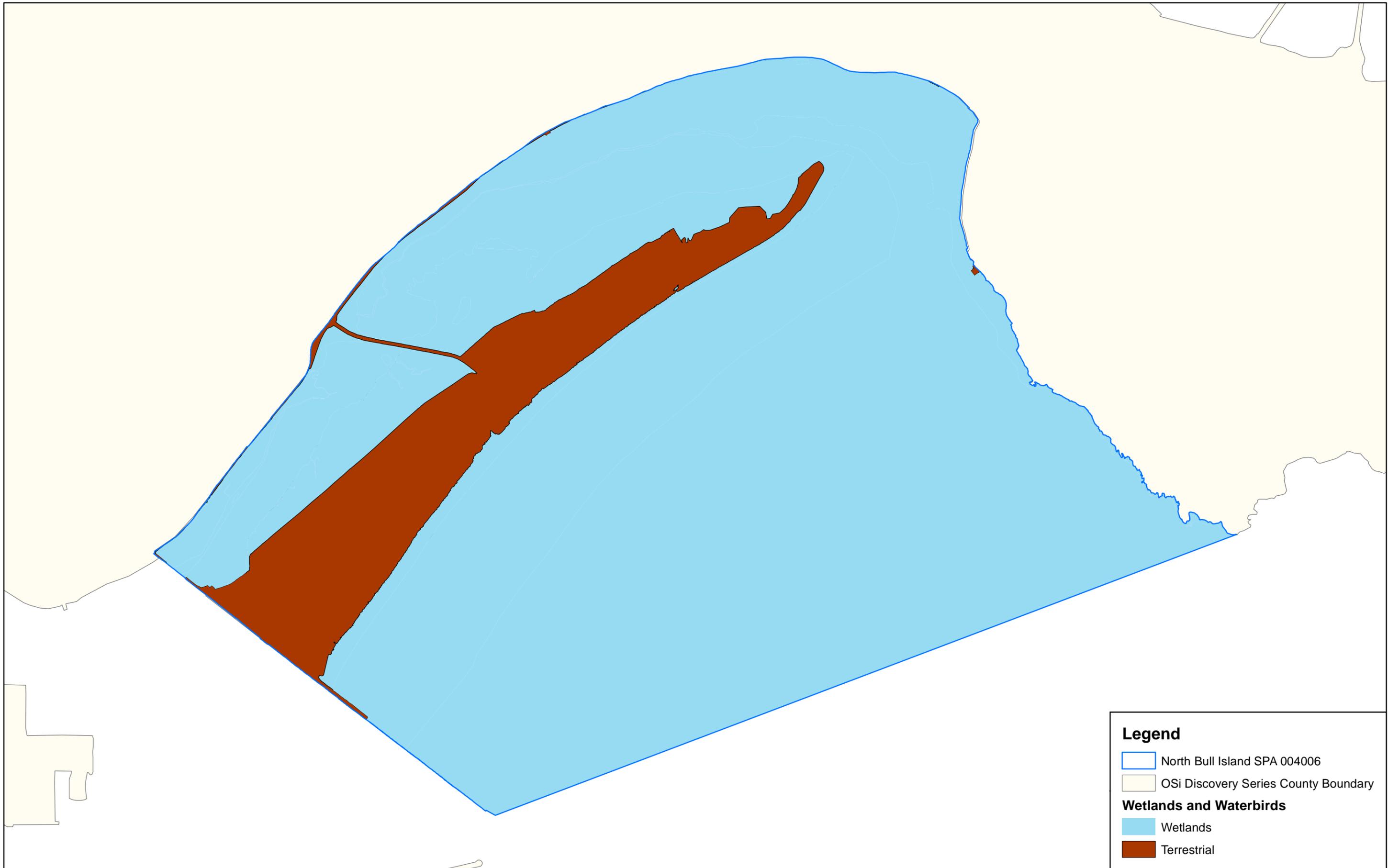
| Attribute | Measure | Target | Notes |
|------------------|----------------|---|---|
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation. See map 3 | The wetland habitat area was estimated as 1,713ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |





Legend

- North Bull Island SPA 004006
- South Dublin Bay and River Tolka Estuary SPA 004024
- Howth Head SAC 000202
- North Dublin Bay SAC 000206
- Rockabill to Dalkey Island SAC 003000
- OSi Discovery Series County Boundary



Legend

- North Bull Island SPA 004006
- OSi Discovery Series County Boundary

Wetlands and Waterbirds

- Wetlands
- Terrestrial

National Parks and Wildlife Service

Conservation Objectives Series

Rogerstown Estuary SPA 004015



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,**

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Web: www.npws.ie

E-mail: nature.conservation@ahg.gov.ie

Citation:

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and the Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|--|
| 004015 | Rogerstown Estuary SPA |
| A043 | Greylag Goose <i>Anser anser</i> |
| A046 | Brent Goose <i>Branta bernicla hrota</i> |
| A048 | Shelduck <i>Tadorna tadorna</i> |
| A056 | Shoveler <i>Anas clypeata</i> |
| A130 | Oystercatcher <i>Haematopus ostralegus</i> |
| A137 | Ringed Plover <i>Charadrius hiaticula</i> |
| A141 | Grey Plover <i>Pluvialis squatarola</i> |
| A143 | Knot <i>Calidris canutus</i> |
| A149 | Dunlin <i>Calidris alpina alpina</i> |
| A156 | Black-tailed Godwit <i>Limosa limosa</i> |
| A162 | Redshank <i>Tringa totanus</i> |
| A999 | Wetlands |

Please note that this SPA overlaps with Rogerstown Estuary SAC (000208). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year : 2013

Title : Rogerstown Estuary SPA (site code 4015) Conservation Objectives Supporting Document V1

Author : NPWS

Series : Conservation objectives supporting document

A043 Greylag Goose *Anser anser*

To maintain the favourable conservation condition of Greylag Goose in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number and range of areas used by waterbirds | No significant decrease in the range, timing or intensity of use of areas by greylag goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Rogerstown Estuary SPA [004015]

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number and range of areas used by waterbirds | No significant decrease in the range, timing and intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A048 **Shelduck *Tadorna tadorna***

To maintain the favourable conservation condition of Shelduck in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of areas used by waterbirds | No significant decrease in the range, timing or intensity of use of areas by shelduck, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A056 **Shoveler *Anas clypeata***

To maintain the favourable conservation condition of Shoveler in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number and range of areas used by waterbirds | No significant decrease in the range, timing or intensity of use of areas by shoveler, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of areas used by waterbirds | No significant decrease in the range, timing and intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part four of the conservation objectives supporting document |

A137 **Ringed Plover *Charadrius hiaticula***

To maintain the favourable conservation condition of Ringed Plover in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number and range of areas used by waterbirds | No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of conservation objectives supporting document |

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A143 Knot *Calidris canutus*

To maintain the favourable conservation condition of Knot in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by knot, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A156 Black-tailed Godwit *Limosa limosa*

To maintain the favourable conservation condition of Black-tailed Godwit in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by black-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A162 **Redshank *Tringa totanus***

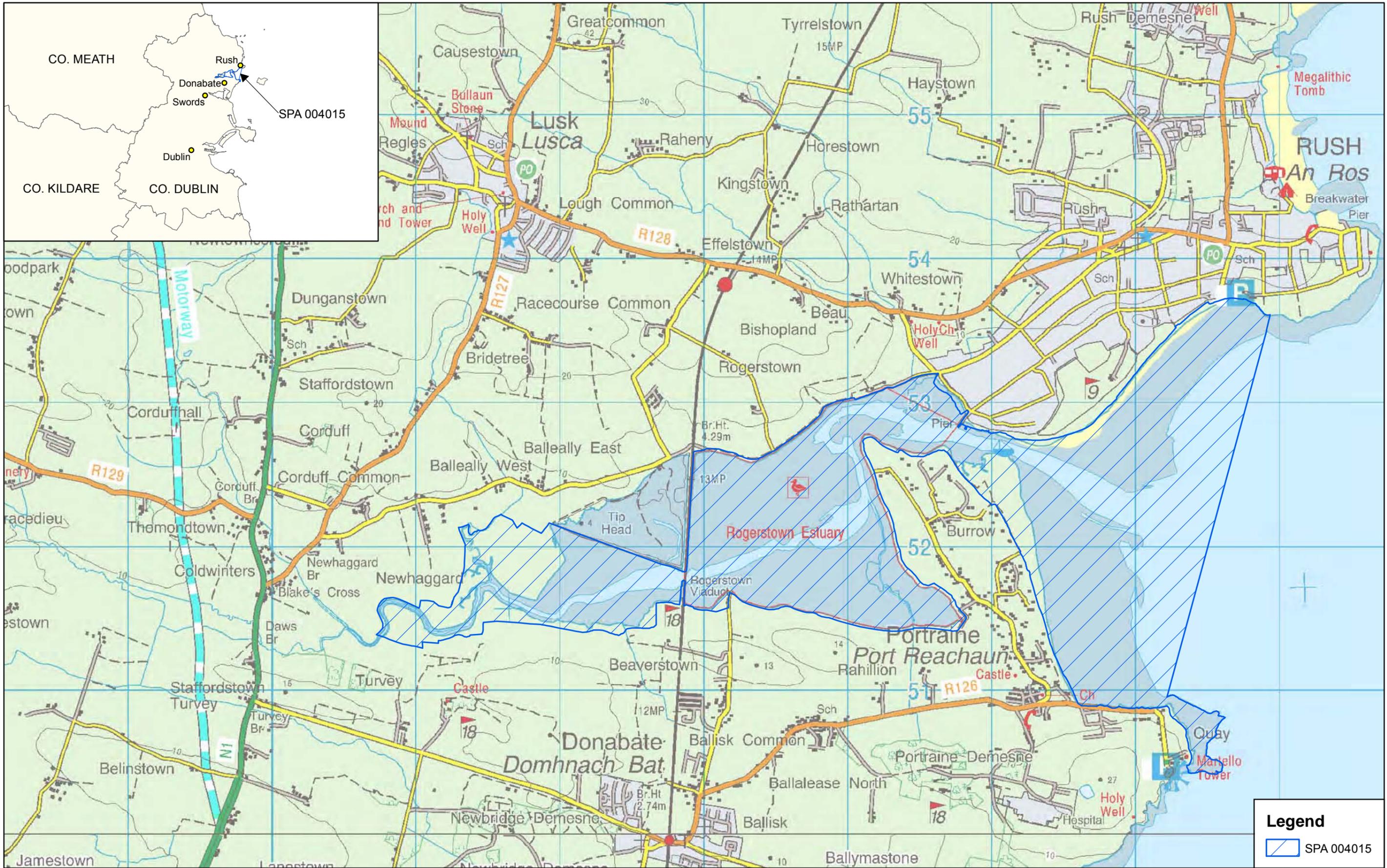
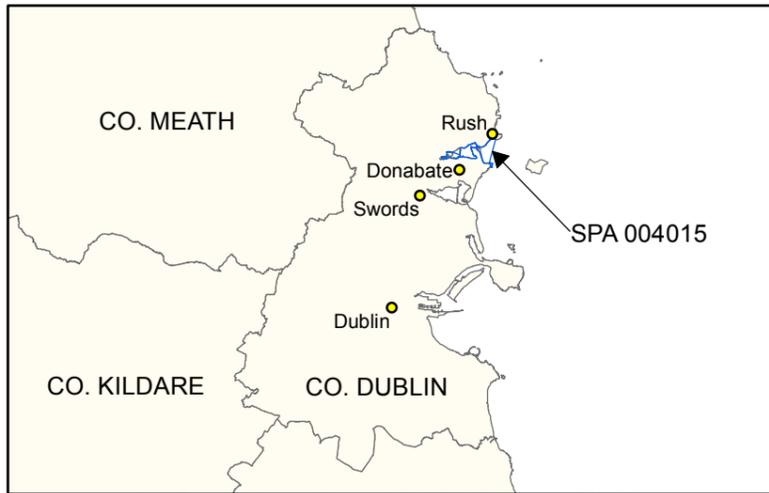
To maintain the favourable conservation condition of Redshank in Rogerstown Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Number, range, timing and intensity of use of area | No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Rogerstown Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

| Attribute | Measure | Target | Notes |
|------------------|----------------|--|---|
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 646 hectares, other than that occurring from natural patterns of variation | The wetland habitat area was estimated as 646ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |



An Roinn Ealaíon, Oidhreacht agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 1:
ROGERSTOWN ESTUARY SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SPA 004015
CO. DUBLIN; version 1.02

0 0.25 0.5 0.75 1 km

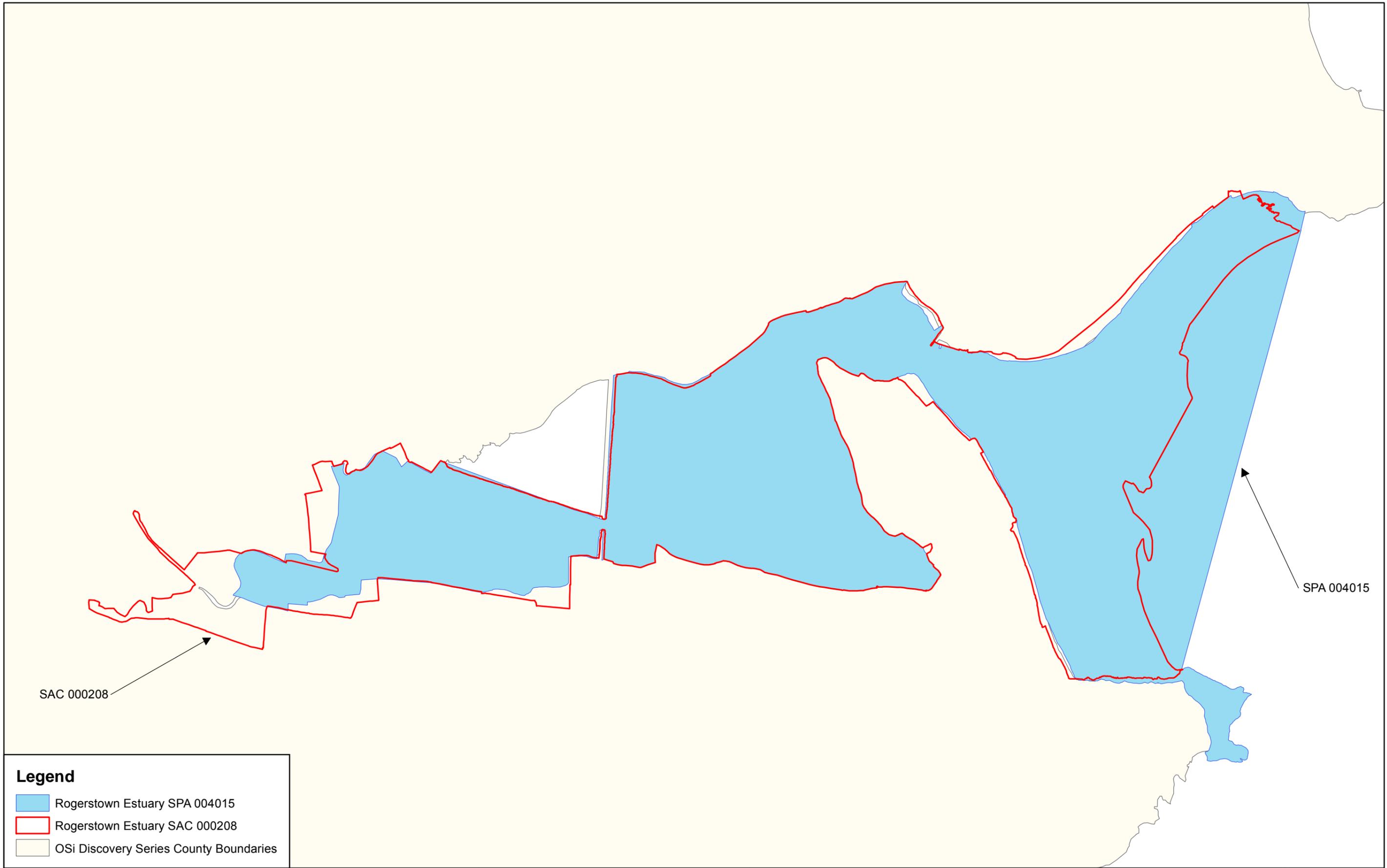
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaite. Macasamhail d'ábhar na Suirbhéaracha Ordoínáil le chead ón Rialtas (Ceadúnas Uimh. EN 0059212)

Legend

SPA 004015

Map Version 1
Date: May 2013



Legend

- Rogerstown Estuary SPA 004015
- Rogerstown Estuary SAC 000208
- OSi Discovery Series County Boundaries

National Parks and Wildlife Service

Conservation Objectives Series

Baldoyle Bay SPA 004016



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2013) Conservation Objectives: Baldoyle Bay SPA 004016. Version 1.
National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

**Series Editor: Rebecca Jeffrey
ISSN 2009-4086**

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|---|
| 004016 | Baldoyle Bay SPA |
| A046 | Brent Goose <i>Branta bernicla hrota</i> |
| A048 | Shelduck <i>Tadorna tadorna</i> |
| A137 | Ringed Plover <i>Charadrius hiaticula</i> |
| A140 | Golden Plover <i>Pluvialis apricaria</i> |
| A141 | Grey Plover <i>Pluvialis squatarola</i> |
| A157 | Bar-tailed Godwit <i>Limosa lapponica</i> |
| A999 | Wetlands |

Please note that this SPA overlaps with Baldoyle Bay SAC (000199). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping SAC as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

Year : 2012
Title : Baldoyle Bay SPA (site code 4016) Conservation Objectives Supporting Document V1
Author : NPWS
Series : Unpublished report to NPWS

A046 **Brent Goose *Branta bernicla hrota***

To maintain the favourable conservation condition of Light-bellied Brent Goose in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing and intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Baldoyle Bay SPA [004016]

A048 *Shelduck Tadorna tadorna*

To maintain the favourable conservation condition of Shelduck in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|--------------------------------------|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of areas | No significant decrease in the range, timing or intensity of use of areas by shelduck, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Baldoyle Bay SPA [004016]

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Baldoyle Bay SPA [004016]

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Baldoyle Bay SPA [004016]

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Baldoyle Bay SPA [004016]

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

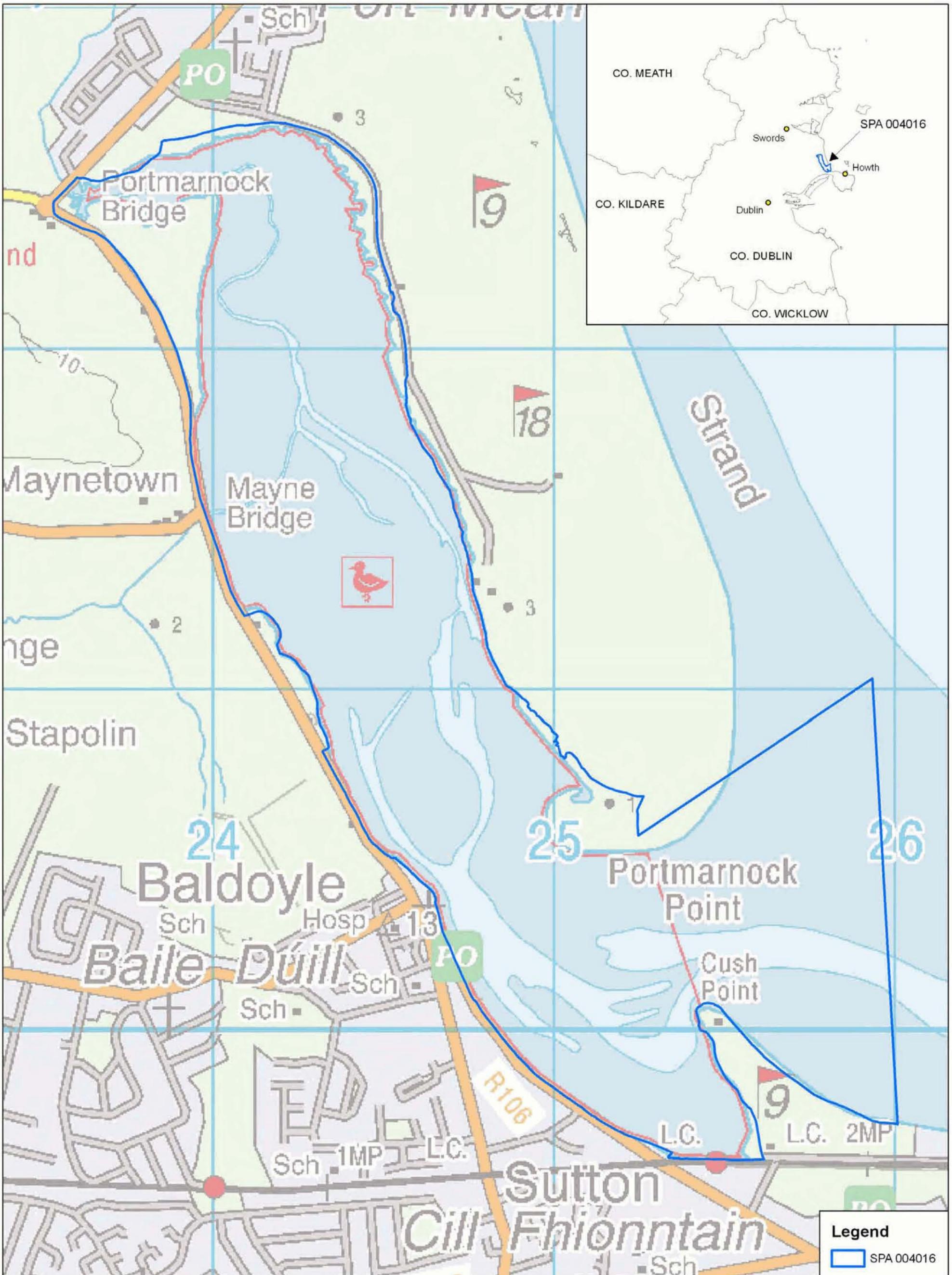
| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

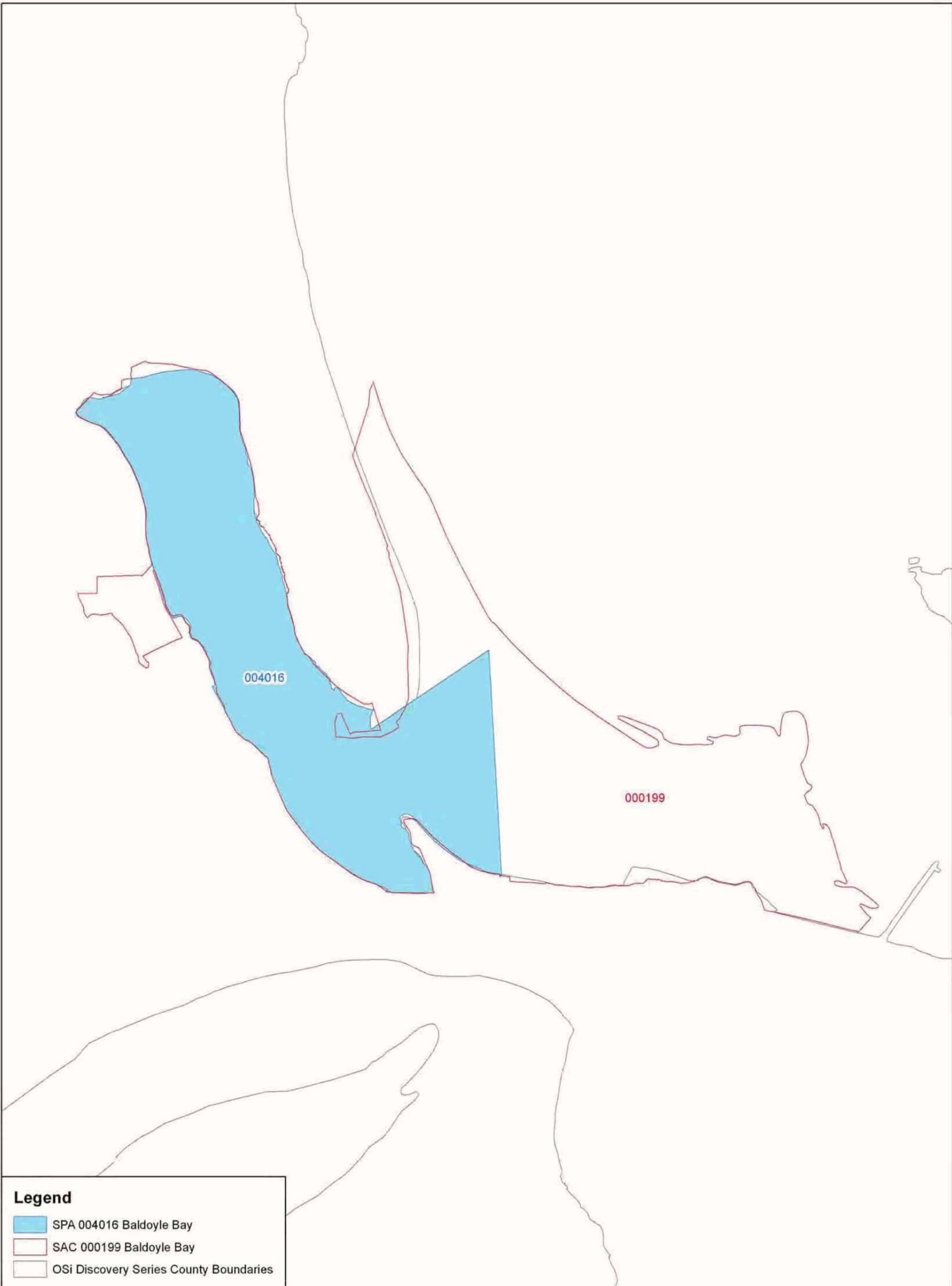
Conservation Objectives for : Baldoye Bay SPA [004016]

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in Baldoye Bay SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|----------------|---|---|
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 263ha, other than that occurring from natural patterns of variation | The wetland habitat area was estimated as 263ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |





Legend

- SPA 004016 Baldoyle Bay
- SAC 000199 Baldoyle Bay
- OSi Discovery Series County Boundaries

National Parks and Wildlife Service

Conservation Objectives Series

South Dublin Bay and River Tolka Estuary SPA
004024



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,**

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Citation:

**NPWS (201) Conservation Objectives: South Dublin Bay and River Tolka
Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department
of Arts, Heritage and the Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

004024 South Dublin Bay and River Tolka Estuary SPA

| | |
|------|--|
| A046 | Light-bellied Brent Goose <i>Branta bernicla hrota</i> |
| A130 | Oystercatcher <i>Haematopus ostralegus</i> |
| A137 | Ringed Plover <i>Charadrius hiaticula</i> |
| A141 | Grey Plover <i>Pluvialis squatarola</i> |
| A143 | Knot <i>Calidris canutus</i> |
| A144 | Sanderling <i>Calidris alba</i> |
| A149 | Dunlin <i>Calidris alpina alpina</i> |
| A157 | Bar-tailed Godwit <i>Limosa lapponica</i> |
| A162 | Redshank <i>Tringa totanus</i> |
| A179 | Black-headed Gull <i>Chroicocephalus ridibundus</i> |
| A192 | Roseate Tern <i>Sterna dougallii</i> |
| A193 | Common Tern <i>Sterna hirundo</i> |
| A194 | Arctic Tern <i>Sterna paradisaea</i> |
| A999 | Wetlands |

Please note that this SPA overlaps with South Dublin Bay SAC (000210). It adjoins North Bull Island SPA (004006) and North Dublin Bay SAC (000206). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year : 2014
Title : North Bull Island SPA (site code: 4006) and South Dublin Bay and River Tolka Estuary SPA (site code: 4024) Conservation objectives supporting document V1
Author : NPWS
Series : Conservation objectives supporting document

Other References

Year : 1995
Title : Seabird monitoring handbook for Britain and Ireland: a compilation of methods for survey and monitoring of breeding seabirds
Author : Walsh, P.; Halley, D.J.; Harris, M.P.; del Nevo, A.; Sim, I.M.W.; Tasker, M.L.
Series : JNCC, Peterborough

Year : 2008
Title : Autumn roosting by terns in south Dublin Bay
Author : Merne, O.J.; Madden, B.; Archer, E.; Porter, B.
Series : Irish Birds 8: 335-340

Year : 2010
Title : Terns roosting in Dublin Bay, autumn 2010
Author : Merne, O.J.
Series : Irish Birds 9: 126-128

Year : 2014
Title : BirdLife International Seabird Ecology and Foraging Range Database
Author : BirdLife International
Series : <http://seabird.wikispaces.com>

Year : 2014
Title : Dublin Bay Birds Project - Dublin Port Tern Conservation Project; report for the 2014 season
Author : Newton S.; Tierney N.; Whelan R.
Series : BirdWatch Ireland and Dublin Port Company

Spatial data sources

| | |
|-------------------------|---|
| Year : | 2014 |
| Title : | NPWS SPA boundary data |
| GIS Operations : | SPA boundary polygons divided into two classifications (wetlands, terrestrial) based on line identified by expert judgement. Expert opinion used as necessary to resolve any issues arising |
| Used For : | Wetlands (map 3) |

A046 @[\HVY`]YX **Brent Goose *Branta bernicla hrota***

To maintain the favourable conservation condition of Light-bellied Brent Goose in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part four of the conservation objectives supporting document |

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of conservation objectives supporting document |

Conservation Objectives for : South Dublin Bay and River Tolka Estuary SPA [004024]

A141 Grey Plover *Pluvialis squatarola*

Grey Plover is proposed for removal from the list of Special Conservation Interests for South Dublin Bay and River Tolka Estuary SPA. As a result, a site-specific conservation objective has not been set for this species.

| Attribute | Measure | Target | Notes |
|------------------|----------------|---------------|--------------|
|------------------|----------------|---------------|--------------|

A143 **Knot *Calidris canutus***

To maintain the favourable conservation condition of Knot in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by knot, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : South Dublin Bay and River Tolka Estuary SPA [004024]

A144 *Sanderling Calidris alba*

To maintain the favourable conservation condition of Sanderling in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A149 **Dunlin *Calidris alpina alpina***

To maintain the favourable conservation condition of Dunlin in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A162 Redshank *Tringa totanus*

To maintain the favourable conservation condition of Redshank in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A179 Black-headed Gull *Chroicocephalus ridibundus*

To maintain the favourable conservation condition of Black-headed Gull in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by black-headed gull other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : South Dublin Bay and River Tolka Estuary SPA [004024]

A192 Roseate Tern *Sterna dougallii*

To maintain the favourable conservation condition of Roseate Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---------------------------------|-----------------------------------|------------------------|---|
| Passage population: individuals | Number | No significant decline | Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010 respectively. Given the counting conditions (i.e. low light levels and long distance recording) it was rarely possible to identify the terns to species level but the majority of the birds appear to have been common terns (<i>Sterna hirundo</i>), with smaller numbers of Arctic and roseate terns (<i>S. paradisaea</i> , <i>S. dougallii</i>) (sandwich, little and black terns (<i>S. sandvicensis</i> , <i>S. albifrons</i> , <i>Chlidonias niger</i>) were also recorded) (Merne et al., 2008; Merne 2010). At least 645 roseate tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of roseate tern using this SPA may be significantly higher |
| Distribution: roosting areas | Number; location; area (hectares) | No significant decline | Merne et al. (2008) describe the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Terns have been occasionally recorded outside of this area on adjacent sandflats extending to Irishtown/South Bull Wall and to Blackrock but these birds eventually join the birds roosting in the main area (Merne et al., 2008) |
| Prey biomass available | Kilogrammes | No significant decline | Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of terns arriving to the roosting area indicated that most flew in from an easterly and southeasterly direction leading the authors to suggest they were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). During the breeding season, roseate terns can make extensive use of marine waters adjacent to their breeding colonies. Key prey items: Small, schooling marine fish, very rarely small crustaceans. Key habitats: roseate tern forage in/over shallow and upwelling areas, including tide rips and shoals and over sandy bottoms. Foraging range: max. 30km, mean max. 18.28km, mean 12.3km (Birdlife International, 2014). As these foraging range estimates relate to birds during the breeding season, the distances between post-breeding roost sites and feeding areas may be greater |

| | | | |
|------------------------------|--|---|---|
| Barriers to connectivity | Number; location; shape; area (hectares) | No significant increase | Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of terns arriving to the roosting area indicated that most flew in from an easterly and southeasterly direction leading the authors to suggest they were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). During the breeding season roseate terns can make extensive use of marine waters adjacent to their breeding colonies. Key habitats: roseate tern forage in/over shallow and upwelling areas, including tide rips and shoals and over sandy bottoms. Foraging range: max. 30km, mean max. 18.28km, mean 12.3km (Birdlife International, 2014). As these foraging range estimates relate to birds during the breeding season, the distances between post-breeding roost sites and feeding areas may be greater |
| Disturbance at roosting site | Level of impact | Human activities should occur at levels that do not adversely affect the numbers of roseate tern among the post-breeding aggregation of terns | Merne et al. (2008) describes the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Although principally used as a night roost, birds begin to roost at least one hour before sunset during the period July - September with peak activity occurring between mid-August and mid-September (Merne et al., 2008; Merne, 2010). Merne (2010) recorded significant disturbance events to the roosting terns caused by people with dogs off the leash and kite surfing |

Conservation Objectives for : South Dublin Bay and River Tolka Estuary SPA [004024]

A193 Common Tern *Sterna hirundo*

To maintain the favourable conservation condition of Common Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|---|-----------------------------------|------------------------|---|
| Breeding population abundance: apparently occupied nests (AONs) | Number | No significant decline | Measure based on standard tern survey methods (see Walsh et al., 1995). For more information on the history and recent population estimates of the tern colony at this SPA see Newton et al. (2014) |
| Productivity rate: fledged young per breeding pair | Mean number | No significant decline | Measure based on standard tern survey methods (see Walsh et al., 1995). For more information on the history and recent population estimates of the tern colony at this SPA see Newton et al. (2014) |
| Passage population: individuals | Number | No significant decline | Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010 respectively. Given the counting conditions (i.e. low light levels and long distance recording), it was rarely possible to identify terns to species level but the majority of the birds appear to have been common terns (<i>Sterna hirundo</i>), with smaller numbers of Arctic and roseate terns (<i>S. paradisaea</i> , <i>S. dougallii</i>); (sandwich, little and black terns (<i>S. sandvicensis</i> , <i>S. albifrons</i> , <i>Chlidonias niger</i>) were also recorded) (Merne et al., 2008; Merne 2010). At least 4,887 common tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of common tern using this SPA may be significantly higher |
| Distribution: breeding colonies | Number; location; area (Hectares) | No significant decline | The common tern breeding colony in Dublin Bay is primarily sited on an artificial structure known as the 'ESB Dolphin' (see Newton et al., 2014) |
| Distribution: roosting areas | Number; location; area (Hectares) | No significant decline | Merne et al. (2008) describe the main roosting area as the exposed sand banks in south Dublin Bay, primarily between the Martello Towers of at Sandymount (319524, 232021) and Williamstown (320796, 229979). Terns have been occasionally recorded outside of this area on adjacent sandflats extending to Irishtown/South Bull Wall and to Blackrock but these birds eventually joined the birds roosting in the main area (Merne et al 2008) |
| Prey biomass available | Kilogrammes | No significant decline | During the breeding season, common terns can make extensive use of marine waters adjacent to their breeding colonies. Key prey items: Small fish, crustaceans, insects and occasionally squid. Key habitats: forage in/over shallow coastal waters, bays, inlets, shoals, tidal-rips, drift lines, beaches, saltmarsh creeks, lakes, ponds or rivers. Foraging range: max. 37km; mean max. 33.81km; mean 8.67km (Birdlife International, 2014). Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of arriving terns to the primary roosting area indicated that most flew into Dublin Bay from an easterly and southeasterly direction leading the authors to suggest they were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). Foraging ranges between post-breeding roost sites and feeding areas may be greater than the estimates given for the breeding season |

| | | | |
|------------------------------|--|--|--|
| Barriers to connectivity | Number; location; shape; area (hectares) | No significant increase | During the breeding season, common terns can make extensive use of marine waters adjacent to their breeding colonies. Foraging range: max. 37km; mean max. 33.81km; mean 8.67km (Birdlife International, 2014). Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of arriving terns to the primary roosting area indicated that most flew into Dublin Bay from an easterly and southeasterly direction leading the authors to suggest the birds were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). Foraging ranges between post-breeding roost sites and feeding areas may be greater than the estimates given for the breeding season |
| Disturbance at breeding site | Level of impact | Human activities should occur at levels that do not adversely affect the breeding common tern population | The common tern breeding colony in Dublin Bay is primarily sited on an artificial structure known as the 'ESB Dolphin' (see Newton et al., 2014) |
| Disturbance at roosting site | Level of impact | Human activities should occur at levels that do not adversely affect the numbers of common tern among the post-breeding aggregation of terns | Merne et al (2008) describes the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Although principally used as a night roost, birds begin to roost at least one hour before sunset during the period July - September with peak activity occurring between mid-August and mid-September (Merne et al 2008; Merne 2010). Merne (2010) recorded significant disturbance events to the roosting terns caused by people with dogs off the leash and kite surfing |

Conservation Objectives for : South Dublin Bay and River Tolka Estuary SPA [004024]

A194 Arctic Tern *Sterna paradisaea*

To maintain the favourable conservation condition of Arctic Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

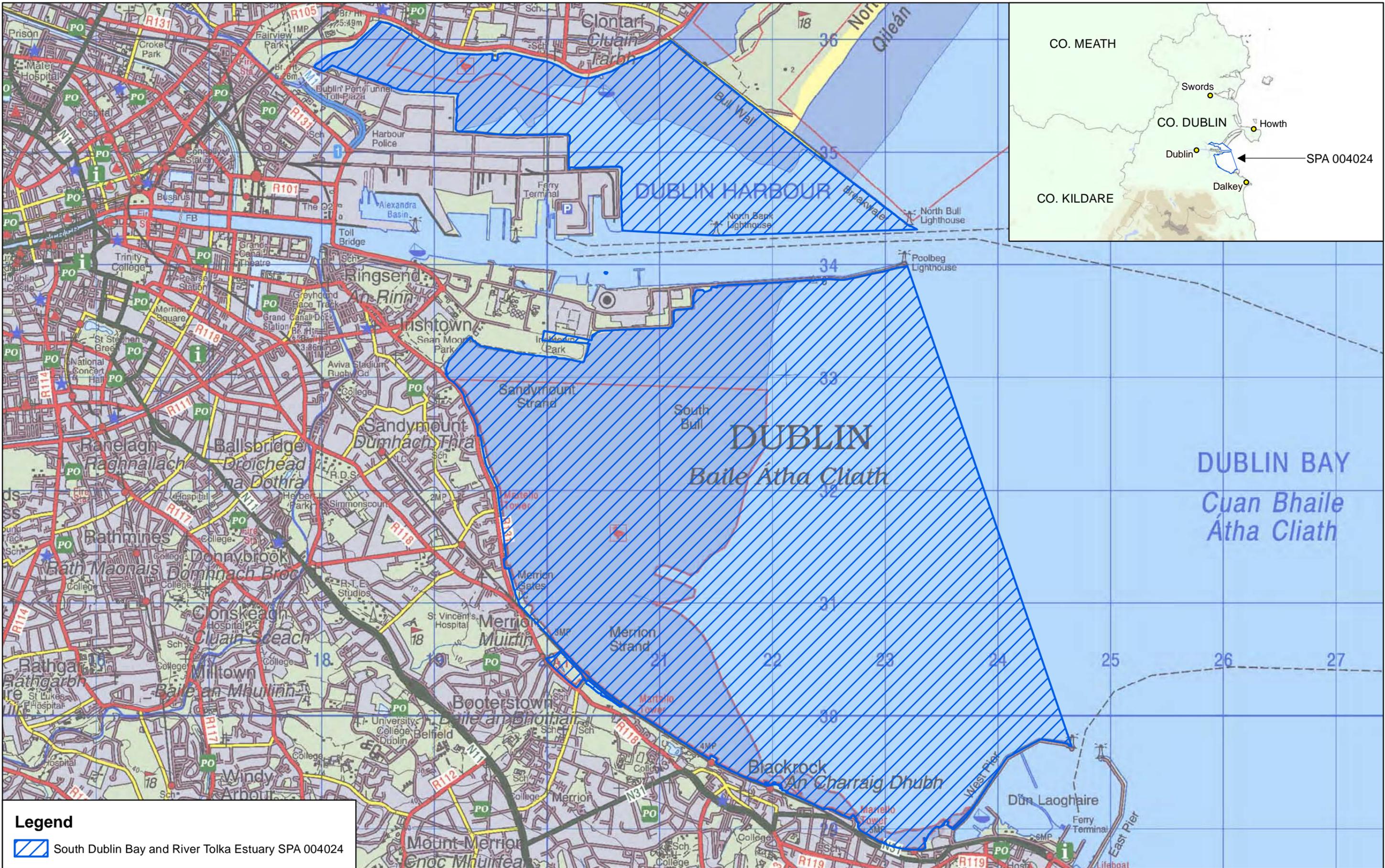
| Attribute | Measure | Target | Notes |
|------------------------------|-----------------------------------|------------------------|--|
| Passage population | Number of individuals | No significant decline | Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010 respectively. Given the counting conditions (i.e. low light levels and long distance recording) it was rarely possible to identify the terns to species level but the majority of the birds appear to have been common terns (<i>Sterna hirundo</i>), with smaller numbers of Arctic and roseate terns (<i>S. paradisaea</i> , <i>S. dougallii</i>); (sandwich, little and black terns (<i>S. sandvicensis</i> , <i>S. albifrons</i> , <i>Chlidonias niger</i>) were also recorded) (Merne et al., 2008; Merne 2010). At least 200 Arctic tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of Arctic tern using this SPA may be significantly higher |
| Distribution: roosting areas | Number; location; area (hectares) | No significant decline | Merne et al. (2008) describe the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Terns have been occasionally recorded outside of this area on adjacent sandflats extending to Irishtown/South Bull Wall and to Blackrock but these birds eventually join the birds roosting in the main area (Merne et al., 2008) |
| Prey biomass available | Kilogrammes | No significant decline | Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of terns arriving to the roosting area indicated that most flew in from an easterly and southeasterly direction leading the authors to suggest they were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). During the breeding season Arctic terns can make extensive use of marine waters adjacent to their breeding colonies. Key prey items: Small fish, crustaceans and other invertebrates. Key habitats: forage in/over open waters and shallow bays, rocky shores, tidal flats, shoals, tide rips and ocean fronts. Foraging range: max. 20.6km, mean max. 12.24km, mean 11.75km (Birdlife International, 2014). As these foraging range estimates relate to birds during the breeding season, the distances between post-breeding roost sites and feeding areas may be greater |

| | | | |
|------------------------------|--|--|---|
| Barriers to connectivity | Number; location; shape; area (hectares) | No significant increase | Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area but direct survey evidence is incomplete. Evening observations of arriving terns to the primary roosting area indicated that most flew into Dublin Bay from an easterly and southeasterly direction leading the authors to suggest the birds were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne et al., 2008). During the breeding season Arctic terns can make extensive use of marine waters adjacent to their breeding colonies. Foraging range: max. 20.6km, mean max. 12.24km, mean 11.75km (Birdlife International, 2014). As these foraging range estimates relate to birds during the breeding season, the distances between post-breeding roost sites and feeding areas may be greater |
| Disturbance at roosting site | Level of impact | Human activities should occur at levels that do not adversely affect the numbers of Arctic tern among the post-breeding aggregation of terns | Merne et al. (2008) describes the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Although principally used as a night roost, birds begin to roost at least one hour before sunset during the period July - September with peak activity occurring between mid-August and mid-September (Merne et al., 2008; Merne, 2010). Merne (2010) recorded significant disturbance events to the roosting terns caused by people with dogs off the leash and kite surfing |

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

| Attribute | Measure | Target | Notes |
|------------------|----------------|---|---|
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation. See map 3 | The wetland habitat area was estimated as 2,192ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |



Legend
 South Dublin Bay and River Tolka Estuary SPA 004024

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MAP 1:
**SOUTH DUBLIN BAY AND
 RIVER TOLKA ESTUARY SPA
 CONSERVATION OBJECTIVES
 SPA DESIGNATION**
 Map to be read in conjunction with the NPWS Conservation Objectives Document.

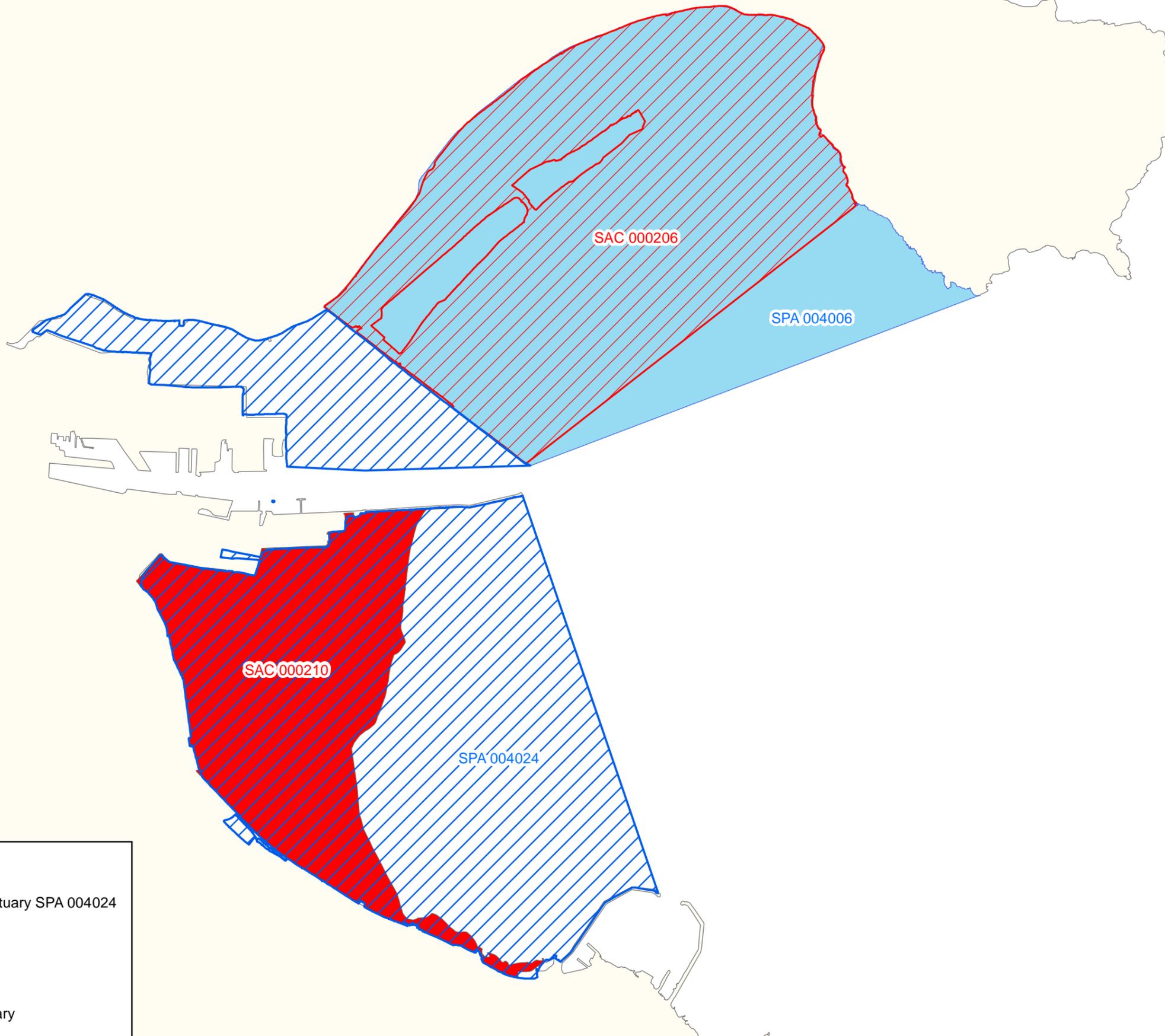
SITE CODE:
SPA 004024; version 2. CO. DUBLIN

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
 Ordnance Survey of Ireland Licence No EN 0059214. © Ordnance Survey of Ireland Government of Ireland

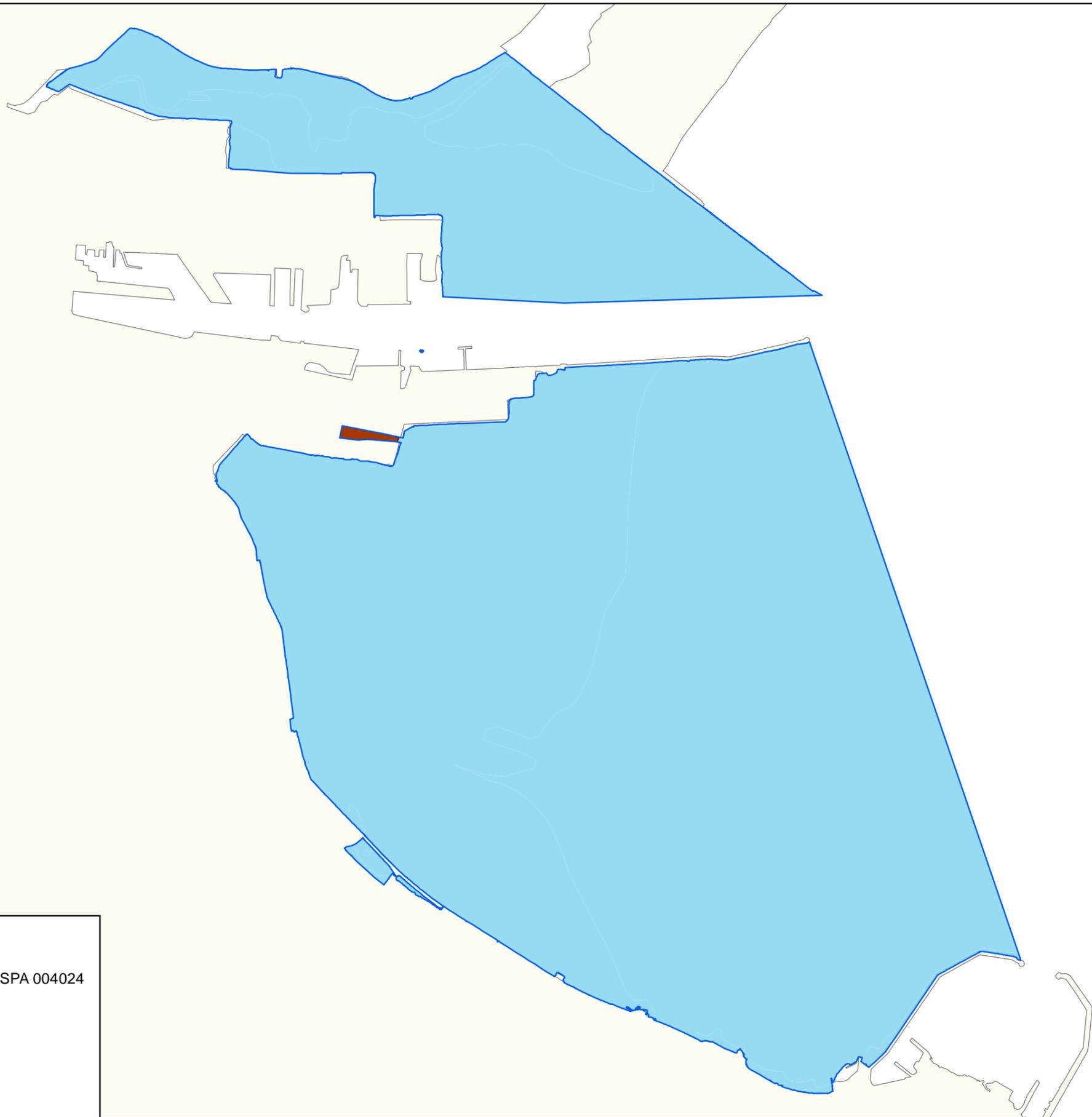
Níl sna teorainneacha ar na léarscáléanna ach nod garshuíomhach ginearálta. Féadfar athbheirithneithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

Map Version 1
Date: Sep 2014



Legend

-  South Dublin Bay and River Tolka Estuary SPA 004024
-  North Bull Island SPA 004006
-  North Dublin Bay SAC 000206
-  South Dublin Bay SAC 000210
-  OSi Discovery Series County Boundary



Legend

- South Dublin Bay and River Tolka Estuary SPA 004024
- OSi Discovery Series County Boundary
- Wetlands and Waterbirds**
- Wetlands
- Terrestrial

National Parks and Wildlife Service

Conservation Objectives Series

Malahide Estuary SPA 004025



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



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Gaeltacht.**

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The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

| | |
|--------|---|
| 004025 | Malahide Estuary SPA |
| A005 | Great Crested Grebe <i>Podiceps cristatus</i> |
| A046 | Brent Goose <i>Branta bernicla hrota</i> |
| A048 | Shelduck <i>Tadorna tadorna</i> |
| A054 | Pintail <i>Anas acuta</i> |
| A067 | Goldeneye <i>Bucephala clangula</i> |
| A069 | Red-breasted Merganser <i>Mergus serrator</i> |
| A130 | Oystercatcher <i>Haematopus ostralegus</i> |
| A140 | Golden Plover <i>Pluvialis apricaria</i> |
| A141 | Grey Plover <i>Pluvialis squatarola</i> |
| A143 | Knot <i>Calidris canutus</i> |
| A149 | Dunlin <i>Calidris alpina alpina</i> |
| A156 | Black-tailed Godwit <i>Limosa limosa</i> |
| A157 | Bar-tailed Godwit <i>Limosa lapponica</i> |
| A162 | Redshank <i>Tringa totanus</i> |
| A999 | Wetlands |

Please note that this SPA overlaps with Malahide Estuary SAC (000205). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year : 2013
Title : Malahide Estuary SPA (site code 4025) Conservation objectives supporting document V1
Author : NPWS
Series : Conservation objectives supporting document

A005 Great Crested Grebe *Podiceps cristatus*

To maintain the favourable conservation condition of Great Crested Grebe in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by great crested grebe, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A048 **Shelduck *Tadorna tadorna***

To maintain the favourable conservation condition of Shelduck in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by shelduck, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A054 **Pintail *Anas acuta***

To maintain the favourable conservation condition of Pintail in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by pintail, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A067 Goldeneye *Bucephala clangula*

To maintain the favourable conservation condition of Goldeneye in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by goldeneye, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A069 Red-breasted Merganser *Mergus serrator*

To maintain the favourable conservation condition of Red-breasted Merganser in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part four of the conservation objectives supporting document |

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A141 **Grey Plover *Pluvialis squatarola***

To maintain the favourable conservation condition of Grey Plover in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A143 Knot *Calidris canutus*

To maintain the favourable conservation condition of Knot in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Waterbird population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by knot, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A149 **Dunlin *Calidris alpina alpina***

To maintain the favourable conservation condition of Dunlin in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A156 Black-tailed Godwit *Limosa limosa*

To maintain the favourable conservation condition of Black-tailed Godwit in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by black-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Malahide Estuary SPA [004025]

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

| Attribute | Measure | Target | Notes |
|------------------|---|--|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Conservation Objectives for : Malahide Estuary SPA [004025]

A162 Redshank *Tringa totanus*

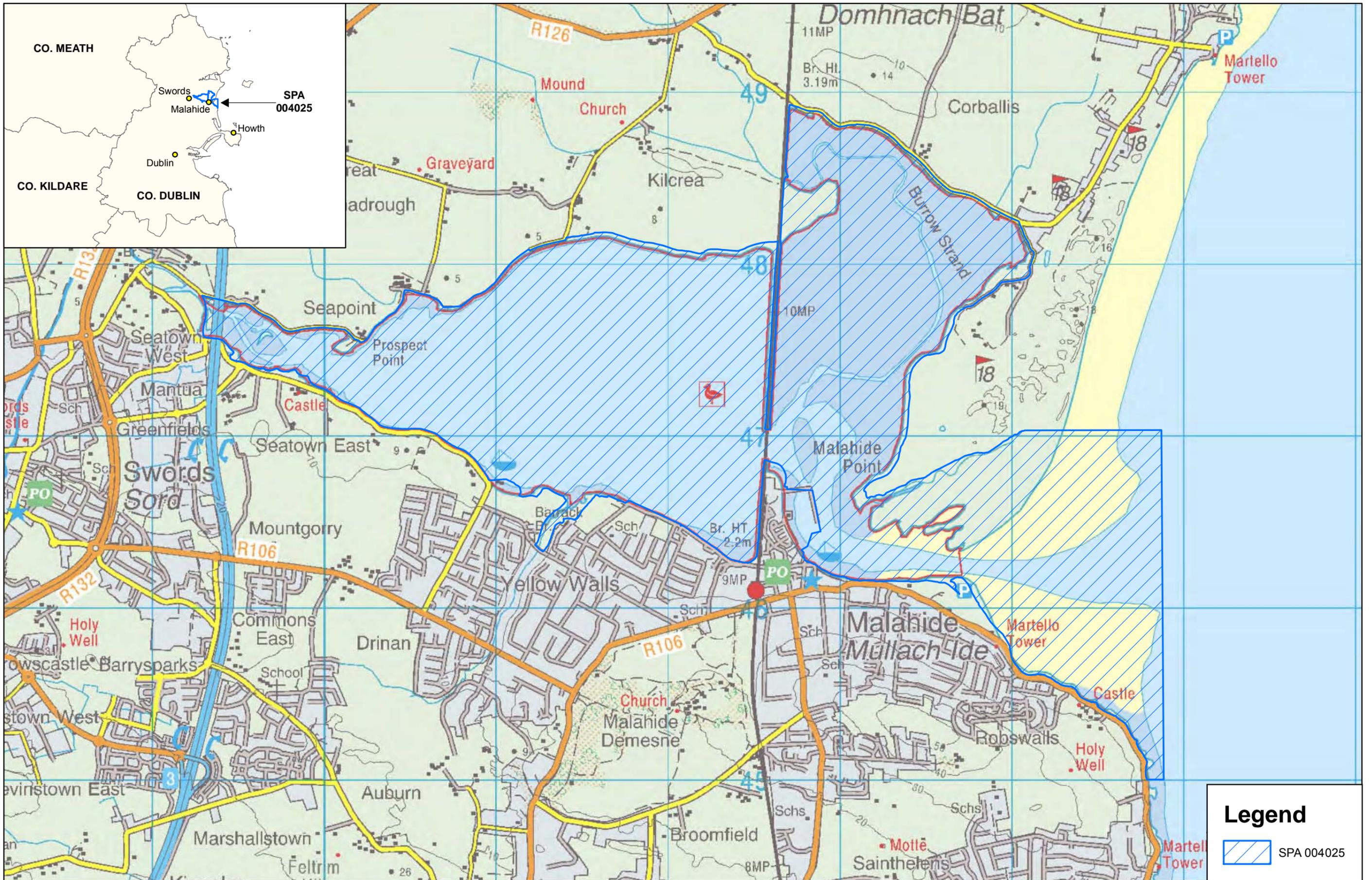
To maintain the favourable conservation condition of Redshank in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

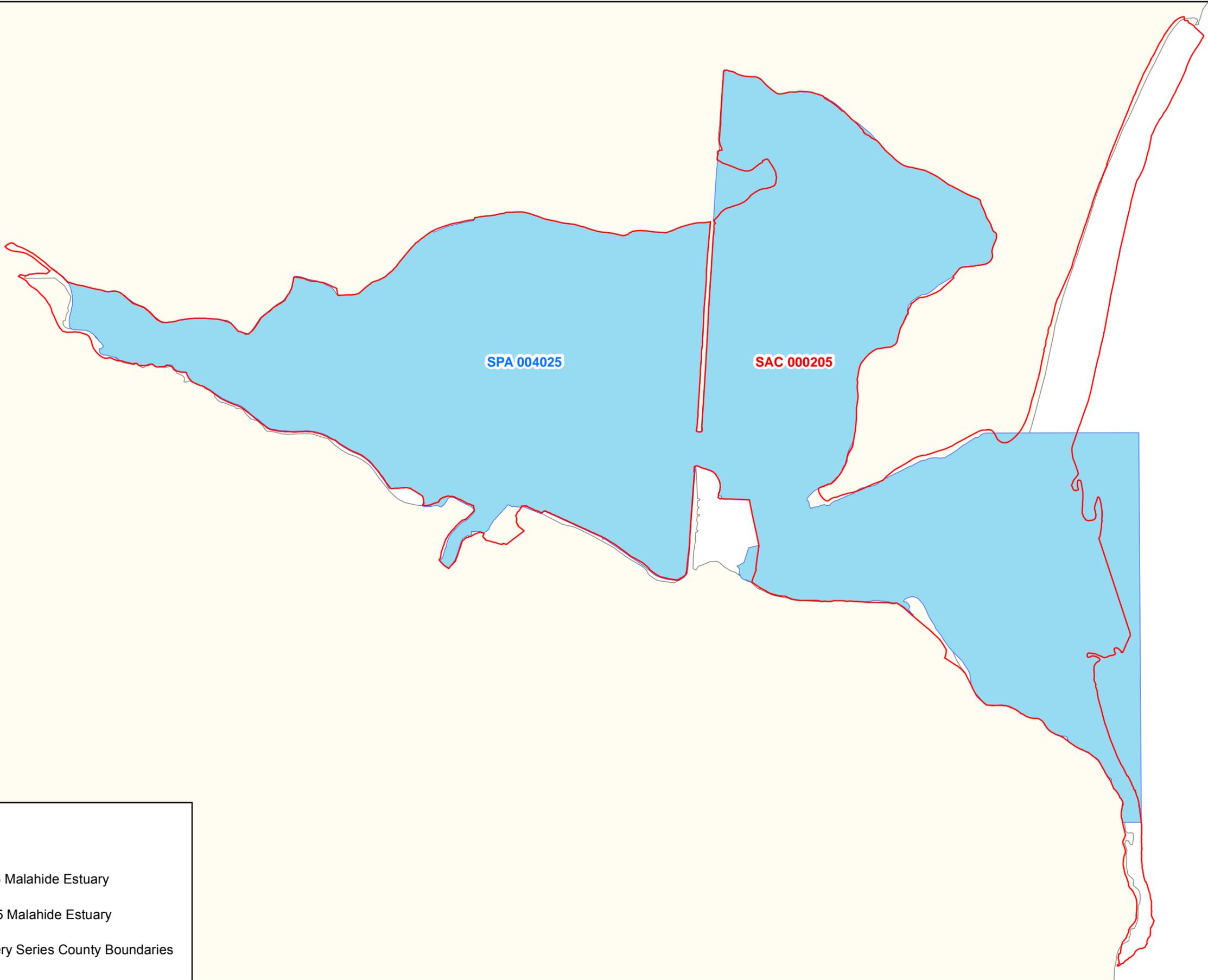
| Attribute | Measure | Target | Notes |
|------------------|---|---|---|
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation | Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in Malahide Estuary SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

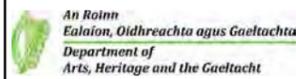
| Attribute | Measure | Target | Notes |
|------------------|----------------|--|---|
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 765 hectares, other than that occurring from natural patterns of variation | The wetland habitat area was estimated as 765ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |





Legend

- SPA 004025 Malahide Estuary
- SAC 000205 Malahide Estuary
- OSi Discovery Series County Boundaries



MAP 2:
 MALAHIDE ESTUARY SPA
 CONSERVATION OBJECTIVES
 ADJOINING / OVERLAPPING
 DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

0 0.5 1 km



Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).
 Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadunas Uimh. EN 0059212)

Site Code
 SPA 004025 version 1.03
 SAC 000205 version 1.02
 Map Version 1
 Date: March 2013

Conservation objectives for Lambay Island SPA [004069]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

| Bird Code | Common Name | Scientific Name |
|-----------|--------------------------|----------------------------------|
| A009 | Fulmar | <i>Fulmarus glacialis</i> |
| A017 | Cormorant | <i>Phalacrocorax carbo</i> |
| A018 | Shag | <i>Phalacrocorax aristotelis</i> |
| A043 | Greylag Goose | <i>Anser anser</i> |
| A183 | Lesser Black-backed Gull | <i>Larus fuscus</i> |
| A184 | Herring Gull | <i>Larus argentatus</i> |
| A188 | Kittiwake | <i>Rissa tridactyla</i> |
| A199 | Guillemot | <i>Uria aalge</i> |

| | | |
|------|-----------|---------------------------|
| A200 | Razorbill | <i>Alca torda</i> |
| A204 | Puffin | <i>Fratercula arctica</i> |

Citation: NPWS (2018) Conservation objectives for Lambay Island SPA [004069]. Generic Version 6.0.
Department of Culture, Heritage and the Gaeltacht.

Conservation objectives for Howth Head Coast SPA [004113]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

| Bird Code | Common Name | Scientific Name |
|-----------|-------------|-------------------------|
| A188 | Kittiwake | <i>Rissa tridactyla</i> |

Citation: NPWS (2018) Conservation objectives for Howth Head Coast SPA [004113]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.

Conservation objectives for Ireland's Eye SPA [004117]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

| Bird Code | Common Name | Scientific Name |
|-----------|--------------|----------------------------|
| A017 | Cormorant | <i>Phalacrocorax carbo</i> |
| A184 | Herring Gull | <i>Larus argentatus</i> |
| A188 | Kittiwake | <i>Rissa tridactyla</i> |
| A199 | Guillemot | <i>Uria aalge</i> |
| A200 | Razorbill | <i>Alca torda</i> |

Citation: NPWS (2018) *Conservation objectives for Ireland's Eye SPA [004117]. Generic Version 6.0.*
Department of Culture, Heritage and the Gaeltacht.

Conservation objectives for Dalkey Islands SPA [004172]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- 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 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, and
- 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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

| Bird Code | Common Name | Scientific Name |
|-----------|--------------|--------------------------|
| A192 | Roseate Tern | <i>Sterna dougallii</i> |
| A193 | Common Tern | <i>Sterna hirundo</i> |
| A194 | Arctic Tern | <i>Sterna paradisaea</i> |

Citation: NPWS (2018) Conservation objectives for Dalkey Islands SPA [004172]. Generic Version 6.0.
Department of Culture, Heritage and the Gaeltacht.

APPENDIX 2: AIR QUALITY ASSESSMENT

1 AIR QUALITY ASSESSMENT

1.1 Introduction

This report assesses the potential impacts to air quality arising from or associated with the MP2 Project. It should be read in conjunction with the site layout plans and the project description in Section 3 of the NIS.

Potential effects to air quality may arise during the construction phase, such as from the generation of construction dusts and construction traffic. The construction activities have been examined to identify those that have the potential for air emissions. The operational development will give rise to potential emissions from road traffic and shipping, similar to the existing operation. Each of these potential sources has been identified and emissions have been evaluated using standard procedures. Considerations extend beyond construction and operational activities and included in this section are factors that are vulnerable to unplanned events that have the potential to cause significant sudden environmental effects. The measures to reduce, avoid and prevent these likely significant effects are proposed, where they are necessary. Thereafter, the likely significant residual effects of the project on air quality are predicted.

This report has been prepared in accordance with the following guidance documents:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
- The European Commission *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report* (2017).
- The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).
- The EPA *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (2017).
- The DHPLG published the revised *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018).

1.2 Assessment Methodology

1.2.1 Baseline Air Quality

The current state of the environment in terms of baseline air quality has been determined from the data from the EPA monitoring Zone A (Dublin) network to determine compliance with relevant ambient air legislation. In addition to the EPA monitoring, DPC carry out a series of ambient air quality monitoring tests within the environs of the port. The monitoring was undertaken in the period 2014 - 2018 at a series of 18 locations (as shown in Figure 1-1) in the environs of the port. This monitoring is employed in this assessment to demonstrate the spatial variation in the Port and in the wider Dublin area in conjunction with the data from the EPA network.

The likely evolution of this baseline in future years without the proposed development (i.e. the “Do-Nothing” scenario is also presented.



Figure 1-1 DPC Air Monitoring Locations

1.2.2 Construction Stage Impacts

There are four potential impacts to atmosphere from the construction stage of the proposed development:

- Generation and dispersion of construction dusts during the proposed works (demolition, dredging and general construction);
- Emissions associated with construction traffic;
- Potential odours (such as during dredging); and
- Greenhouse gas emissions from the construction phase of the proposed development.

The methodologies employed for each of these impacts is summarised as follows:

Dust Dispersion

Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors and also to sensitive ecosystems. The potential for dust generation from the construction activities associated with the proposed development will be assessed on the basis of a review of the proposed methodologies and the proximity of these activities to sensitive receptors.

Construction activities such as stone importation, excavation, earth moving, dredging and backfilling may generate quantities of dust, particularly in dry weather conditions. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

The potential for dust emissions from the construction phase of the project is addressed qualitatively in accordance with the NRA Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (Rev. 1) (NRA 2011; referred to hereafter as the NRA Guidelines).

Construction Traffic

The proposed construction operation will involve the movement of materials and reconfiguration of existing roadways, buildings and lands to create an additional three hectares of usable terminal. Additional infill material may be sourced offsite and transported via the newly configured access to the Port. All dredged material will be barged to the dump site and will not travel by road. An analysis of construction traffic will be undertaken in accordance with the NRA Guidelines.

Odour

The main potential odour from the construction stage relates to the potential for fugitive odours from the dredging operation, particularly hydrogen sulphide, which can be particularly offensive.

- DPC undertook maintenance dredging campaigns within the port's navigation channel and berthing pockets in 2012, 2016, 2017 and 2018. Hydrogen sulphide was not encountered in the port during any of these dredging campaigns.
- During the 2003 dredging of Berths 32 and 33 within Alexandra Basin West, a long reach excavator on a pontoon was used and the dredge material was brought onto the quay wall and processed for shipment to Germany. Again, hydrogen sulphide was not encountered.

Despite the low risk of encountering odours, a series of odour mitigation measures have been presented to minimise the impact of this operation and to prevent any nuisance in the unlikely event that they are encountered.

Greenhouse Gas Emissions

The construction phase climate assessment was carried out to identify sources and quantify total Greenhouse Gas (GHG) emissions generated from the construction activities associated with the proposed development. This assessment was carried out using the carbon calculator for construction activities developed by the Environment Agency (EA) in the UK. The carbon calculator calculates the embodied carbon dioxide (CO₂) of materials plus CO₂ associated with their transportation. The tool also considers personal travel, site energy use and waste management.

1.2.3 Operation Stage

Road Traffic Emissions

A prediction of the local impact of traffic-derived pollution during the operation phase was carried out using the Local Assessment model in the Design Manual for Road and Bridges (DMRB), Volume 11, Section 3, Part 1 in accordance with the NRA guidelines for assessment of impacts to air from road transport. Traffic data was provided in the form of Annual Average Daily Traffic (AADT) for the existing scenario and a series of future scenario years accounting for growth based on the Dublin Port Masterplan 2040, reviewed 2018.

Shipping Emissions

Shipping emissions associated with the proposed development have been quantified using the emission factors presented in the EMEP/EEA Emission Inventory Guidebook 2016, Section 1.A.3.d.i Navigation (shipping).

Operational Emissions

Greenhouse gas emissions from energy use at the port, as documented in the carbon footprint, are assessed through a review of the proposed changes to operations at the site to determine the potential for significant impact.

Climate Change Adaption

In addition to emissions generation described above, the adaptability of the proposed development to climate change has also been assessed. In particular, the impacts of flooding in the Dublin Port area has been addressed through consultation with the CFRAM mapping for the area and interaction with the drainage specialist on the MP2 Project.

1.2.4 Assessment Criteria

1.2.4.1 Construction Dust

During the construction phase, dust is considered the principal risk of pollution to the atmosphere. However, there is no legislative limit for total suspended particles, so the guidelines presented by the German Government TA Luft guidance are employed. Under this guidance there is a requirement to maintain monthly dust levels below the guideline of 350mg/m²/day as an annual average at sensitive receptors.

1.2.4.2 Odours

Like construction dusts there is no legislative limit for odours in Ireland and standard industry guidelines are typically applied. The Odour Impact Assessment Guidance for EPA Licensed Sites (AG5) is a procedure that offers a consistent and systematic approach to the assessment of odours on and in the local area of facilities and installations licenced by the EPA. This sensory assessment is used to determine if an odour has potential to cause nuisance.

This will be supplemented with chemical testing as required. In this case, an odour marker compound such as hydrogen sulphide will be used to determine odour nuisance during the dredging works. Hydrogen sulphide

(H₂S) is one of the key odour compounds that can cause odour nuisance impacts. H₂S is a colourless, flammable, extremely hazardous gas with a “rotten egg” odour. It occurs naturally in crude petroleum and natural gas. In addition, H₂S is produced by bacterial breakdown of organic materials and may be released during dredging works if there is organic material disturbed in the bed of the inner Liffey channel.

There are no statutory limits for the protection of human health for H₂S so guidelines are applied. Two thresholds are employed in this assessment – the threshold for odour nuisance and the threshold for health impacts as presented in Table 1-1 (source WHO “Air Quality Guidelines for Europe”, 2000).

Table 1-1 Health and Odour Guidelines H₂S

| Parameter | Averaging Period | Guideline | Source |
|-----------------|------------------|-----------------------|---------------------------|
| Health Effects | 24 hours | 150 µg/m ³ | World Health Organisation |
| Odour Annoyance | 30 minutes | 7 µg/m ³ | World Health Organisation |

1.2.4.3 Combustion Gases/Particulates (such as from road traffic)

In May 2008, all previous European Directives on air quality were replaced with a revised Directive on ambient air quality and cleaner air for Europe (2008/50/EC) which has been transposed into Irish legislation as the Air Quality Standards Regulations 2011 (S.I. 180 of 2011), as amended. These limits as specified in these Regulations are presented in Table 1-2 and represent the main assessment criteria for the operation phase of the MP2 Project.

The 2011 Regulations specify limit values in ambient air for sulphur dioxide (SO₂), lead, benzene, particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO), nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x). These limits are mainly for the protection of human health and are largely based on review of epidemiological studies on the health impacts of these pollutants. In addition, there are limits that apply to the protection of the wider environment (ecosystems and vegetation). All predicted concentrations from the operation of the MP2 Project are compared to the air quality limits to determine the extent of any impact on residential or ecological receptors.

The NRA Guidelines specifies the significance criteria for determining air quality impacts. The predicted increases or decreases from road traffic pollution may be utilised to determine the significance of any impact in relation to the NRA criteria as presented in Table 1-3, Table1-4 and Table 1-5.

Table 1-2 Limits as Specified in Air Quality Standards Regulations 2011 (S.I. 180 of 2011)

| Pollutant | Criteria | Value |
|---|---|---|
| Nitrogen Dioxide | Hourly limit for protection of human health - not to be exceeded more than 18 times/year | 200 µg/m ³ NO ₂ |
| | Annual limit for protection of human health | 40 µg/m ³ NO ₂ |
| | Annual limit for protection of vegetation | 30 µg/m ³ NO + NO ₂ |
| Benzene | Annual limit for protection of human health | 5 µg/m ³ |
| Carbon Monoxide | Maximum daily 8-hour running mean | 10 mg/m ³ |
| Lead | Annual limit for protection of human health | 0.5 µg/m ³ |
| Sulphur Dioxide | Hourly limit for protection of human health - not to be exceeded more than 24 times/year | 350 µg/m ³ |
| | Daily limit for protection of human health - not to be exceeded more than 3 times/year | 125 µg/m ³ |
| | Annual limit for protection of vegetation | 20 µg/m ³ |
| Particulate Matter PM ₁₀ | 24-hour limit for protection of human health - not to be exceeded more than 35 times/year | 50 µg/m ³ PM ₁₀ |
| | Annual limit for protection of human health | 40 µg/m ³ PM ₁₀ |
| Particulate Matter PM _{2.5} | Annual target value for the protection of human health | 20 µg/m ³ PM _{2.5} |

Table 1-3 Definition of Impact Magnitude for Changes in Ambient Air Pollutant Concentrations (Source: NRA, 2011)

| Magnitude of Change | Annual Mean NO ₂ / PM ₁₀ | No of Days with PM ₁₀ Conc greater than 50µg/m ³ | Annual Mean PM |
|---------------------|--|--|--|
| Large | Increase/decrease ≥4µg/m ³ | Increase/decrease >4 days | Increase/decrease ≥2.5µg/m ³ |
| Medium | Increase/decrease 2 - <4µg/m ³ | Increase/decrease 3 of 4 days | Increase/decrease 1.25 - <2.5µg/m ³ |
| Small | Increase/decrease 0.4 - <2µg/m ³ | Increase/decrease 1 or 2 days | Increase/decrease 0.25 - <1.25µg/m ³ |
| Imperceptible | Increase/decrease <0.4µg/m ³ | Increase/decrease <1 day | Increase/decrease <0.25µg/m ³ |

Table 1-4 Air Quality Impact Descriptors for Changes in Annual Mean Nitrogen Dioxide Concentrations at a Receptor (Source: NRA, 2011)

| Absolute Concentration in Relation to Objective/Limit | Changes in Concentration | | |
|---|--------------------------|---------------------|------------------------|
| | Small | Medium | Large |
| Increase with Proposed Project | | | |
| Above Objective/Limit Value with development ($\geq 40\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($\geq 25\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Slight Adverse | Moderate Adverse | Substantial Adverse |
| Just Below Objective/Limit Value with development ($36 < 40\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($22.5 < 25\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Slight Adverse | Moderate Adverse | Moderate Adverse |
| Below Objective/Limit Value with development ($30 < 36\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($18.75 < 22.5\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Negligible | Slight Adverse | Slight Adverse |
| Well Below Objective/Limit Value with development ($< 30\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($< 18.75\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Negligible | Negligible | Slight Adverse |
| Decrease with Proposed Project | | | |
| Above Objective/Limit Value with development ($\geq 40\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($\geq 25\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Slight Beneficial | Moderate Beneficial | Substantial Beneficial |
| Just Below Objective/Limit Value with development ($36 < 40\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($22.5 < 25\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Slight Beneficial | Moderate Beneficial | Moderate Beneficial |
| Below Objective/Limit Value with development ($30 < 36\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($18.75 < 22.5\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Negligible | Slight Beneficial | Slight Beneficial |
| Well Below Objective/Limit Value with development ($< 30\mu\text{g}/\text{m}^3$ of NO_2 or PM_{10}) ($< 18.75\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$) | Negligible | Negligible | Slight Beneficial |

Table 1-5 Air Quality Impact Descriptors for Changes in Number of Days with PM_{10} Concentrations Greater than $50\mu\text{g}/\text{m}^3$ at a Receptor (Source: NRA, 2011)

| Absolute Concentration in Relation to Objective/Limit | Changes in Concentration | | |
|---|--------------------------|---------------------|------------------------|
| | Small | Medium | Large |
| Increase with Proposed Project | | | |
| Above Objective/Limit Value with development (≥ 35 days) | Slight Adverse | Moderate Adverse | Substantial Adverse |
| Just Below Objective/Limit Value with development ($32 < 35$ days) | Slight Adverse | Moderate Adverse | Moderate Adverse |
| Below Objective/Limit Value with development ($26 < 32$ days) | Negligible | Slight Adverse | Slight Adverse |
| Well Below Objective/Limit Value with development (< 26 days) | Negligible | Negligible | Slight Adverse |
| Decrease with Proposed Project | | | |
| Above Objective/Limit Value with development (≥ 35 days) | Slight Beneficial | Moderate Beneficial | Substantial Beneficial |
| Just Below Objective/Limit Value with development ($32 < 35$ days) | Slight Beneficial | Moderate Beneficial | Moderate Beneficial |
| Below Objective/Limit Value with development ($26 < 32$ days) | Negligible | Slight Beneficial | Slight Beneficial |
| Well Below Objective/Limit Value with development (< 26 days) | Negligible | Negligible | Slight Beneficial |

In addition to the statutory limits for the protection of human health listed in Air Quality Standards Regulations (S.I. 180 of 2011), the World Health Organisation (WHO) has published a set of air quality guidelines for the protection of human health. The key publication is the “*WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide, Global update 2005 Summary of risk assessment*”. The WHO guidelines are based on reducing the risk to human health and in some cases the levels differ from the EU statutory limits as these limits are based on balancing health risks with technological feasibility, economic considerations and various other political and social factors in the EU.

The 2005 WHO guidelines are presented in Table 1-6 and illustrate that while the NO₂ levels are analogous to those in S.I. 180 of 2011 (excluding the tolerance levels for the 1-hour averages), the annual average PM₁₀ and PM_{2.5} levels specified by the WHO are half those specified in the legislation. The WHO note that these are the lowest levels at which total, cardiopulmonary and lung cancer mortality have been shown to increase with more than 95% confidence in response to long-term exposure to PM_{2.5}. The EPA has called for movement towards the adoption of these stricter WHO guidelines as the legal standards across Europe and in Ireland.

Table 1-6 WHO 2005 Air Quality Guidelines

| Pollutant | Criteria | Value |
|--|--|--|
| Nitrogen Dioxide (NO ₂) | Hourly level for protection of human health | 200 µg/m ³ NO ₂ |
| | Annual level for protection of human health | 40 µg/m ³ NO ₂ |
| Sulphur Dioxide (SO ₂) | 10 minute level for protection of human health | 500 µg/m ³ |
| | Daily level for protection of human health | 20 µg/m ³ |
| Particulate Matter (PM ₁₀) | 24-hour level for protection of human health | 50 µg/m ³ PM ₁₀ |
| | Annual level for protection of human health | 20 µg/m ³ PM ₁₀ |
| Particulate Matter (PM _{2.5}) | 24-hour level for protection of human health | 25 µg/m ³ PM _{2.5} |
| | Annual level for protection of human health | 10 µg/m ³ PM _{2.5} |

National Climate Change Policy and Targets

CO₂ emissions have a climate warming effect which is global. This is regardless of their rate of release, location or the weather when they are released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Local ambient concentrations of CO₂ are not relevant and there are no limits or thresholds that can be applied to particular sources of carbon emissions – any amount of CO₂ released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO₂ emissions are typically expressed as kilogrammes or tonnes per year, there is a cumulative effect of these emissions because CO₂ emissions have a warming effect which lasts for 100 years or more.

The National Policy Position on Climate Action and Low Carbon Development was published on 23 April 2014. The policy sets a fundamental national objective to achieve transition to a competitive, low-carbon, climate-

resilient and environmentally sustainable economy by 2050. The policy states that GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national strategies – respectively through a series of National Mitigation Plans and a series of National Climate Change Adaptation Frameworks.

The National Policy Position envisages that development of National Mitigation Plans will be guided by a long-term vision of low carbon transition based on the following:

- An aggregate reduction in carbon dioxide (CO₂) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and
- In parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The relevant policy to the MP2 Project is the aggregate reduction emissions of at least 80% from the electricity generation, built environment and transport sector by 2050.

Further to the National Policy Position, the Climate Action and Low Carbon Development Act 2015 was enacted on 10 December 2015. The Climate Action Act sets out the proposed national objective to transition to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050.

On 14 May 2018, the European Council adopted a regulation on greenhouse gas emission reductions - EU effort Sharing Regulation sets out 2030 targets for member states. The starting point is an average of 2016-2018 emissions with binding emission reduction targets of 30% compared to 2005 levels.

Ireland reported total GHG emissions of 61.545 million tonnes CO_{2eq} in 2016, up 2.12 million tonnes CO_{2eq}. When compared to the 1990 baseline, Ireland has increased GHG emissions by 3.6% compared to the 20% reduction target set for Ireland under the EU 2020 strategy.

Transport (which predominately consists of road transport) is currently the second largest contributor of GHG emissions in Ireland (after agriculture) at 19.5%. Greenhouse gas emissions are projected to increase from most sectors. Further growth in emissions from the transport sector is projected in line with a growth in fuel consumption in diesel cars and freight up to 2025. Between 1990 and 2016, the transport sector showed the greatest overall sectoral increase of 139% and increases are linked to economic prosperity with year on year increases observed up to 2007 followed by five years of year on year decrease during the economic downturn. Emissions in the transport sector started to show a year on year increase again in 2014 when compared to the 2013 annual emissions.

1.2.4.4 Potential for Cumulative Impacts

There are a number of other projects within Dublin Port and the general Dublin area that have potential for cumulative and in-combination effects associated with the construction or operation phases of the MP2 Project. These are described in the following paragraphs along with a description of the related developments.

Alexandra Basin Redevelopment (ABR) Project

Works at the ABR Project have been permitted under planning permission (reference 29N.PA0034) and the construction phase of this development are ongoing. The phasing of the works at the ABR Project has been considered as part of the MP2 Project, and elements of the works at the ABR Project fall within the application boundary of the MP2 Project and works will run concurrently. The principal construction activities with potential for cumulative air quality impact taking place in the ongoing construction at the ABR Project include:

- Dredging of contaminated sediment from Alexandra Basin West and the subsequent treatment of same and its recovery through infill in two locations: the disused Graving Dock #2 adjacent to Alexandra Basin West, and Berth 52/53 at the eastern edge of the port area. This will be carried out under an Industrial Emissions Licence from the EPA (Ref. P1022-02). Contaminants in the sediment include heavy metals, TBT, DBT, hydrocarbons, PAHs and PCBs. The treatment which will comprise stabilisation and solidification of the contaminated sediment is proposed to be undertaken on land adjacent to Berth 52/53.
- Dredging of sediments from the navigation channel which will be disposed of at sea under permit from the EPA (Under Dumping at Sea permit S0024-01);

These concurrent construction activities have potential for dust dispersion (including hazardous dusts). A refined dust dispersion model for construction activity has been carried out for the ABR Project and presented in the planning and licence consent applications for this project. The model indicates that there will be no significant impact on human health and the environment from the proposed operations. This is largely as a result of the high moisture content of the dredged material which will naturally mitigate the potential for dust generation. The potential for cumulative dust impact from both projects is considered in this assessment.

Dublin Inland Port

DPC has acquired 44 hectares of land 14 km 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 explicitly zoned to include the activities envisaged by DPC, including road transport depots and transport logistics facilities.

1.3 Existing Environment

1.3.1 Receiving Environment

The site of the MP2 Project is approximately 2km east of Dublin City Centre within the Northern Lands of Dublin Port.

There are sensitive receptors (houses, commercial operations) located in the area and these receptors vary in distance from the proposed development. There is a potential that receptors may experience a change in air quality and the extent of these changes in air quality is identified in this assessment.

The nearest sensitive residential receptors to the south of the proposed development are the residential dwellings on York Road, Pigeon House Road, Ringsend Park and Pembroke Cottages circa 400 metres to the south of the application boundary of the development.

To the north of the development site there is the extensive residential area of Clontarf with the properties along Clontarf Road closest to the application boundary of the development at circa 450 metres.

The nearest commercial receptors to the proposed development include the various operations along Alexandra Road to the north and east of the site. In addition, the 3 Arena Theatre and the Gibson Hotel are the closest receptors to the west of the site. To the south of the site there are a number of office developments on York Road and Thorncastle Road.

Ecological receptors can be affected by deposition of air pollutants such as nitrogen oxides and sulphur dioxide. The nearest sensitive ecological sites to the proposed development are the Grand Canal pNHA (Site Code 2104), the Royal Canal pNHA (Site Code 2103) and South Dublin Bay and River Tolka Estuary SPA (Site Code 4024).

1.3.2 Existing Sources in the Area

The main existing sources of pollution to air quality in the area around Dublin Port are from road traffic, rail traffic, shipping traffic, space heating, industrial emissions and fugitive emissions from fuel/gas storage.

The road network around Dublin Port is centred on the East Wall Road (R131) which connects the East Link Toll Bridge to the south with the Dublin Port Tunnel to the north and forms the western boundary of the port. This road is heavily trafficked, especially at peak times. In addition to this regional road there is a network of internal roads within Dublin Port Estate including the Alexandra Road, the Tolka Quay Road and the Promenade Road which mainly serve HGVs entering and leaving the port.

Irish Rail operates the rail line which runs along Alexandra Road with a number of spurs off this main line. Trains are diesel fired with some localised emissions.

Port operations including shipping emissions (both docked emissions and at sea emissions) and land operations (cranes, trucks, etc.) also give rise to combustion emissions. These emissions are dependent on the fuel employed, the size of the vessel and the duration of the operations.

There are four facilities located in Dublin Port that are licensed by the EPA:

- ESB North Wall Generating Station (IE Licence P0579-03). North Wall generating station has one operating generating unit, an open cycle gas turbine CT5, with a total maximum electricity generating capacity of 115 MW. CT5 is normally fired on natural gas supplied from the national gas network with distillate oil used as a secondary fuel. In 2017 the plant operated for 988 hours only. The plant discharges to atmosphere via one combustion stack (A1-2) and in 2017 the plant discharged a total of 53.707 tonnes of NO_x/NO₂.
- Indaver Waste Transfer Station (Waste Licence W0036-02) which accepts and exports hazardous waste from Ireland to Britain and other European countries for recovery, disposal or treatment. This facility also houses a solvent blending facility which allows for the specific blending of solvents to derive a fuel from this waste. There are no major emissions to atmosphere from this facility.
- Irish Tar & Bitumen Suppliers (IPC Licence P0086-01) who carry out the chemical manufacture of glues, bonding agents and adhesive. The plant has two main emissions to atmosphere each of which discharge NO_x, SO_x and CO.
- Dublin Waste to Energy Limited (IE Licence Register W0232-01) who hold a licence to burn up to 600,000 tonnes of non-hazardous waste and to recover energy in the form of steam and electricity for export to the national grid. There are two main emission points from this facility, one for each incinerator line that both discharge a series of gaseous and particulate combustion emissions through twin stacks at a height of 105 metres. In 2017 this facility reported the following total emissions:

| | |
|--------------------|------------|
| Arsenic | 0.0 kg |
| Cadmium | 2.0 kg |
| Mercury | 2.0 kg |
| Zinc | 2.0 kg |
| Dioxins and Furans | 0.002 kg |
| Chlorine | 67 kg |
| Fluorine | 121 kg |
| Particulates | 315 kg |
| Carbon Monoxide | 10,595 kg |
| Non-methane VOCs | 1294 kg |
| NO _x | 230,785 kg |
| SO _x | 2,467 kg |

As the Dublin conurbation is subject to a ban on smoky coal under the Air Pollution Act, 1987 (Marketing, Sale and Distribution of Fuels) Regulations (1998-2011), the space heating in the area (both residential and commercial) will be based on gas, oil, biomass and non-bituminous coals. Consequently the levels from space heating in the area are not elevated.

1.3.3 Seveso Sites

In addition to the EPA licensed facilities, there are a number Seveso sites located in this part of Dublin Port as regulated under the *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015)*. These Seveso sites store large volumes of solvent, fuel or gas and hence have the potential to have impacts to atmosphere through fugitive emissions as opposed to scheduled emissions through a stack. The Seveso sites located in this area of Dublin Port are listed in Table 1-7.

Table 1-7 Seveso Sites at Dublin Port

| Site | Seveso Tier | Site Nature |
|--|-------------|-----------------|
| Topaz Energy Limited Terminal 1, Alexandra Road, Dublin Port, Dublin 1 | Lower | Fuel Storage |
| Topaz Energy Limited (Yard 3) | Lower | Fuel Storage |
| Calor Teoranta | Upper | Gas Storage |
| Fareplay Energy Ltd (Fareplay Terminal Dublin, Promenade Road, Dublin Port, Dublin 3) | Upper | Fuel Storage |
| Indaver | Upper | Solvent Storage |
| Tedcastles Oil Products (Yard 2) | Upper | Fuel Storage |
| Valero Energy (Ireland) Ltd. (Dublin Joint Fuels Terminal, Alexandra Road, Dublin Port, Dublin 1) | Upper | Fuel Storage |

1.3.4 Baseline Air Quality

Air quality legislation in Ireland deals with air quality by means of "zones" based on population. For Ireland, four zones are defined and the main areas defined in each zone are:

- Zone A: Dublin Conurbation.
- Zone B: Cork Conurbation.
- Zone C: Other cities and large towns comprising Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Letterkenny, Celbridge, Newbridge, Mullingar, Balbriggan, Greystones, Leixlip and Portlaoise.
- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

The MP2 Project is located in Dublin 1 in the jurisdiction of Dublin City Council therefore the site lies within EPA Air Quality Zone A (Dublin Conurbation). The EPA air quality monitoring network for Zone A has been reviewed and suitable representative data is presented to identify the background air quality in the area of the MP2 Project.

A summary of the EPA monitoring carried out in Zone A (Dublin Conurbation) is presented in the following sections. The EPA monitoring network in Dublin, includes the local authority networks, a number of city centre locations (e.g. Coleraine Street, Winetavern Street, etc.) as well as suburban stations (e.g. Rathmines, Blanchardstown, etc.).

There are a wide number of stations in the Dublin area tested for various pollutants and there is variation each year regarding the locations and pollutants monitored at these locations. Presented in this section are the annual averages of all stations in Zone A. The averages are considered representative of the wider Dublin area and the site of the MP2 Project.

1.3.4.1 Nitrogen Dioxide (NO₂)

Nitrogen Dioxide (NO₂) is classed as both a primary and a secondary pollutant. As a primary pollutant NO₂ is emitted from all combustion processes (such as a gas/oil fired boiler or a car engine). As a secondary pollutant NO₂ is derived from atmospheric reactions of pollutants that are themselves, derived mainly from traffic sources. The results of the EPA Dublin network monitoring for the period 2002 to 2017 are presented in Table 1-8. The average results indicate compliance with the limits for the protection of human health (Table 1-2) with the trend indicating a generally reducing ambient level over the fifteen year period in Dublin. This compliance level is to some extent a result of Ireland's location in Western Europe where there is a strong prevailing westerly wind, high rainfall levels and low sunshine levels that allows for the rapid dispersion of pollutants and generally good air quality. In addition, at EU level there is legislation driven improvements to vehicles in terms of both engine performance and fuel specification (known as the Auto Oil Program) which has also helped in the reduction in pollutants over the past fifteen years.

Table 1-8 Results of NO₂ monitoring carried out by the EPA in Zone A

| Year | Annual Mean NO ₂ (µg/m ³) | Annual No. of NO ₂ Values Exceeding Hourly Limit for Protection of Human Health >200µg/m ³ | Annual Mean NO _x (µg/m ³) |
|---------------|--|--|--|
| 2002 | 29 | 4 | - |
| 2003 | 34 | 2 | - |
| 2004 | 28 | 0 | - |
| 2005 | 28 | 1 | - |
| 2006 | 28 | 0 | - |
| 2007 | 28 | 0 | - |
| 2008 | 25 | 1 | 51 |
| 2009 | 28 | 2 | 55 |
| 2010 | 26 | 0 | 46 |
| 2011 | 25 | 1 | 46 |
| 2012 | 23 | 1 | 42 |
| 2013 | 19 | 1 | 33 |
| 2014 | 19 | 6 | 33 |
| 2015 | 20 | 0 | 34 |
| 2016 | 24 | 1 | 43 |
| 2017 | 21 | 1 | 38 |
| Limit | 40 Annual Limit for Protection of Human Health | 18 No of samples not to exceed the year) | 30 (Annual limit for protection of vegetation) |
| WHO Guideline | 40 | - | - |

In addition to the EPA monitoring, DPC carries out a series of ambient air quality monitoring tests within the environs of the port to monitor ongoing trends and issues related to the port operation. The results of the monitoring of nitrogen dioxide (NO₂) in the period 2014 to 2018 are presented in Table 1-9. Monitoring was undertaken using diffusion tubes at a series of 18 monitoring locations as shown in Figure 1-1.

The table illustrates that there were a number of breaches in the EU annual average limit value at a number of monitoring stations (noted in yellow) in all years monitored. With the exception of one of these (A14 at the R131), all others where elevated levels were detected were within the footprint of the Dublin Port operation north of the Liffey and all are located in close proximity to the main port road network. The predominant source of this NO₂ in the port is road traffic and in particular the high volume of HGVs. It is noted that the ESB Generating plant is also a potentially significant source of NO_x with circa 54 tonnes emitted in 2017.

The elevated levels at A14, which is close to the residential areas of York Road and Pigeon House Road, are likely to be related to road traffic on the R131 and East Link Toll Bridge. Road traffic at lower speeds in proximity to the toll barrier will generate higher emissions than traffic operating at more efficient speeds.

At the other four locations south of the Liffey (A15 to A18) the annual averages are more in line with the levels reported by the EPA in Dublin City Centre (Winetavern Street and Coleraine Street). These locations are more representative of background Dublin air as these are not directly adjacent to major roads within the port.

Table 1-9 Results of ambient NO₂ monitoring undertaken in Dublin Port

| Ref. | Location | Average NO ₂ (µg/m ³) | | | |
|--|--|--|-------|-------|-------|
| | | 2014/2015 | 2016 | 2017 | 2018 |
| A1 | Junction of Promenade Road and Bond Road | 50.28 | 38.85 | 47.84 | 40.21 |
| A2 | Junction of Promenade Road and 1 Branch Road South | 48.44 | 30.97 | 30.54 | 29.85 |
| A3 | North east perimeter of the Port | 41.11 | 27.23 | 42.83 | 28.68 |
| A4 | Alexandra Road (Port entrance) | 52.29 | 45.55 | 42.67 | 46.09 |
| A5 | Junction of Alexandra Road and 3 Branch Road South | 52.95 | 38.24 | 38.26 | 42.06 |
| A6 | Junction of Alexandra Road and 2 Branch Road North | 43.63 | 37.93 | 41.23 | 37.39 |
| A7 | Junction of Alexandra Road and Terminal Road North | 55.38 | 32.99 | 47.45 | 35.60 |
| A8 | Alexandra Road Extension (eastern boundary of Port) | 47.05 | 31.35 | 47.74 | 31.77 |
| A9 | Port lands adjacent to Tom Clarke Bridge | 47.28 | 44.40 | 53.18 | 39.45 |
| A10 | Ocean Pier | 45.17 | 36.03 | 41.22 | 31.07 |
| A11 | Breakwater Road South | 44.11 | 37.20 | 40.96 | 35.66 |
| A12 | Adjacent to Berth 52 | 41.55 | 25.20 | 44.27 | 31.33 |
| A13 | Alexandra Road Extension (eastern boundary of Port) | 48.72 | 30.30 | 43.63 | 31.43 |
| A14 | R131 (East Link Toll Booth) | 48.26 | 36.85 | 44.08 | 41.41 |
| A15 | Southern shore of Estuary (adjacent to Hammond Lane) | 35.12 | 29.05 | 27.66 | 29.73 |
| A16 | South Bank Road | 30.65 | 25.58 | 30.70 | 28.49 |
| A17 | Coast road at Poolbeg Beach | 30.16 | 20.17 | 28.02 | 19.79 |
| A18 | Coast road at Sean O'Casey Park | 22.36 | 20.22 | 19.45 | 17.94 |
| Annual Average Limit for the Protection of Human Health | | 40 | | | |
| WHO Guideline | | 40 | | | |

1.3.4.2 Particulate Matter (PM₁₀ and PM_{2.5})

Particulate Matter (PM₁₀ and PM_{2.5}) may be emitted as a primary pollutant from road vehicle exhausts, which is the main source in urban areas. In rural areas, sources will include traffic, agricultural activities and natural processes such as sea salt aerosol. Also point sources such as combustion, i.e. domestic fires, industrial boilers etc. are primary sources of PM₁₀. PM₁₀ may also be formed as secondary pollutants from the condensation or reaction of chemical vapours in the atmosphere. Particulate Matter (PM_{2.5}) has similar effects on health as PM₁₀, however, PM_{2.5} is a better indicator of anthropogenic (man-made) emissions. The results of the EPA network for the period 2002 to 2017 are presented in Table 1-10. As with NO_x, the PM₁₀ and PM_{2.5} data for Zone A shows compliance with the human health limits presented in Table 1-2. All sites in the Dublin area have been in full compliance with the human health limits for the past fifteen years and show a slight gradual decrease in annual emissions which is due to the legislation driven improvements in fuel and engine technology. It is also noted that since 2012 the aggregated Zone A data also shows levels below the WHO guidelines for air quality (Table 1-6) which are significantly lower than the statutory limits.

Table 1-10 Results of PM₁₀ and PM_{2.5} monitoring carried out by the EPA in Zone A

| Year | Annual Mean PM ₁₀ (µg/m ³) | Annual no. of PM ₁₀ Values Exceeding 24 Hour Limit for Protection of Human Health >50µg/m ³ | Annual Mean PM _{2.5} (µg/m ³) |
|----------------------|---|---|--|
| 2002 | 23 | 17 | - |
| 2003 | 23 | 25 | - |
| 2004 | 18 | 16 | - |
| 2005 | 16 | 5 | - |
| 2006 | 18 | 9 | - |
| 2007 | 15 | 5 | - |
| 2008 | 16 | 3 | 16 |
| 2009 | 16 | 3 | 10 |
| 2010 | 16 | 4 | 11 |
| 2011 | 15 | 9 | 11 |
| 2012 | 14 | 2 | 10 |
| 2013 | 17 | 56 | 10 |
| 2014 | 15 | 22 | 8 |
| 2015 | 14 | 39 | 6 |
| 2016 | 14 | 9 | 9 |
| 2017 | 12 | 20 | 8 |
| Limit | 40 (Annual Limit for protection of human health) | 35 (No of Samples not to exceed per year) | 25 (Annual target value for the protection of human health) |
| WHO Guideline | 20 | - | 10 |

Monitoring for fine particulate matter (PM₁₀ and PM_{2.5}) was undertaken by DPC at two locations within the port since 2014 and the annual average results of this monitoring are shown in Table 1-11. The results show that the levels of both pollutants within the port are below the limits for the protection of human health (refer Table 1-2) but are typically above the corresponding WHO guidelines (refer Table 1-6). However, the levels within the port are markedly higher than the EPA recorded levels in the greater Dublin area (Zone A) as shown in Table 1-10. This is likely as a direct result of the high volumes of diesel powered vehicles and HGVs operating within the port that are known to be higher emissions of particulate matter than the wider vehicle fleet in the public roads across Dublin. Sea salt aerosol would also be significant at coastal areas such as at the port. The ESB generating station would not be a significant source as particulate emissions from natural gas combustion are negligible.

Table 1-11 Results of ambient PM₁₀ and PM_{2.5} monitoring undertaken in Dublin Port

| Ref. | Location | Average PM ₁₀ (µg/m ³) | | | | Average PM _{2.5} (µg/m ³) | | | |
|---|--|---|------|------|------|--|------|------|------|
| | | 2014/15 | 2016 | 2017 | 2018 | 2014/15 | 2016 | 2017 | 2018 |
| D5 | Breakwater Road South | 26.4 | 26.4 | 24.8 | 27.9 | 17.4 | 14.0 | 6.8 | 12.2 |
| D6 | Port lands adjacent to Tom Clarke Bridge | 28.2 | 31.4 | 34.6 | 29.8 | 16.9 | 18.3 | 11.0 | 11.4 |
| Annual Average Limit for the Protection of Human Health | | 40 | | | | 20 | | | |
| WHO Guideline | | 20 | | | | 10 | | | |

1.3.4.3 Sulphur Dioxide (SO₂)

The largest sources of SO₂ emissions are as a primary pollutant from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO₂ emissions include industrial processes such as extracting metal from ore, and the burning of high sulphur containing fuels by locomotives, large ships, and non-road equipment. SO₂ is linked with a number of adverse effects on the respiratory system.

The levels in SO₂ in Dublin over the period 2002 to 2017 are presented in Table 1-12. The levels are low and less than 20% of the limit for the protection of human health (refer Table 1-2). These levels are decreasing annually and are low largely as a result of the ban on smoky coal under the Air Pollution Act, 1987 (Marketing, Sale and Distribution of Fuels) Regulations (1998-2011).

In addition, the sulphur content of fuels for road, non-road and marine fuels are heavily regulated through the following:

- SI 155 of 2011 - European Communities Act, 1972 (Environmental Specifications for Petrol, Diesel Fuels and Gas Oils for use by non-road mobile machinery, including inland waterway vessels, agricultural and forestry tractors, and recreational craft) Regulations 2011.
- SI No.119 of 2008 - Sulphur Content of Heavy Fuel Oil, Gas Oil and Marine Fuels.
- SI 156 of 2011 - European Communities Act 1972 (Sulphur Content of Heavy Fuel Oil, Gas Oil, and Marine Fuels) (Amendment) Regulations 2011.

Table 1-12 Results of SO₂ monitoring carried out by the EPA in Zone A

| Year | Annual Mean SO ₂ (µg/m ³) | Annual no. of SO ₂ Values Exceeding 24 Hour Limit for Protection of Human Health >125µg/m ³ | Annual no. of SO ₂ Values Exceeding 1 Hour Limit for Protection of Human Health >350µg/m ³ |
|-------|--|---|--|
| 2002 | 6.7 | 0 | 0 |
| 2003 | 7.4 | 0 | 0 |
| 2004 | 3.3 | 0 | 0 |
| 2005 | 3.2 | 0 | 0 |
| 2006 | 3.2 | 0 | 0 |
| 2007 | 2.5 | 0 | 0 |
| 2008 | 2.0 | 0 | 0 |
| 2009 | 2.7 | 0 | 0 |
| 2010 | 2.5 | 0 | 0 |
| 2011 | 2.4 | 0 | 0 |
| 2012 | 2.0 | 0 | 0 |
| 2013 | 2.4 | 0 | 0 |
| 2014 | 3.6 | 0 | 0 |
| 2015 | 1.6 | 0 | 0 |
| 2016 | 1.2 | 0 | 0 |
| 2017 | 1.7 | 0 | 0 |
| Limit | 20 (Annual limit for the protection of vegetation) | 3 (No of samples not to exceed per year) | 24 (No of samples not to exceed per year) |

The results of the DPC monitoring of sulphur dioxide (SO₂) in the period 2014 to 2018 are presented in Table 1-13. Monitoring was undertaken using diffusion tubes at a series of 18 monitoring locations as shown in Figure 1-1. Unlike the NO₂ data, the SO₂ data around the port shows that all levels are well below the EU limit for the protection of ecosystems (refer Table 1-2). This is largely as a result of recent statutory driven reductions in the sulphur content of road fuels, shipping fuels and some home heating fuels. As such, there is a general downward trend in ambient SO₂ in recent years.

There is also less spatial variation in the data with a largely uniform dataset. The stations at the coast along the mouth of the estuary (A11, A12, A13, A15 and A17) show slightly higher levels than the others indicating a potential source of SO₂ within this area.

There are no major sources of SO₂ associated with the port given the above restrictions on fuel specification and type. While there is a generating station adjacent to the site, this is powered by natural gas with low sulphur emissions.

It is notable that the levels in the port area are generally higher than those recorded by the EPA in Dublin City Centre as shown in Table 1-12.

Table 1-13 Results of ambient SO₂ monitoring undertaken in Dublin Port

| Ref. | Location | Average SO ₂ (µg/m ³) | | | |
|--|--|--|------|------|------|
| | | 2014/2015 | 2016 | 2017 | 2018 |
| A1 | Junction of Promenade Road and Bond Road | 1.85 | 0.98 | 1.07 | 1.62 |
| A2 | Junction of Promenade Road and 1 Branch Road South | 1.78 | 1.84 | 4.34 | 2.42 |
| A3 | North east perimeter of the Port | 2.56 | 2.41 | 2.55 | 2.59 |
| A4 | Alexandra Road (Port entrance) | 1.69 | 2.26 | 1.17 | 2.30 |
| A5 | Junction of Alexandra Road and 3 Branch Road South | 2.66 | 3.07 | 1.56 | 3.82 |
| A6 | Junction of Alexandra Road and 2 Branch Road North | 3.78 | 4.04 | 4.03 | 6.52 |
| A7 | Junction of Alexandra Road and Terminal Road North | 4.33 | 3.18 | 3.55 | 4.17 |
| A8 | Alexandra Road Extension (eastern boundary of Port) | 2.40 | 2.52 | 3.29 | 2.85 |
| A9 | Port lands adjacent to Tom Clarke Bridge | 1.46 | 2.34 | 1.10 | 2.24 |
| A10 | Ocean Pier | 3.28 | 2.59 | 2.07 | 3.32 |
| A11 | Breakwater Road South | 5.19 | 3.45 | 3.19 | 5.55 |
| A12 | Adjacent to Berth 52 | 5.07 | 3.34 | 1.53 | 1.74 |
| A13 | Alexandra Road Extension (eastern boundary of Port) | 5.87 | 2.00 | 2.64 | 3.19 |
| 2.08A14 2.34 | R131 (East Link Toll Booth) | 1.81 | 1.77 | 1.17 | 2.12 |
| A151.77 | Southern shore of Estuary (adjacent to Hammond Lane) | 3.59 | 2.34 | 1.32 | 2.68 |
| A16 | South Bank Road | 1.31 | 1.77 | 1.06 | 2.54 |
| A17 | Coast road at Poolbeg Beach | 4.84 | 2.08 | 4.27 | 3.19 |
| A18 | Coast road at Sean O'Casey Park | 1.25 | 1.34 | 1.19 | 1.67 |
| Annual Average Limit for the Protection of Human Health | | 20 | | | |

1.3.4.4 Carbon Monoxide (CO)

Carbon monoxide is produced from the partial oxidation of carbon-containing compounds (i.e. organic fuels such as coal, oil, petrol, diesel, wood, etc.) during the combustion process. CO forms when there is not enough oxygen to produce carbon dioxide (CO₂). As such, CO is a primary pollutant from all combustion process including vehicle exhausts, shipping exhausts, domestic heating, etc. The extent of CO emissions depends on the fuel type and the combustion conditions. Once inhaled, CO is quickly absorbed into the bloodstream from the lungs. Then it combines with haemoglobin in the blood to form carboxyhaemoglobin. This reduces the ability of the blood to carry oxygen around the body and it robs the heart, brain and other vital organs of oxygen.

Annual average levels of CO in Dublin are presented in Table 1-14. Recent levels are less than 10% of the limit value (refer Table 1-2) and show a gradual decrease annually. CO will be emitted by the natural gas generating station in Dublin Port as well as from the road/rail/shipping activities.

Table 1-14 Results of CO monitoring carried out by the EPA in Zone A

| Year | Annual Mean CO (mg/m ³) | Annual no. of CO Values Exceeding Hourly Limit for Protection of Human Health >10mg/m ³ |
|-------|--|--|
| 2002 | 0.7 | 0 |
| 2003 | 0.4 | 0 |
| 2004 | 0.6 | 0 |
| 2005 | 0.6 | 0 |
| 2006 | 0.5 | 0 |
| 2007 | 0.3 | 0 |
| 2008 | 0.4 | 0 |
| 2009 | 0.3 | 0 |
| 2010 | 0.3 | 0 |
| 2011 | 0.3 | 0 |
| 2012 | 0.4 | 0 |
| 2013 | 0.3 | 0 |
| 2014 | 0.3 | 0 |
| 2015 | 0.2 | 0 |
| 2016 | 0.3 | 0 |
| 2017 | 0.3 | 0 |
| Limit | 10 (8-hour limit for protection of human health) | No of Samples not to exceed per year |

1.3.4.5 Volatile Organic Compounds (VOCs)

VOCs such as benzene (a known human carcinogen) are emitted directly from petrol fuelled vehicles. Other VOCs are also emitted from petrol exhausts (toluene, ethylbenzene, xylenes). VOCs have varying sources and properties and only benzene has a limit for the protection of human health in the legislation (Table 1-2). The EPA monitor for benzene and other VOCs in Rathmines and these results are presented in Table 1-15. Benzene levels in Dublin are low and well below the limit for the protection of human health (refer Table 1-2) and have remained low for the last ten years. Levels of the other VOCs in Dublin have also remained stable in the last seven years but there is no limit designated as the standard for the protection of human health.

Existing sources of VOCs from the current operations at Dublin Port include road/rail and shipping traffic as well as fuel/solvent handling and storage from the adjoining Seveso sites.

Table 1-15 Results of VOC monitoring carried out by the EPA in Zone A

| Year | Annual Mean Benzene ($\mu\text{g}/\text{m}^3$) | Annual Mean Toluene ($\mu\text{g}/\text{m}^3$) | Annual Mean Ethylbenzene ($\mu\text{g}/\text{m}^3$) | Annual Mean m/p-Xylene ($\mu\text{g}/\text{m}^3$) | Annual Mean o-Xylene ($\mu\text{g}/\text{m}^3$) |
|-------|--|--|---|---|---|
| 2002 | 2.5 | - | - | - | - |
| 2003 | 1.1 | - | - | - | - |
| 2004 | 1.3 | - | - | - | - |
| 2005 | 0.5 | 1.2 | 0.1 | 0.4 | 0.1 |
| 2006 | 2.7 | 6.5 | 0.8 | 2.6 | 0.7 |
| 2007 | 2.8 | 5.1 | 0.5 | 1.4 | 0.4 |
| 2008 | 0.9 | 6.1 | 0.3 | 0.5 | 0.2 |
| 2009 | 0.8 | 2.7 | - | 3.0 | 0.4 |
| 2010 | 0.8 | 2.3 | 0.3 | 0.5 | 0.1 |
| 2011 | 1.6 | 3.6 | 0.4 | 1.5 | 0.5 |
| 2012 | 1.2 | 3.5 | 0.5 | 1.8 | 0.4 |
| 2013 | 0.94 | 1.9 | 0.31 | 1.48 | 0.35 |
| 2014 | 0.94 | 2.07 | 0.28 | 1.61 | 0.41 |
| 2015 | 0.92 | 1.88 | 0.16 | 0.8 | 0.22 |
| 2016 | 1.01 | 2.07 | 0.20 | 0.93 | 0.22 |
| 2017 | 0.92 | 2.30 | 0.22 | 1.29 | 0.29 |
| Limit | 5 (Annual limit for protection of human health) | NA | NA | NA | NA |

1.3.4.6 General Dusts

Monitoring for dusts (general particulate matter) was undertaken by DPC at four locations within the port between 2014 and 2018 and the results of this monitoring are shown in Table 1-16. The results of the monitoring in the port area north of the Liffey (D1, D2 and D4) show levels below the TA Luft Guideline for dust nuisance which would indicate that dust levels within the port are not currently causing an adverse impact.

The location on the south of the estuary (D3) shows a level considerably higher than the guideline in 2014/2015 indicating a potential adverse dust impact in this area. It is noted that the Hammond Lane and Ecocem sites are in close proximity to this monitoring station and these operations may contribute to the dust levels recorded. It is noted that these levels have reduced significantly through the monitoring period and show compliance in 2018.

Table 1-16 Results of dust deposition monitoring undertaken in Dublin Port from 2014 to 2018

| Ref. | Location | Annual Average Dust Deposition Rate (mg/m ² /day) | | | |
|--|--|--|------|------|------|
| | | 2014/2015 | 2016 | 2017 | 2018 |
| D1 | 3 Branch Road South | 221 | 241 | 266 | 176 |
| D2 | Ocean Pier | 220 | 280 | 287 | 286 |
| D3 | Southern shore of Estuary | 528 | 483 | 404 | 325 |
| D4 | Junction of Alexandra Road and 2 Branch Road North | 292 | 301 | 300 | 257 |
| TA Luft Guideline for non-hazardous dusts | | 350 | | | |

1.3.5 ‘Do-Nothing’ Scenario

The baseline air quality trends shown for the Dublin area from 2002 to 2017 presented in Section 1.2 show a gradual decline for all pollutants on an annual basis. These gradual decreases are based on the implementation of a series of national and EU driven policies and legislation on emissions from road traffic, industrial emissions and space heating. The EPA reports do highlight the main challenges of reducing air pollution from key sources such as particulate matter emissions from solid fuel burning (e.g. peat, coal and wood) in the residential sector and NOx emissions from vehicles in the transport sector.

In the future, the Government’s proposed ‘National Clean Air Strategy’ for Ireland is expected to propose further policy solutions to address the major public health and environmental challenges posed by air pollution to Ireland which is anticipated to enable the further improvements in ambient air quality with the objective of achieving compliance with the WHO Guidelines.

Ongoing reductions in tailpipe emissions from the Auto Oil program will lead to a continual reduction in emissions per fleet vehicle in Ireland as newer Euro 6/VI vehicle, hybrids and electric vehicles replace older vehicles. This decrease may be offset by the increased number of vehicles in the fleet and/or a reduction in the efficiency on the road network.

Industrial, energy and space heating emissions are expected to show a gradual decrease through greater regulation from a range of EU and national policies, targets and strategies on emissions reductions and demand management.

Within the Dublin Port area, the ambient air quality levels presented for the period 2015 to 2018 show a trend of a largely stable baseline with little or no significant increase/decrease in ambient air quality levels monitored. It is noted that DPC has been granted planning permission for works to the port's private internal road network which includes works on public roads at East Wall Road, Bond Road and Alfie Byrne Road consisting of construction of new roads and enhancements to existing roads within the Dublin Port estate north of River Liffey. This development is currently being implemented by DPC and has been designed to improve efficiencies in traffic movement within the port and therefore reduce congestion. This increased efficiency and reduced congestion may result in a potential reduction in emissions from road traffic within the port in future years.

In addition, DPC is currently developing an initiative with the haulier companies operating in the port to provide the necessary Compressed Natural Gas (CNG) fuelling infrastructure across the port to facilitate the future trend for HGVs to change fuel from diesel to CNG. CNG emissions are significantly lower than the corresponding diesel fuelled vehicles and this represents a potential significant emissions reduction strategy. The European Environment Agency 'EMEP/EEA air pollutant emission inventory guidebook 2016' (Update Jul. 2018), published a series of default emission factors for various sources and Table 1-17 shows the published emission factors of key pollutants from diesel and CNG fuelled heavy vehicles. The table illustrates the significant reduction in emission per kg of fuel used with CNG relative to diesel with a 61% reduction in NO_x, a 98% reduction in PM and a more modest reduction in greenhouse gases (CO₂) at 13%.

Table 1-17 Tier 1 Emission Factors for Diesel and CNG from HGVs

| Pollutant | Diesel | CNG |
|------------------------------|--------|-------|
| NO _x (g/kg fuel) | 33.37 | 13.00 |
| PM (g/kg fuel) | 0.94 | 0.02 |
| CO ₂ (kg/kg fuel) | 3.169 | 2.743 |

In the event that this scheme is a success with a significant uptake of the CNG fuel by hauliers, then the existing port baseline air quality will likely result in a significant decrease in NO_x and PM levels measured at the port.

In the absence of the MP2 Project, the evolving baseline DPC carbon footprint presented in Section 1.3.4 is predicted to continue with a general increase on transport related emissions as a result of increased throughput associated with the port Masterplan. As shown in Table 1-17, the use of CNG in haulage vehicles can result in a slight reduction in CO₂ emissions per vehicle the resultant impact of this measure will depend on the uptake of hauliers for this fuel.

DPC has proposed port specific mitigation with a view to reducing emissions while vessels are berthed at the port. DPC propose to provide shore to ship power (SSP) on berths 52 and 53 for vessels at these berths. This will facilitate powering of the berthed vessels by the national grid which will allow the vessel to turn off their main and auxiliary engines for the duration of berthing. This reduces direct GHG emissions from the ships while in

port. These emissions are not currently accounted for in the carbon footprint presented in Table 1-17. As a result of this measure, the electricity use at the port will increase resulting in a net increase in the electricity generation emissions recorded in the footprint. However, it is important to note that the net impact will be positive in terms of climate whereby existing shipping emission in port will be offset through the use of electricity. Under the EU Renewable Energy Directive (2009/28/EC), Ireland has committed to meet a national target through 40% renewable electricity by 2010 (with 2030 and 2050 targets to be agreed). With the decarbonisation of the electricity generation market, the use of electrical SSP will present a net positive relative to the use of ship engines. While this measure will lead to an increase in the baseline footprint presented there would be a slight net reduction in emissions on a national level.

In terms of the evolving national baseline, the EPA estimate emissions to 2035 using two scenarios as follows:-

- “With Existing Measures” - scenario assumes that no additional policies and measures, beyond those already in place by the end of 2016 (latest national greenhouse gas emission inventory), are implemented.
- “With Additional Measures” –scenario assumes implementation of the With Measures scenario in addition to progressing of renewable and energy efficiency targets for 2020.

The latest EPA projections (May 2018) indicate that under the “With Measures” scenario, transport emissions are projected to increase by 18% in the period 2017 to 2020 to 14.55 Mt CO_{2eq} and 20% over the period 2017-2030 to 14.75 Mt CO_{2eq}.

Under the “With Additional Measures” scenario, transport emissions are projected to increase by 17% over the period 2017 – 2020 to 14.39 Mt CO_{2eq} and a similar increase over the period 2017-2030 to 14.32 Mt CO_{2eq}

Based on these trends, the transport sector is the one facing the greatest challenge in achieving the emissions reductions set out in the National Policy Position.

1.4 Impact Assessment

1.4.1 Construction Stage

1.4.1.1 Construction Dust

In accordance with the NRA Guidelines, where there are construction activities at a development site, there is a risk that dust may cause an impact at sensitive receptors in close proximity to the source of the dust generated. These distances are presented in Table 1-18 (source NRA Guidelines, May 2011 Revision).

Table 1-18 NRA Assessment Criteria for the Impact of Dust Emissions from Construction Activities, (with standard mitigation in place)

| Source | | Potential Distance for Significant Effects (Distance from Source) | | |
|--------|-------------|--|------------------|--------------------|
| Scale | Description | Soiling | PM ₁₀ | Vegetation Effects |

| | | | | |
|----------|--|------|-----|-----|
| Major | Large Construction sites, with high use of haul routes. | 100m | 25m | 25m |
| Moderate | Moderate Construction sites, with moderate use of haul routes. | 50m | 15m | 15m |
| Minor | Minor Construction sites, with minor use of haul routes. | 25m | 10m | 10m |

It is important to note at the outset that one of the principal factors affecting dust generation and dust deposition relates to moisture content. Moisture increases the mass of a dust particle meaning particles are less friable and hence, less prone to dust dispersion. In most construction projects, the principal means of dust suppression is through maintaining a high moisture level on dust particles. In the case of the proposed works at Dublin Port, all dredged material will inherently have high moisture content and hence a lower risk of dust impact.

The proposed construction phase is presented in Section 3 of this NIS and includes details of the main tasks and durations. In summary, the following are the main activities with relevance to air quality and dust impact:

- Demolition of Terminal 2 building, Terminal 5 building, Terminal 5 Check-in, Terminal 5 Sheds (3 no.), Terminal 1 Car Check in booths.
- Dredging of sediments from the navigation channel which will be disposed of at sea under permit from the EPA.

The dredging operations are considered very low risk for dust impacts given that this material will have very high moisture content (circa 50% by weight). This is also the case for the transport of this material. As such, these operations are considered to have negligible dust impacts and are not considered further in this assessment.

The area of the construction site of the MP2 Project is categorised as “major” and hence, as per the NRA Guidelines, any receptor within 100 metres of the site has the potential for adverse effects from construction dusts. Given the nature of the port and the distance to and sensitive receptors, there are no properties located within this impact zone. As a consequence, construction dust from the MP2 Project will be “**negligible**” for the duration of the works.

The dispersion model presented in the EIS for the ABR Project illustrated that the operation of the dredge spoil treatment facility, coupled with infilling and general site construction for that project will not have an adverse impact on sensitive receptors in the area around Dublin Port. All concentrations of dust and metals will remain within the relevant limits and guidelines for the protection of human health. In all cases the results showed only a marginal increase on the existing background levels in the area as a result of these works.

Both of the construction phases of the MP2 Project and ABR Project will run concurrently and hence there is potential for cumulative impact relating to construction dust. However, given the marginal to negligible impacts presented in both analyses, the cumulative impact of construction dust is considered “**negligible**”. Furthermore, DPC are required to carry out dust deposition monitoring within the port to demonstrate compliance with the TA Luft Guideline (350mg/m²/day) under Schedule B.3 of the IE Licence (P1022-01).

1.4.1.2 Construction Odour

There is a relatively low potential for odour generation and nuisance to occur during the construction phase. The potential exists where decayed organic material has the potential to release sulphurous compounds (such as H₂S) or where solvent contamination is uncovered.

Both of these sources will potentially be released under water during the dredging operations. Low levels of organic solvents are predicted in the dredged material and any vapour released will quickly condense into the liquid phase and either dissolve in the water (such as water soluble solvents such as alcohols) or form a residue on the water surface where not water soluble (such as aromatics). In both cases the impact to air quality and climate is considered “**negligible**”.

1.4.1.3 Construction Traffic

Construction traffic will arrive and depart the port via the national road network (M1, East Wall Road, etc.). All HGV movements will be in compliance with the Dublin City Council HGV Management Strategy. Within the North Port Estate, traffic will be routed through the existing road network to reach the MP2 Project application boundary. Traffic within the proposed site will be diverted in a phased manner to ensure the existing facilities at Terminal 1 and Terminal 2 remain operational with minimal impact.

An indicative Construction Programme for the MP2 Project (as shown in Section 3 of the NIS) has been used to determine the anticipated construction traffic on the road network. The peak HGV traffic volume will occur Q3 2030. There will be an average daily traffic over this period of 57 HGV movements per day, based on a 5-day working week. The peak week within the proposed construction stage will be Q4 2030 where on average there will be 81 HGV movements per day. This would incorporate a peak of 17 HGV movements each way per hour between 7am and 8 am. Both the DMRB and the NRA Guidelines state that air quality impacts from changes in road traffic volumes may be significant and should be assessed where the traffic volumes show an increase or decrease in traffic emissions of 5-10% or more. The traffic analysis indicates that current traffic volumes on the East Wall Road are 15,622 AADT and hence the 81 traffic movements equates to circa 1% of the East Wall Road volumes. In this regard, employing the DMRB/NRA criteria the construction traffic volumes will not be significant and the resultant air quality impact from construction traffic is “**negligible**”.

1.4.2 Operation Phase

1.4.2.1 Operation Phase Road Traffic

Road traffic from the MP2 Project can impact directly on local air quality and any sensitive receptors that are located adjacent to the local road network may experience the impacts to local air quality. Traffic on the road network is predicted to increase during the operation stage in line with the increased throughput of cargo and passengers as predicted under the Masterplan. Given the main traffic routes on the existing network and the locations of residential areas along these routes, the following links have been assessed using the DMRB local model:

- R1: Residential Properties along Royal Oak Housing, Santry to quantify the impacts for properties along the M1 exiting the Dublin Port Tunnel.

- R2: Residential Properties along East Wall Road close to the port entrance
- R3: Residential Properties along Sherriff Street Upper
- R4: Residential Properties along Pigeon House Road to quantify the impacts from traffic on the East Link toll road

The results of the analysis for all four receptors are presented in Table 1-19.

Table 1-19 Local Impact to Air Quality as a result of Operational Traffic

| Property Group | Scenarios | Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$) | Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$ | |
|--|-------------------|---|--|--|
| | | Annual Average NO2 | Annual Average PM10 | No. of Days $>50 \mu\text{g}/\text{m}^3$ |
| R1 Royal Oak Housing (Santry) | 2018 Existing | 24.70 | 15.19 | 0.14 |
| | 2026 Do-Minimum | 24.85 | 15.22 | 0.15 |
| | 2026 Do-Something | 25.07 | 15.28 | 0.15 |
| | 2040 Do-Minimum | 25.05 | 15.27 | 0.15 |
| | 2040 Do-Something | 25.89 | 15.51 | 0.19 |
| R2 Residential Housing on East Wall Road | 2018 Existing | 23.26 | 15.36 | 0.17 |
| | 2026 Do-Minimum | 23.29 | 15.4 | 0.17 |
| | 2026 Do-Something | 23.45 | 15.47 | 0.18 |
| | 2040 Do-Minimum | 23.43 | 15.49 | 0.19 |
| | 2040 Do-Something | 24.03 | 15.77 | 0.25 |
| R3 Apartments on Sheriff Street Upper | 2018 | 21.76 | 14.61 | 0 |
| | 2026 Do-Minimum | 21.90 | 14.68 | 0 |
| | 2026 Do-Something | 22.15 | 14.77 | 0 |
| | 2040 Do-Minimum | 22.15 | 14.79 | 0 |
| | 2040 Do-Something | 23.24 | 15.22 | 0.15 |
| R4 Residential Houses on Pigeon House Road | 2018 | 24.80 | 15.76 | 0.25 |
| | 2026 Do-Minimum | 24.81 | 15.80 | 0.26 |
| | 2026 Do-Something | 25.04 | 15.89 | 0.28 |
| | 2040 Do-Minimum | 24.98 | 15.91 | 0.29 |
| | 2040 Do-Something | 25.82 | 16.27 | 0.41 |
| Statutory Limits | | 40 | 40 | 25 |

The results indicate that all levels of pollutants are predicted to remain within the limits for the protection of human health along each of these routes even with the full predicted growth in traffic by 2040. Using the NRA significance criteria (as outlined in Table 1-3) the predicted increases associated with the MP2 Project relative

to the “do-minimum” scenario are classed as “imperceptible” to “small”. While the levels remain below the relevant limits these increases and air quality impact from this traffic are classed as “**negligible**”. This includes for the wider masterplan traffic and hence the cumulative traffic impact on air quality is also considered “**negligible**”.

In accordance with the UK DMRB, the regional impact of the proposed operational road traffic has been assessed in terms of the total mass of CO₂ emitted and the results are presented in **Table 1-20**. This assessment covers the wider road network employed by the traffic and not simply the roads within the port.

Table 1-20 Total Emissions from the Operational Road Traffic

| Scenario | Carbon Dioxide (CO ₂) (tonnes) |
|-------------------|--|
| 2026 Do-Minimum | 37,796 |
| 2026 Do-Something | 42,904 |

The results of the assessment indicate that the total GHG emissions as CO₂ from the 2026 Do-Something Scenario will increase with the proposed development in operation. This approximate 13% increase equates to 5,108 tonnes of carbon dioxide per annum in 2026 compared to the Do-Nothing scenario. These impacts are considered as “**permanent slight adverse impact**”.

1.4.2.2 Operation Phase - Shipping Emissions

The long term development of the Port was established by the Dublin Port Masterplan 2012-2040 which was published in February 2012 and then reviewed and updated in June 2018. Under the Masterplan shipping volumes at the port are predicted to increase annually at an average annual growth rate of 3.3% from 2010 to 2040 .

Specifically, the MP2 Project will deliver additional capacity for both the Ro-Ro and Lo-Lo modes through the following:

- Construction of a new Ro-Ro jetty (Berth 53).
- A reorientation of the already consented Berth 52.
- A lengthening of an existing river berth (50A) to provide the DFT Container Terminal with additional capacity to handle larger container ships.
- Redevelop Oil Berth 3 as a future deep water container berth (-13.0m CD) for the DFT Container Terminal.

The total cargo shipping volumes from 2010 and projected for the MP2 Project in 2040 and the overall Masterplan in 2040 are presented in Table 1-21. The total predicted increase in capacity over the 30 years under the 2040 Masterplan is 77.2 million tonnes by 2040 relative to the 28.9 million tonnes in 2010. The MP2 Project will provide 32.1% of the increase in capacity required with a projected capacity of an addition 15.5 million tonnes by 2040.

Table 1-21 Total Shipping Volumes 2010 (Baseline), 2014 (MP2 Project) and 2040 (Masterplan)

| Cargo Type | 2010 Actual Volumes | MP2 Project 2040 Projected Volumes | Masterplan 2040 Projected Volumes |
|---------------------------------|---------------------|------------------------------------|-----------------------------------|
| Ro-Ro ('000 units) | 701 | 1,165 | 2,249 |
| Ro-Ro Sailings per day | 13.0 | 14.6 | 18.0 |
| Lo-Lo ('000 TEU) | 641 | 1,091 | 1,574 |
| Lo-Lo Sailings per week | 7.4 | 8.6 | 11.0 |
| Total tonnes | 28,879,000 | 44,379,000 | 77,157,000 |
| Total Sailings per annum | 5,130 | 5,776 | 7,142 |

This change in shipping capacity will have a potential to impact the existing shipping emissions and due to the nature of shipping this will be a direct transboundary impact. However, it is important to note that the proposed increased tonnages to 2040 will be accommodated on larger vessels whereby an increased number of units can be accommodated on any vessel. As shown in Table 1-21, while the tonnages handled at the port are projected to increase by 167% with the Masterplan, the number of sailings will only increase by 39% illustrating the projected efficiency.

The projected changes in shipping numbers associated with the MP2 Project and cumulatively with the overall Masterplan to 2040 are presented in Table 1-22. The results indicate an increase in shipping emissions associated with the MP2 Project as a result of the increased Ro-Ro and Lo-Lo shipping numbers and cumulatively, a further associated increase with the shipping predicted under Masterplan 2040.

These predictions conservatively assume no future reductions in emissions through improved fuel or engine technology (e.g. such as shore side power to vessels). The results indicate that by 2040, the 2010 emissions will have increased by a factor of 13% as a result of the MP2 Project and 39% as a result of the wider Masterplan shipping traffic. This is considered to be a “long term and permanent slight adverse impact” and transboundary in nature.

Table 1-22 Total Shipping Emissions 2010 (Baseline), 2014 (MP2 Project) and 2040 (Masterplan)

| Scenario | Total NO _x per annum (tonnes) | Total VOCs per annum (tonnes) | Total TSP per annum (tonnes) |
|------------------|--|-------------------------------|------------------------------|
| 2010 | 19,818 | 707 | 379 |
| MP2 Project 2040 | 22,314 | 796 | 426 |
| Masterplan 2040 | 27,593 | 984 | 527 |

Note: Emissions based on Tier 1 emission factors for ships using marine diesel oil/marine gas oil.

EU Directives are in force which relate to the content of sulphur in marine gas oil (EU Directive 93/12 and EU Directive 1999/32) and the content of sulphur in heavy fuel oil used in SECA (EU-Directive 2005/33).

The Marine Environment Protection Committee (MEPC) of IMO has approved amendments to Marpol Annex VI in October 2008 in order to strengthen the emission standards for NO_x and the sulphur contents of heavy fuel oil used by ship engines.

The current Marpol 73/78 Annex VI legislation on NO_x emissions, formulated by IMO (International Maritime Organisation) is relevant for diesel engines with a power output higher than 130 kW, which are installed on a ship constructed on or after 1 January 2000 and diesel engines with a power output higher than 130 kW which undergo major conversion on or after 1 January 2000.

The Marpol Annex VI, as amended by IMO in October 2008, considers a three tiered approach as follows:

- Tier I: diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2000 and prior to 1 January 2011;
- Tier II: diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2011;
- Tier III (1): diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2016.

Given the existing legal requirements around fuel and emissions for shipping, the extent of emissions per vessel are gradually reducing and will continue to reduce in future years. As such, the analysis presented in Table 1-17 should be considered a conservative worst case estimate.

APPENDIX 3: UNDERWATER NOISE ASSESSMENT

1 UNDERWATER NOISE ASSESSMENT

1.1 Introduction

This section presents an assessment of the likely underwater noise impacts associated with the MP2 Project in the port area including the River Liffey and Dublin Bay. A detailed description of the MP2 Project is provided in Section 3 of the NIS.

1.1.1 Underwater Noise Overview

Noise is defined as unwanted sound. Underwater noise arising during the construction and operation phases of the MP2 Project has the potential to impact human activities such as diving and has the potential to impact on marine mammals and fish which are listed for protection under the EU Habitats Directive and Council Regulation. There are no significant effects on diving birds as the probability of interaction is extremely unlikely. Based on comparisons to human hearing underwater and an understanding of avian hearing physiology, hearing is not a useful mechanism for birds underwater (Dooling & Therrien, 2012). An assessment of the effect of underwater noise on diving birds has been screened out for these reasons.

Underwater noise is quantified in frequency (Hertz) and intensity (decibels). The decibel (symbol: dB) is a unit of measurement used to express the ratio of one value of a physical property to another on a logarithmic scale. It can be used to express a change in value (e.g., +1 dB or -1 dB) or an absolute value. In the case of underwater noise absolute values, it expresses the ratio of an underwater sound pressure to a reference value of 1 micropascal (μPa).

When used in this way, the decibel symbol is appended to indicate the reference value, for example, 180 dB re 1 μPa . The level in decibels is entirely dependent on the reference level. It is important to note that the reference level for airborne noise is different and the acoustic impedance of air and water are also different. This leads to a significant difference in decibel levels for the same sound pressure level. Decibel levels in water are significantly higher and cannot be compared directly to decibel levels in air.

Another important consideration in relation to noise is that it is not a persistent pollutant, once the noise source ceases noise levels drop very quickly to pre-existing levels. The natural underwater soundscape is not silent, biological sounds from fish and marine mammals are mixed with sounds from waves and surface noise, current flow and turbulence and rain and storm noise. The ambient noise levels in coastal water, bays and harbours are subject to wide variations, particularly with breaking waves. Wind speed determines wave activity and underwater noise levels significantly. An increase of 7.2 dB in underwater noise levels was found by Piggott (1965) to result from the doubling of wind speed.

1.1.1.1 Activities giving rise to Underwater Noise Levels

The MP2 Project is described in detail in Section 3 of the NIS. The principal underwater noise impacts will arise from the following activities:

- Ground investigation works to assess the nature of the bedrock and overburden materials. The works will be carried out by cable percussion boring, rotary coring, and penetration testing;

- Excavation of maritime infrastructure close to the Liffey channel;
- Piling during installation of quay walls and jetties;
- Dredging of berthing pockets and localised channel widening;
- Disposal of the dredged material at the licensed dump site at the entrance to Dublin Bay located to the west of the Burford Bank;
- Increased vessel traffic following construction and operation of new port facilities.

1.2 Assessment Methodology

This underwater noise assessment comprises of a description of the receiving environment, a description of likely significant impacts, recommendations for remedial measures, a statement of residual impacts and monitoring proposals for the MP2 Project. The methodology used for this assessment is consistent with best practice for underwater noise assessments and includes interaction with the benthic & fisheries and marine mammal specialists.

Dublin Bay has been monitored and underwater noise levels reported on several occasions. The shipping traffic noise levels are determined by the proximity to passing vessels. Construction and dredging noise occurs sporadically from maintenance activities and in recent years from the construction of the ABR Project. This assessment is based on reporting of a number of measurements which describe the receiving environment, followed by a description of the activities likely to give rise to underwater noise. The potential impacts are described and evaluated. Mitigation measures are recommended along with monitoring requirements.

1.3 Receiving Environment

Underwater noise levels can be divided into three typical categories:

1. Background noise level (no dominant sound, low noise level);
2. Biological noise level (louder sounds not attributable to anthropogenic sources); and
3. Shipping noise (louder sounds attributable to shipping traffic).

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

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

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

1.3.1 Sensitivity of the Receiving Environment

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

The site is noise sensitive due to the proximity of marine species including fish; Salmon, River Lamprey, Sea Lamprey, Eel, Smelt and Shad, and marine mammals, primarily the resident seal population and Harbour Porpoise associated with the nearby Special Area of Conservation. The underwater noise impact thresholds used in this report are set out generally in Popper et al. (2014), NPWS (2014), NOAA (2013) and Finneran & Jenkins (2012).

The outer part of Dublin Bay is a popular recreational diving location, with scenic dives at Scotsman's Bay, Sandycove, Muglins Rock, Dalkey Island and Irelands Eye. Popular wreck sites include the Queen Victoria and other wreck sites further out. The closest of these sites (Scotsman's Bay) is located some 6 km from the end of the Great South Wall, which is in turn over 2 km from the nearest piling activity.

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

1.3.2 Strive Report (2011)

Underwater noise levels were measured at locations around Ireland, including Dublin Bay and reported for the EPA by Beck et al. (2011).

For Dublin Bay, the noise monitoring equipment was located on the -10m CD contour line on two sites, north and south of the main shipping channel. Weather conditions at each location during the measurements were fair weather with winds of less than 10 knots. Background Noise levels are expected to be higher in adverse weather conditions.

The results were reported as broadband (5 Hz to 20 kHz) RMS values. At the northern side of Dublin Bay, noise levels were between 125 dB and 135 dB re 1 μ Pa across all frequency bands whereas at the southern site the noise levels were marginally higher, while still remaining below 140 dB re 1 μ Pa. At the northern site, the low-frequency components (below 100 Hz) were about equal for all noise whereas at the southern end the biological and background noise levels do not appear to have these low-level frequency components. There were significant temporal variations, related to shipping activity and what appears to be an elevated noise level during night hours when compared with daytime.

Shipping noise is dependent on the level of shipping traffic. It is similar to road traffic in the sense that a busy international shipping channel is like a motorway, i.e. has a constantly high level. For the majority of Irish waters shipping noise is like road traffic noise on a rural road. As a car/ship goes by there is an elevated level and the noise returns to background levels quickly thereafter.

1.3.3 ABR Project

The Alexandra Basin Redevelopment (ABR) Project (29N.PA0034) is currently underway in the port. During the course of construction underwater noise levels were measured and reported in [Table 1](#). The background noise levels are higher than those reported for the outer Dublin Bay area. Elevated levels due to shipping were similar to the outer bay area in that the levels rose for the short period when the ship was passing.

[Table 1 Underwater noise levels measured in the port area 2017](#)

| Source | North Wall Light | | ESB Pontoon | |
|--------------------|------------------|----------------------------|-----------------|----------------------------|
| | SPL | SEL | SPL | SEL |
| | dBre: 1µPa @ 1m | dBre: 1µPa ² -s | dBre: 1µPa @ 1m | dBre: 1µPa ² -s |
| Natural Background | 150 | <132 | 130-140 | 110-120 |
| Shipping | 165 | 150 | 165 | 150 |
| Piling | 180 | 140 | - | - |

1.3.4 2017 Piling Noise Monitoring Report

Piling noise in Alexandra Basin West was monitored on 23 November 2017 while piling was taking place on the Ocean Pier quay wall. A notable feature of the piling noise was the intermittent nature of the noise source. While piling is underway ‘all day’, the actual piling strikes occur for one third of actual time. This is due to the need to ensure the piles are properly aligned, piling depth checks, changes in piling settings, meal breaks and equipment. The average ‘striking period’ duration was under 12 minutes with varying breaks in between.

Measurements were carried out at two locations 200m from the source (Alexandra Basin/North Wall Quay) and 1,200m from the source (ESB Pontoon/Tern Nesting Site) down river during piling. Background underwater noise measurements were also carried out in the period between piling and reported in [Table 1](#)

A typical pile strike is shown in Figure 1. The metrics of this pile strike have been used to predict potential noise impacts from the MP2 Project.

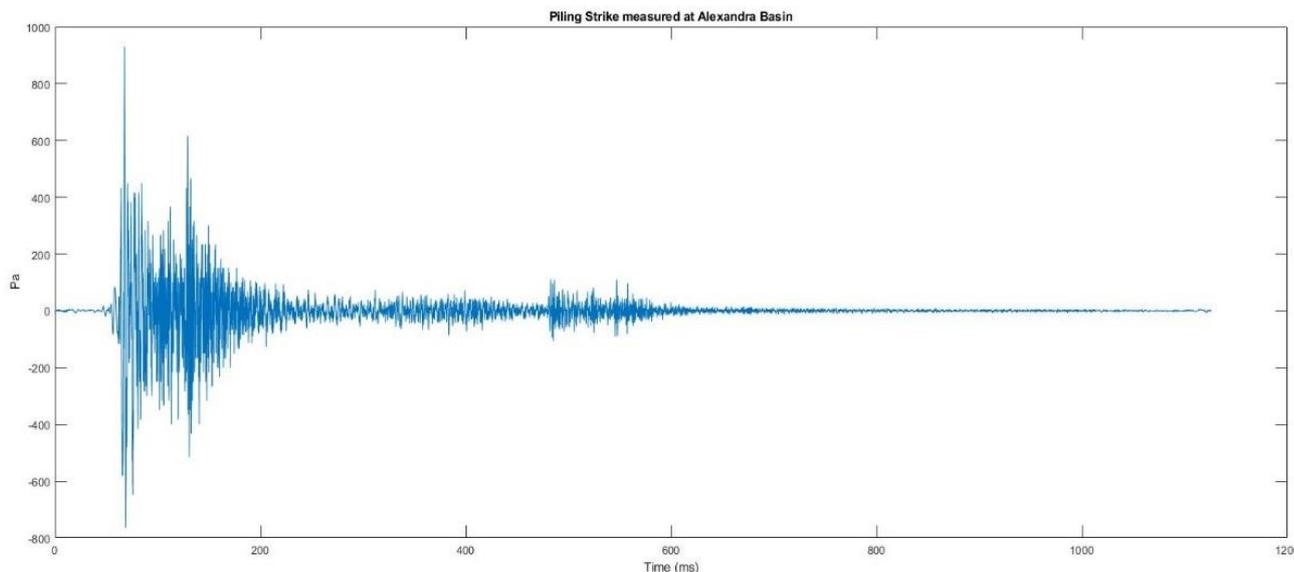


Figure 1 Pile Strike at Alexandra Basin West

1.4 Potential Effects

Dublin Port has been in operation for over 300 years with motorised vessels for over 100 years. While the level of traffic has increased, the North Quay Wall was constructed 150 years ago and the port area has centred on the two Alexandra Basins throughout this time. Underwater noise levels related to the MP2 Project will increase temporarily during construction and revert to shipping traffic related noise once constructed.

Sound transmission in shallow water is highly variable and site specific because it is strongly influenced by the acoustic properties of the bottom and surface as well as by variations in sound speed within the water column (Richardson et. al., 1995). With shallow water sound transmission, the combination of environmental factors makes it difficult to develop accurate theoretical models. The theory must be combined with site-specific empirical data to obtain reliable propagation predictions.

There are two main impacts to be assessed; construction of the MP2 Project, during which the worst case noise will relate to piling activity, and the normal port operation during construction and when construction is complete. This assessment is based on the piling and construction activity being carried out while the port is in normal operation. The extent of piling operations required for this development is set out in Table 2 below.

Table 2 Extent of Dredging and Piling Activity

| Location | Piling Required |
|----------|---|
| Berth 53 | 1.0 m dia. to 1.2m dia. x 22mm to 25mm thick tubular steel piles (raking and vertical) |
| Berth 52 | AZ- 28-700 Sheet Pile with 1.6m dia. x 22mm-25mm thickness King Piles (as per ABR Project Drawings). AZ- 28-700 Sheet Pile deadman. AZ- 28-700 Sheet Pile for cellular walls. |

| Location | Piling Required |
|-------------------|--|
| Berth 50A | AZ- 28-700 Sheet Pile with 1.4m dia. x 22mm-25mm thickness King Piles (similar to that under construction for the ABR Project) AZ- 28-700 Sheet Pile deadman. |
| Oil Berth 3 | AZ- 28-700 Sheet Pile with 1.4m dia. x 22mm-25mm thickness King Piles (similar to that under construction for the ABR Project) AZ- 28-700 Sheet Pile deadman. |
| Jetty Road | AZ- 28-700 Sheet Pile with 1.4m dia. x 22mm-25mm thickness King Piles (similar to that under construction for the ABR Project) AZ- 28-700 Sheet Pile deadman. |
| Berth 53 Dredging | Dredging works at Berth 53. The standard depth of the channel will be -10.0m CD |
| Channel Dredging | Channel dredging works to the south of the existing navigation channel. The standard depth of the channel will be -10.0m CD |
| Other Dredging | Dredging works are also required at Oil Berth 3 where the standard depth of the berthing pocket will be -13.0m and Berth 50A the standard depth of the berthing pocket will be -11.0m CD |

1.4.1 Underwater Noise Sources

Quoted (peak) source levels for underwater noise sources are quoted in dB re μPa at 1 metre. This is a 'notional' figure extrapolated from far field measurements as it is not practicable to measure sound levels at 1m from an active source such as a ship or a pile-driver. Measurements are taken in what is known as the far field and extrapolated back to a notional 1 m from the idealised point source. It is usual to take measurements at several hundred metres or kilometres in deep water and extrapolate the measured levels to what has become known as a 1 m source level. This is illustrated in Figure 2.

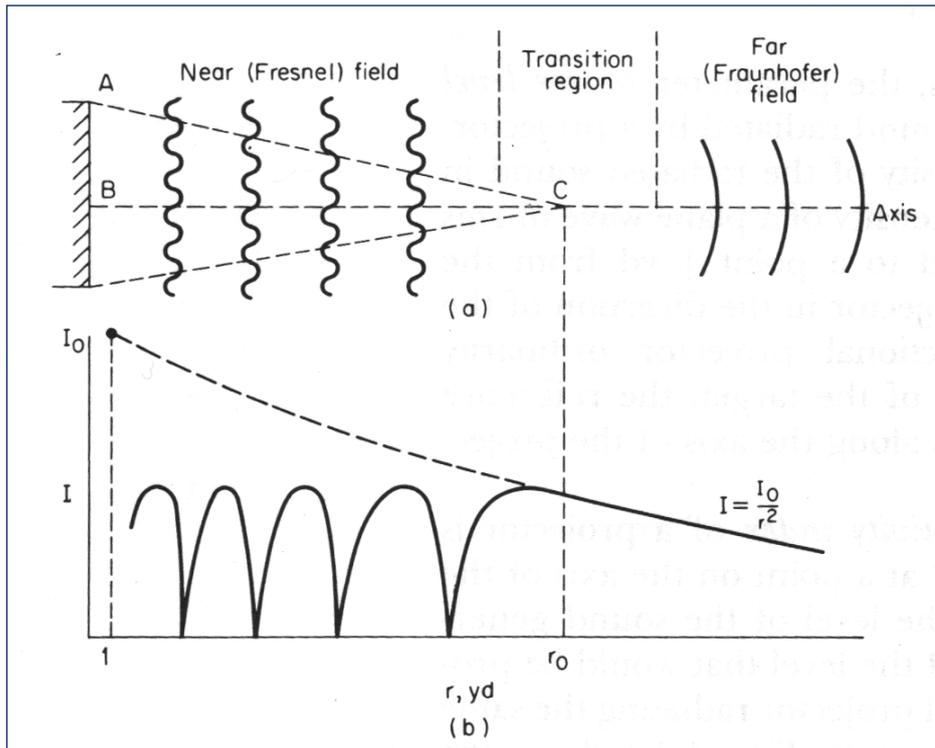


Figure 2 Underwater Noise source level fields (Urich 1983, fig. 4)

The actual propagation of sound in the near (Fresnel) field produces an undulating curve, but the extrapolated (dashed) line indicates a much higher theoretical source level.

This extrapolation leads to apparently high values for the source level and can lead to erroneous conclusions about the impact on marine mammals and fish for the following reasons:

- Far field source levels do not apply in the near field of the array where the sources do not add coherently; sound levels in the near field are, in fact, lower than would be expected from far field estimates.
- Source level calculations are generally based on theoretical point sources with sound propagating equally in all directions. This is not easily replicated in real world conditions.
- The majority of published data for underwater sources is based on deep water measurements. Sound propagation in shallow water is significantly more complex and sound does not propagate as efficiently as it would in deep water.

A table of typical underwater noise levels is set out below in Table 3.

Table 3 Table of typical underwater noise levels

| Source | SPL dB re:1µPa @ 1m | SEL dB re: 1µPa ² -s | Sound Duration seconds | Peak Frequency Hertz | Bandwidth Hertz |
|---|---------------------------|------------------------------------|------------------------------|----------------------------|--------------------|
| Super Tanker 337m long @ 18 knots | 185 | - | constant | 23 | 5-100 |
| Dredging (Suction/Hopper dredge) | 177 | - | constant | 80-200 | 20-8,000 |
| Tug vessel (while towing) | 145-170 | - | constant | - | 37-5,000 |
| Fishing vessel (12m long @ 7 knots) | 150 | - | constant | 300 | 250-1000 |

The operation of dredgers on silty material results in underwater noise levels in the same range as shipping traffic. While the dredger is operating suction equipment, it is travelling at slow speed. Shipping traffic in the area is usually larger vessels, generally travelling at higher speeds or manoeuvring using thruster engines. The impact of dredging noise is therefore not regarded as likely to have a significant effect in the overall context and the worst case underwater noise level will arise from impact piling and this assessment is carried out on that basis.

The criteria used to assess the significance of the underwater noise impacts is presented in Table 4. Underwater noise criteria are the subject of ongoing research. In many cases, species specific data is sparse or does not currently exist and has to be extrapolated from similar species. The criteria are selected from best international practise and publications. The thresholds for mustelids is taken from the only available guideline which provides a threshold for sea otters because there is no published threshold for the Eurasian otter.

Table 4 Underwater Noise Impact Criteria

| Organism | Impact Type | Threshold dB | Criteria | Data Source |
|------------------------|---|-------------------------------|----------|-------------------------------|
| Human Diver | Annoying but not harmful | 160 dB re: 1µPa SPLPeak | Peak | Norro et al (2010) |
| | Just audible | 145 dB re: 1µPa SPLRMS | RMS | Parvin et al. (2002) |
| Fish | Mortality of fish eggs and larvae | 210 dB re 1µPa2s | SELcum | Popper <i>et al.</i> , (2014) |
| | | 207 dB re: 1µPa SPLPeak | Peak | Popper <i>et al.</i> , (2014) |
| | Mortality/ PTS in adult fish* | 207 – 219 dB re 1µPa2s | SELcum | Popper <i>et al.</i> , (2014) |
| | | 207 – 213 dB re: 1µPa SPLPeak | Peak | Popper <i>et al.</i> , (2014) |
| | Recoverable injury in adult fish* | 203 – 216 dB re 1µPa2s | SELcum | Popper <i>et al.</i> , (2014) |
| | | 207 – 213 dB re: 1µPa SPLPeak | Peak | Popper <i>et al.</i> , (2014) |
| | Temporary Threshold Shift (TTS) | 186 dB re 1µPa2s | SELcum | Popper <i>et al.</i> , (2014) |
| Cetaceans | Permanent Threshold Shift (PTS) [SPLPeak] | 230 dB re: 1µPa SPLPeak | Peak | NPWS (2014) |
| | | 198 dB re 1µPa2s | SEL | NPWS (2014) |
| | Behaviour effects | 160 dB re: 1µPa SPLRMS | RMS | NOAA (2013) |
| Pinnipeds | Permanent Threshold Shift (PTS) [SPLPeak] | 218 dB re: 1µPa SPLPeak | Peak | NPWS (2014) |
| | | 186 dB re 1µPa2s | SEL | NPWS (2014) |
| Mustelids (Sea Otters) | Permanent Threshold Shift (PTS) | 220 dB re 1µPa2s | SEL | Finneran & Jenkins (2012) |

1.4.2 Underwater Noise Impacts

The scale of this development in the context of the existing harbour is described in Section 3: Project Description of this NIS.

The construction of the quay walls and berths will involve some marine traffic transporting materials but the most significant underwater noise element of the construction phase will be the piling requirement. The piling specification is similar to that being used in the ABR Project. The majority of the piles are the AZ sheet piles which will be driven using a vibratory pile driver. The heavy tubular piles will be 1.0 to 1.6 m in diameter. Experience at Dublin Port has shown that heavy tubular piles greater than 1.0m in diameter sink several metres vertically into the seabed when initially lowered. It is likely however that at least half of the tubular pile driving will require an impact hammer to drive the piles to the required depth. No riverside impact piling to take place between March and May along the River Liffey. The piling operation is described in detail in Section 3.

Driving heavy tubular piles such as those proposed is an intermittent activity. The pile is lifted into place, aligned and lowered slowly into position. Initially there will be multiple stops for alignment checks, each lasting as long as the preceding pile driving period. Gradually the pile is driven for longer periods. As this occurs frequent checks on alignment are again required. Due to the length of the piles it is likely that the piles will be installed in sections so further time is required to weld extension sections to the pile.

An examination of piling log sheets for a typical days piling activity during the ABR project (23rd November 2017) shows that piling started at 09:17 and was carried out in eight ‘sessions’ taking 12.6 minutes on average. Break periods between piling averaged seven minutes for short breaks, for example a quick alignment check. Longer breaks of 50 minutes were required for setup changes. The piling finished at 13:58 to facilitate welding and setup for the following day. Total piling strikes during this period was 3,796 with an average of 475 strikes per period. The average striking rate was one strike every 1.6 seconds.

As can be seen from this description, the impact piling is not a continuous activity, the likelihood is that even at peak requirement, the impact hammer will only be used for 30% to 50% of the day. Support activities will involve relocating the three barges and operating hydraulic power packs to power the piling rig. A crane will be required to lift the piles into place.

1.4.2.1 Underwater Noise Sources

The underwater noise impacts will occur in two phases, the construction phase and the operations phase. During the operations phase, the impact will be confined to vessel traffic at the port. Underwater noise levels will remain as they are currently, i.e. elevated levels for a short period in the outer bay as a vessel navigates the channel and elevated levels for short periods (10 to 30 minutes) while the vessel berths in the port. The noise levels associated with shipping traffic are outlined in Table 3. Noise levels during construction will be significantly higher than those arising from port operations. The main activities required during construction with potential underwater noise impacts are outlined in Table 5. Noise from impact piling described will represent the worst case noise event during construction.

The assessment of underwater noise impacts will be carried out on the basis of the impact piling noise during construction as all other activities will have lower impacts.

Table 5 Construction Tasks with potential underwater noise impacts

| Construction Activity | Details | Extent/Duration | RMS Noise Levels dB re: 1µPa @ 1m |
|--|-------------------------------------|--|--------------------------------------|
| Delivery of piles (by sea if required) | Vessel traffic, similar to existing | Cargo vessel deliveries to port similar to existing shipping traffic | 170 |
| Delivery and assembly of the barges | Described in Section 1.4.2 | Mobilisation and Demobilisation will take 2-3 days on each occasion | 170 |

| Construction Activity | Details | Extent/Duration | RMS Noise Levels dB re: 1µPa @ 1m |
|-----------------------------|--|---|--------------------------------------|
| Relocation of jack up barge | Described in Section 1.4.2 | Estimated every 3 days over the piling period | 170 |
| Support vessel | Safety requirement | Full piling period | 150 |
| Operation of jack up barge | Support equipment (hydraulics, crane, etc.) | Full piling period | 150 |
| Vibratory Piling | Required for all sheet piles | Full piling period | 170 |
| Impact Piling | Required for all circular piles and some sheet piles | Full piling period | 222 (worst case) |

It is clear from Table 5 that impact piling will cause the worst case underwater noise impacts. Each of the other activities is at least 30 dB quieter than the impact piling activity. The choice of piling method is a complex issue involving the need to drive the pile fully to ensure long term stability, a parameter which varies with site-specific soil conditions. While the noise level arising during vibratory pile driving is lower, the available pile driving energy is also significantly lower. Vibratory pile driving is also not very effective in firm clays and cannot drive piles deeply into stiff clays (Tomlinson & Woodward (2008)). The impact driving hammer is however suitable for driving all types of pile in stiff to hard clays.

With lower energy pile driving the time taken to drive a pile is longer. This has a significant effect on the acoustic impact of the activity as the Sound Exposure Level (SEL) and Cumulative Sound Exposure Level (SEL_{cum}) are key criteria which are time based. The longer the duration of the event the higher the SEL or SEL_{cum} level. Impact pile driving results in a shorter duration of piling noise. Vibratory piling will be utilised for a significant portion of the work at Dublin Port, i.e. the sheet piling. The ground conditions however require impact piling is utilised for the heavy tubular piles.

Based on previous experience at Dublin Port, where extensive piling was being carried out, piling will probably occur about 30-50% of the working time during the day. The balance of the time being taken up with alignment checks, welding and other support activities and meal breaks. This utilisation factor is consistent with Bailey et al. (2010). The total duration of impact piling will therefore be a small proportion of the overall construction period.

Due to the proximity of sensitive protected species and the potential for high levels of underwater noise from impact piling in particular, this EIAR includes this specific assessment of underwater noise levels.

The context for this assessment includes the enclosed shallow water area in which the activity takes place along with the scale of the development. These factors in particular indicate that potential underwater noise impacts will be significant at close range but not in the wider bay area.

1.4.2.2 Underwater Noise Prediction

As outlined in Table 5, the worst case underwater noise impact is during impact pile driving. Impact pile driving is the subject of considerable interest due to the noise levels arising from driving large (4-5 m diameter) piles for offshore wind farms in open water. It is important to distinguish that type of piling from the activity proposed in an enclosed area at Dublin Port.

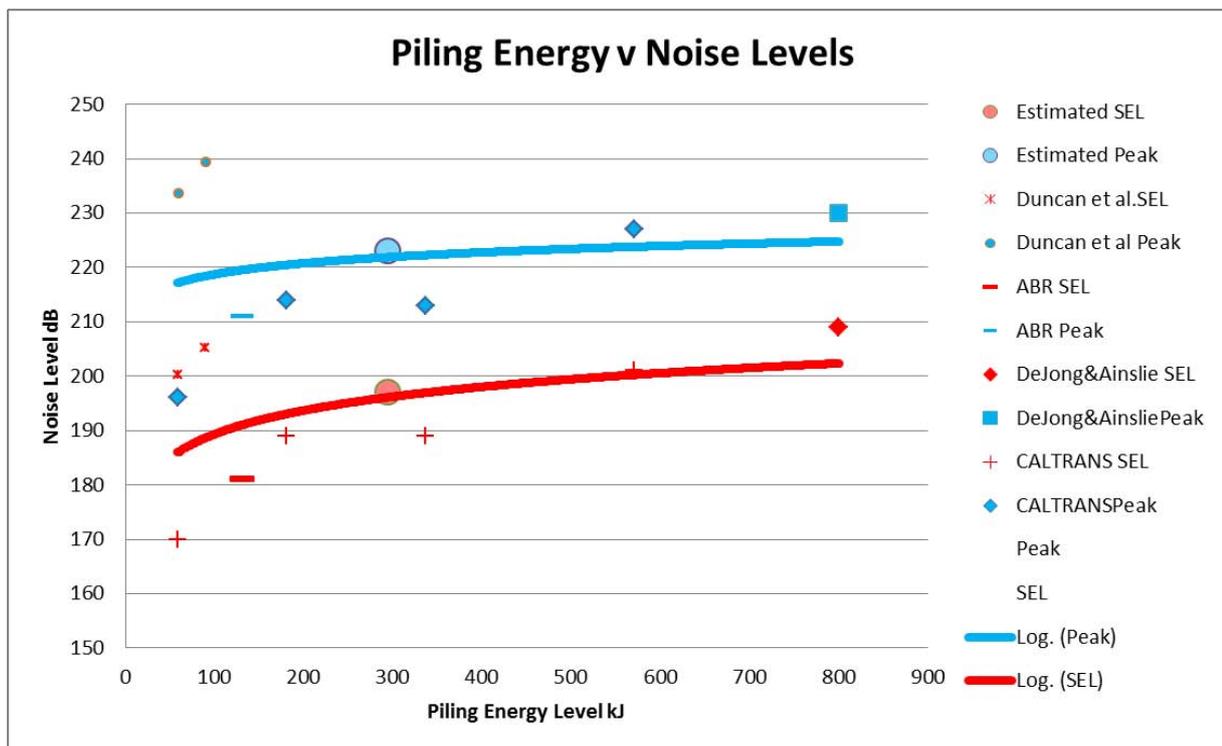


Figure 3 Sound Source levels from a range of piling activities

Piling intensity can be determined by the energy input per strike. De Jong and Ainslie (2008) relate impact piling energy to sound output and provide underwater noise source level data for an 800 kJ piling operation. The California Department of Transport has provided a compendium of pile driving sound data, Caltrans (2007), which has a large database of pile types and diameters.

Four appropriate examples of piling activity across a range of piling energies were taken from this compendium and plotted in Figure 3. Measured data, collected by RPS in Dublin Port as part of the ABR Project are also included on the figure. The plot is completed with data taken from Duncan et al (2010) from two projects in Australia.

Trend-line plots are provided for all the data. It should be noted however that the Duncan et al (2010) data appears to be significantly higher than data from the other sources. If this data were excluded, the trend-line fit for the remaining data (comprising 6 different independent projects) would be much better. There may be site specific factors that gave rise to higher levels, in particular the calcarenite seabed in Australia.

The estimated maximum strike energy required at Dublin Port has been estimated to be 294 kJ, which is considerably higher than that used in Alexandra Basin West in 2017. Including the Duncan et al (2010) data on

a trend-line curve in Figure 3 this provides source level estimates for pile driving noise, presented in Table 6. SEL_{cum} is based on 1,000 strikes.

Table 6 Estimated impact piling sound source levels for Dublin Port

| Metric | Noise Levels |
|--------------------------|-------------------------------------|
| Peak Sound Level | 223 dB re 1µPa @ 1m |
| Sound Exposure Level SEL | 197 dB re 1µPa ² -s @ 1m |
| SEL _{cum} | 227 dB re 1µPa ² -s @ 1m |
| RMS Sound Pressure Level | 206 dB re 1µPa @ 1m |

1.4.3 Underwater Noise Model

There are several methods available for modelling the propagation of sound between a source and receiver ranging from very simple models which simply assume spreading according to a 10 log (r) or 20 log (r) relationship (as discussed above) to full acoustic models (e.g. ray tracing, normal mode, parabolic equation, wavenumber integration and energy flux models). In addition, semi-empirical models are available which lie somewhere in between these two extremes in terms of complexity.

When the water is very shallow (as is the case at Dublin Port) sound propagation theory predicts that, if the effective water depth is less than $\lambda/4$, (where λ = wavelength of the sound) waves are not matched to the duct and very large propagation losses occur (this means that frequencies lower than 30 Hz will not propagate effectively in the area). The situation at Dublin Port is further complicated by the bathymetry and the confined nature of the navigation channel and the port.

As a pressure pulse from an impulsive source propagates towards the receiver, the duration of the pulse increases. Thus the relationship between the peak sound pressure level and the SEL changes with distance. The SEL level was calculated based on the rms (90% energy) sound pressure level normalised to a one second time interval. The single pulse SEL values have been combined for each pulse as part of the various cumulative SEL modelling scenarios.

It is important to note that the rms sound pressure level will depend upon the integration window used or, in other words, the measurement time for the rms. Using a longer duration measurement would result in a lower rms sound pressure level than using a shorter one. Therefore the rms sound pressure source level, determined the interval which contains 90% of the sound energy, has been calculated based on a digitisation of the time history plot of the waveform. This integration procedure gives a more relevant and consistent value for comparison between various studies and is the suggested metric in Southall et al. (2007).

In open water, increasing the distance from the sound source usually results in the level of sound becoming lower, due primarily to the spreading of the sound energy with distance, The way that the sound spreads (geometrical divergence) will depend upon several factors such as water column depth, pressure, temperature gradients, salinity as well as water surface and bottom (i.e. seabed) conditions. Thus, even for a given locality,

there are temporal variations to the way that sound will propagate. However, in simple terms, the sound energy may spread out in a spherical pattern (close to the source) or a cylindrical pattern (much further from the source), although other factors mean that decay in sound energy may be somewhere between these two simplistic cases. The issue is further complicated in the confined space at Dublin Port. Reflections from the quay walls, interference patterns at the basin openings and absorption by the navigation channel sides all impact on underwater noise propagation.

In acoustically shallow waters such as Dublin Bay, the propagation mechanism is determined by multiple interactions with the seabed and the water surface (Lurton 2002; Etter 2013; Urick 1983; Kinsler et al. 1999). Whereas in deeper waters the sound will propagate further without encountering the surface or bottom of the sea, in shallower waters the sound may be reflected and absorbed at either or both boundaries.

With a shallow source, the source and its reflected image become a dipole source with a vertical directionality (Urich 1983). In deep water with both a shallow source and a shallow receiver, spreading loss may be as much as $40 \log R$, versus the $20 \log R$ expected from spherical spreading. In shallow water, the shallow source dipole effect introduces an additional $10 \log R$ spreading loss (Grachev 1983, quoted in Richardson et. al. (1985)), increasing the loss from $\sim 15 \log R$ to $\sim 25 \log R$. A similar interference effect occurs when the receiving location is within $\frac{1}{4}$ wavelength of the surface, (At 15 metres depth this impacts all frequencies under 25 Hz).

At the sea surface, the majority of sound is reflected back in to the water due to the difference in acoustic impedance (i.e. sound speed and density) between air and water. Scattering of sound at the surface of the sea can be an important factor with respect to the propagation of sound. In an ideal case (i.e. for a perfectly smooth sea surface), the majority of sound wave energy will be reflected back into the sea. For rough seas, however, much of the sound energy is scattered (e.g. Eckart 1953; Fortuin 1970; Marsh, Schulkin, and Kneale 1961; Urick and Hoover 1956). Scattering can also occur due to bubbles near the surface such as those generated by wind or fish. Scattering may also result from the presence of suspended solids in the water such as particulates and marine life. Scattering is more pronounced for higher frequencies than for low frequencies and is dependent on the sea state (i.e. wave height).

Because surface scattering results in differences in reflected sound, its effect will be more important at longer ranges from the source sound and in acoustically shallow water (i.e. where there are multiple reflections between the source and receiver). The degree of scattering will depend upon the sea state/wind speed, water depth, frequency of the sound, temperature gradient, angle of incidence and range from source. It should be noted that variations in propagation due to scattering will vary temporally within an area primarily due to different sea-states / wind speeds at different times. However, over shorter ranges (e.g. several hundred meters or less) the sound will experience fewer reflections and so the effect of scattering should not be significant.

When sound waves encounter the bottom, the amount of sound reflected will depend on the geo-acoustic properties of the bottom (e.g. grain size, porosity, density, sound speed, absorption coefficient and roughness) as well as the angle of incidence and frequency of the sound (Cole 1965; Hamilton 1970; Mackenzie 1960; McKinney and Anderson 1964; Etter 2013; Lurton 2002; Urick 1983). At Dublin Port the bottom is comprised primarily of mud or other acoustically soft sediment and will reflect less sound than acoustically harder bottoms such as rock or sand. This effect will also depend on the profile of the bottom (e.g. the depth of the sediment layer and how the geo-acoustic properties vary with depth below the sea floor). The effect is less pronounced

at low frequencies (a few kHz and below). A scattering effect (similar to that which occurs at the surface) also occurs at the bottom (Essen 1994; Greaves and Stephen 2003; McKinney and Anderson 1964; Kuo 1992).

Another important factor is the sound speed gradient. Changes in temperature, salinity and pressure with depth mean that the speed of sound varies throughout the water column. This can lead to significant variations in sound propagation and can also lead to sound channels, particularly for high frequency sound. Sound can propagate in a duct-like manner within these channels, effectively focussing the sound, and conversely they can also lead to shadow zones. The frequency at which this occurs depends on the characteristics of the sound channel but, for example, a 25 m thick layer would not act as a duct for frequencies below 1.5 kHz. The temperature gradient can vary throughout the year and thus there will be potential variation in sound propagation depending on the season.

In choosing which propagation model to employ, it is important to ensure that it is fit for purpose and produces results with a suitable degree of accuracy for the application in question, taking into account the context. Thus, in some situations (e.g. low risk due to underwater noise, range dependent bathymetry is not an issue, non-impulsive sound) a simple (N log R) model will be sufficient, particularly where other uncertainties outweigh the uncertainties due to modelling. On the other hand, some situations (e.g. very high source levels, impulsive sound, complex source and propagation path characteristics, highly sensitive receivers and low uncertainties in assessment criteria) warrant a more complex modelling methodology.

The first step in choosing a propagation model is therefore to examine these various factors, such as set out below:

- balancing of errors / uncertainties;
- range dependant bathymetry;
- frequency dependence; and
- source characteristics.

For impulsive sound, such as that produced by a piling source, the sound propagation is rather more complex than can be modelled using a simple N log (R) relationship. For example, as discussed previously, the rms sound pressure level of an impulsive sound wave will depend upon the integration window used. An additional phenomenon occurs where the pulse waveform elongates with distance from the source due to a combination of dispersion and multiple reflections. This temporal “smearing” can significantly affect the peak pressure level and reduces the rms amplitude with distance (because the rms window is longer).

Sound propagation modelling for this assessment was therefore based on an established, peer reviewed, range dependent sound propagation model which utilises the semi-empirical model developed by Rogers (1981). The model provides a robust balance between complexity and technical rigour over a wide range of frequencies, has been validated by numerous field studies and has been benchmarked against a range of other models. The following inputs are required for the model:

- third-octave band source sound level data;
- range (distance from source to receiver);
- water column depth (input as bathymetry data grid);

- sediment type;
- sediment and water sound speed profiles and densities;
- sediment attenuation coefficient; and
- source directivity characteristics.

The propagation loss is calculated using the formula:

$$TL = 15 \log_{10} R + 5 \log_{10} (H\beta) + \frac{\beta R \theta_L^2}{4H} - 7.18 + \alpha_w R$$

Where R is the range, H the water depth, β the bottom loss, θ_L the limiting angle and α_w the absorption coefficient of sea water (α_w is a frequency dependant term which is calculated based on Ainslie and McColm, 1998).

The limiting angle, θ_L is the larger of θ_g and θ_c where θ_g is the maximum grazing angle for a skip distance and θ_c is the effective plane wave angle corresponding to the lowest propagating mode.

$$\theta_g = \sqrt{\frac{2Hg}{c_w}} \quad \theta_c = \frac{c_w}{2fH}$$

Where g is the sound speed gradient in water and f is the frequency.

The bottom loss β is approximated as:

$$\beta \approx \frac{0.477 (\rho_s / \rho_w) (c_w / c_s) K_s}{[1 - (c_w / c_s)^2]^{3/2}}$$

Where ρ_s is the density of sediment, ρ_w the density of water, c_s the sound speed in the sediment, c_w the sound speed in water and K_s is the sediment attenuation coefficient.

The propagation model also takes into account the depth dependent cut-off frequency for propagation of sound (i.e. the frequency below which sound does not propagate):

$$f_{cut-off} = \frac{c_w}{4h \sqrt{1 - \frac{c_w^2}{c_s^2}}}$$

Where c_s and c_w are the sound propagation speeds in the substrate and water.

The propagation and sound exposure calculations were conducted a water column depths of 12m in order to determine the likely range for injury and disturbance. It should be noted that the effect of directivity has a strong bearing on the calculated zones for injury and disturbance because a marine mammal with direct line of sight to the source will be exposed to greater noise levels than an animal in the outer navigation channel or the greater bay area.

Using the measurement of piling noise carried out at Alexandra Basin West as a source for the Rodgers model, the Peak and SEL underwater noise levels have been predicted out to a range of 1,400m and shown in Figure 4.

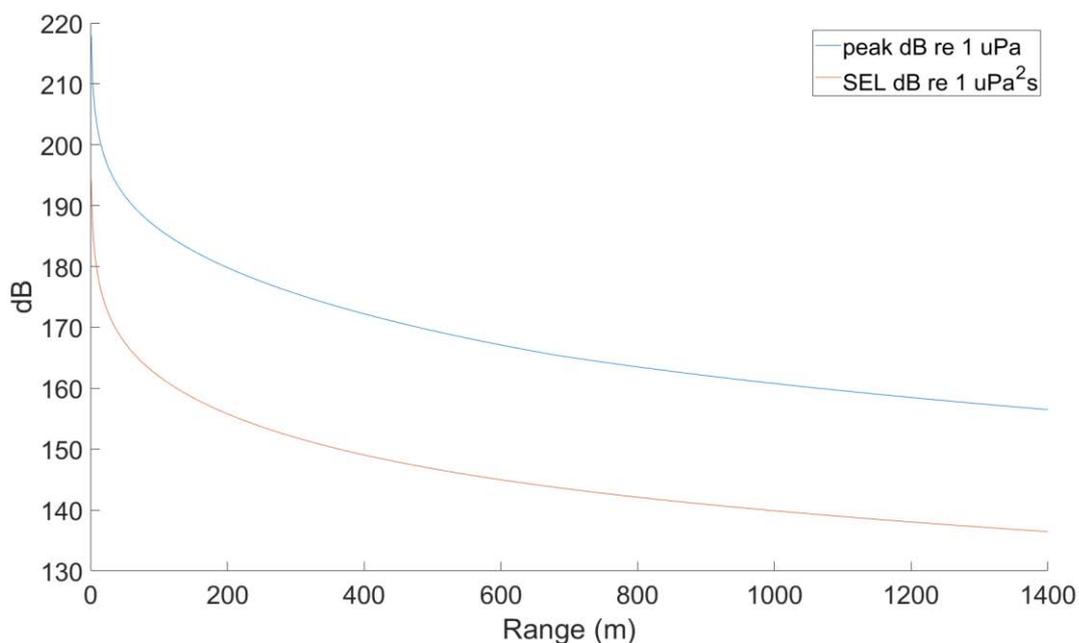


Figure 4 Predicted underwater noise levels

Due to the confined shallow space and the narrow channel width, the worst case impact zone is quite small in extent. The potential injury zones are summarised as follows:

- Potential discomfort to recreational divers limited to 1km with clear line of sight;
- Potential injury to fish species is limited to 12m from the source;
- Permanent Threshold Shift injury to marine mammals is limited to 1m from the source; and
- Disturbance to marine mammals is limited to 120m from the source.

As outlined above the site location is a confined area close to the port. The underwater noise impact zone will be limited to the navigation channel and the River Liffey for the impact zones set out in Table 7.

Table 7 Underwater noise impact zones

| Organism | Impact Type | Threshold dB | Criteria | Range |
|--------------------------|---|----------------------------------|------------------|--------|
| Human Diver ¹ | Annoying but not harmful | 160 dB re: 1µPa SPLPeak | Peak | 1065m |
| | Just audible | 145 dB re: 1µPa SPLRMS | RMS | 625m |
| Fish | Mortality of fish eggs and larvae | 210 dB re 1µPa2s | SELcum | n/a |
| | | 207 dB re: 1µPa SPLPeak | Peak | 10m |
| | Mortality/ PTS in adult fish* | 207 – 219 dB re 1µPa2s | SELcum | n/a |
| | | 207 – 213 dB re: 1µPa SPLPeak | Peak | 10m |
| | Recoverable injury in adult fish* | 203 – 216 dB re 1µPa2s | SELcum | 12m |
| | | 207 – 213 dB re: 1µPa SPLPeak | Peak | 10m |
| | | Temporary Threshold Shift (TTS) | 186 dB re 1µPa2s | SELcum |
| Cetaceans | Permanent Threshold Shift (PTS) [SPLPeak] | 230 dB re: 1µPa SPLPeak | Peak | n/a |
| | | 198 dB re 1µPa2s | SEL | n/a |
| | Behaviour effects | 160 dB re: 1µPa SPLRMS | RMS | 120m |
| Pinnipeds | Permanent Threshold Shift (PTS) [SPLPeak] | 218 dB re: 1µPa SPLPeak | Peak | 1m |
| | | 186 dB re 1µPa2s | SEL | 1m |
| Mustelids (Sea Otters) | Permanent Threshold Shift (PTS) | 220 dB re 1µPa2s | SEL | n/a |

The potential impact of these underwater noise levels on Annex II qualifying interest marine mammal species are addressed in the main body of this NIS. There will be no underwater noise impact at recreational diving sites in Dublin Bay.

The impact radius as shown in Table 7 is localised, when piling takes place it is an intermittent activity during the day. No piling is carried out within the main Liffey Channel during the March to May period as set out in the NIS. Any increase in underwater noise levels during construction will only occur as a not significant short term adverse impact. The long term impact from shipping traffic is likely to be neutral as any change in underwater noise from vessels is localised in shallow water and unlikely to affect the overall underwater noise level.

¹ Based on open water conditions

1.4.4 Conclusions

Site specific underwater noise levels have been established whilst piling and dredging operations have been taking place.

The principal underwater noise impacts will arise from the following activities: ground investigation works to assess the nature of the seabed, demolition and excavation close to the Liffey channel, piling during installation of quay walls and jetties, dredging works including the disposal of the dredged material to the west of the Burford Bank and increased shipping traffic.

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

The site is noise sensitive due to the proximity of marine species including fish in the Liffey channel. The outer part of Dublin Bay is a popular recreational diving location, with scenic dives at Scotsman's Bay, Sandycove, Muglins Rock, Dalkey Island and Irelands Eye. The closest of these sites (Scotsman's Bay) is located some six kilometres from the end of the Great South Wall, and more than eight kilometres from the nearest piling activity. The outer bay is also home to marine mammals, primarily the resident seal population and Harbour Porpoise associated with the nearby Special Area of Conservation.

The construction of the quay walls and berths will involve some marine traffic transporting materials but the most significant underwater noise element of the construction phase will be the piling requirement.

An underwater noise propagation model was used to predict the potential underwater noise impacts of the MP2 Project. The propagation and sound exposure levels were calculated in order to determine the likely range for injury and disturbance using well established modelling and injury criteria. Due to the confined shallow space and the narrow channel width, the worst case impact zone is quite small in extent. The potential injury zones are summarised as follows:

- Potential discomfort to recreational divers limited to 1 km with clear line of sight;
- Potential injury to fish species is limited to 12 m from the source;
- Permanent Threshold Shift injury to marine mammals is limited to 1m from the source; and
- Disturbance to marine mammals is limited to 120 m from the source.

APPENDIX 4: COASTAL PROCESSES ASSESSMENT

1 COASTAL PROCESSES ASSESSMENT

1.1 Introduction

This report assesses the potential impact of the MP2 Project on the coastal processes in the Dublin Port and Dublin Bay areas and includes information about the tidal regime and the inshore wave climate.

In addition, this report also includes information about sediments in the receiving environment and the inshore wave climate along the Clontarf frontage.

The assessment presented in this report is based on the project description detailed in Section 3 of the NIS.

1.2 Assessment Methodology

1.2.1 Modelling Methodology

RPS used the MIKE 21/3 hydrodynamic numerical modelling software package developed by DHI, to address potential coastal processes issues. This was achieved by developing a range of two dimensional and three dimensional numerical models to represent:

- the pre-project scenario (in this case, post-Alexandra Basin Redevelopment (ABR) Project); and
- the post-project scenario with the MP2 Project works in place.

These models were used in conjunction with hydrographic survey data and site specific water quality monitoring data to assess the construction and operational impacts of the MP2 Project in the context of the following coastal processes:

- The dispersion and settlement of sediment plumes generated during dredging operations;
- The dispersion of sediment material disposed of at the spoil site;
- The tidal regime;
- Sediment dynamics and the morphological response of the seabed within Dublin Port;
- The inshore wave climate; and
- Flood risk to the surrounding areas.

The impact of the MP2 Project on these coastal processes has been quantified by means of difference plots throughout this report, i.e. post-project minus pre-project conditions. As such, the extent and magnitude of potential impacts as a result of the MP2 Project can be clearly identified and compared against baseline conditions. To conclude the assessment, mitigation measures are proposed to reduce impacts, where appropriate.

1.2.2 Coastal Process Modelling Software

A suite of coastal process models, based on the MIKE software developed by DHI, was used to assess the potential impact of the MP2 Project on the coastal processes within Dublin Port and Bay. The MIKE system is

a state of the art, industry standard, modelling system, based on a flexible mesh approach. This software was developed for applications within oceanographic, coastal and estuarine environments.

A brief synopsis of the MIKE system and modules used for this assessment is outlined below:

1. **MIKE 21 & MIKE 3 Flow Model FM system** - Using these flexible mesh modelling systems, it is possible to simulate the mutual interaction between currents, waves and sediment transport by dynamically coupling the relevant modules in both two and three dimensions. Hence, a full feedback of the bed level changes on the waves and flow calculation can be included.
2. **The Hydrodynamic module** –This module is capable of simulating water level variations and flows in response to a variety of forcing functions in lakes, estuaries and coastal regions. The HD Module is the basic computational component of the MIKE 21 and MIKE 3 Flow Model systems providing the hydrodynamic basis for the Sediment Transport and Spectral Wave modules

The Hydrodynamic module solves the two/three-dimensional incompressible Reynolds averaged Navier-Stokes equations subject to the assumptions of Boussinesq and of hydrostatic pressure. Thus the module consists of continuity, momentum, temperature, salinity and density equations. When being used in three dimensions, the free surface is taken into account using a sigma coordinate transformation approach whereby the vertical layer is divided equally into a discrete number of layers.

3. **The Spectral Wave module** – This module simulates the growth, decay and transformation of wind-generated waves and swell in offshore and coastal areas and accounts for key physical phenomena including wave growth by wave action, dissipation, refraction, shoaling and wave-current interaction.
4. **The Sediment Transport module** - The Sediment Transport Module simulates the erosion, transport, settling and deposition of cohesive sediment in marine and estuarine environments and includes key physical processes such as forcing by waves, flocculation and sliding. The module can be used to assess the impact of marine developments on erosion and sedimentation patterns by including common structures such as jetties, piles or dikes. Point sources can also be introduced to represent localised increases in current flows as a result of outfalls or ship movements etc.

A full description of these systems and modules can be found in Appendix 12-1.

1.2.3 Coastal Process Models and Data Sources

The models used to assess the impact of the MP2 Project on the coastal processes were developed from RPS' present-day Dublin Bay model.

RPS' present-day Dublin Bay Model was created using flexible mesh technology to provide detailed information on the coastal processes around Dublin Port and Dublin Bay. The model uses mesh sizes varying from 250,000 m² (equivalent to 500m x 500m squares) at the outer boundary of the model down to a very fine 225 m² (equivalent to 15m x 15m squares) along the approach channel and around the harbour channel (as presented in Figure 1). The bathymetry of this model was developed using data gathered from a hydrographic survey of the Dublin Port and Tolka estuary undertaken in 2017 and supplemented by data from the Irish National Seabed Survey, INFOMAR and other local surveys collated by RPS for the Irish Coastal Protection Strategy Study (ICPSS, 2003). The extent, mesh structure and bathymetry of this model is illustrated in Figure 1.

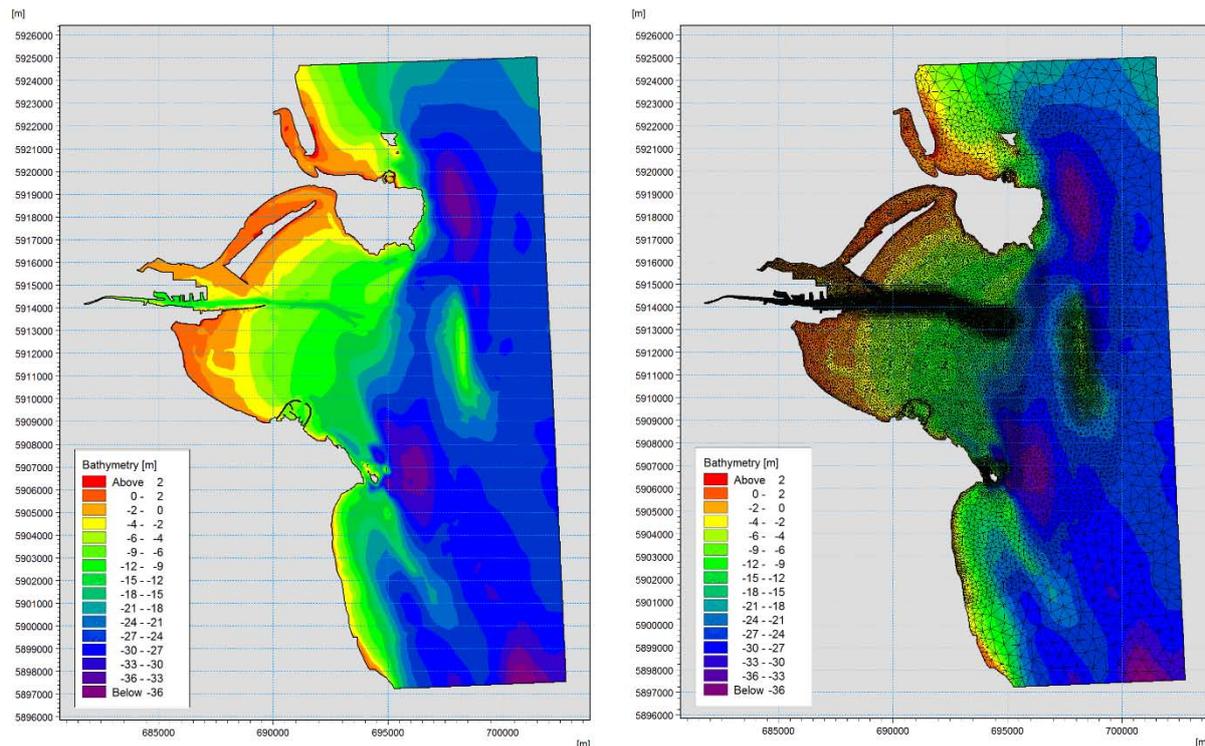


Figure 1 Extent and bathymetry of the Dublin Bay model (left) and the mesh structure of the Dublin Bay model (right)

The Dublin Bay model was then updated to produce a 2D version of the model that represented the pre-MP2 Project scenario (in this case, this represents the post-ABR Project layout within Dublin Port). The Dublin Bay model was further updated to produce a second 2D version of the model which represented the Dublin Port post-project scenario with the MP2 Project in place. As such the post-project scenario model had updated bathymetry at Berth 50A/Oil Berth 4, Berth 53 and in the area of the channel dredging works. The constructed elements of the MP2 Project including the new open piled Berth 53, Berth 52 Berth 50A,Oil Berth 3 were also represented in the model.

These two-dimensional models were used to appraise the impact of the MP2 Project on the existing tidal regime, the inshore wave climate and the dumping and dispersion of dredge material at the licensed offshore disposal site. However, as the coastal processes within Dublin Port are highly three-dimensional owing to the fresh water input from the Rivers Liffey, Tolka and Dodder, it was necessary to develop 3D versions of the pre and post-project scenario models.

As illustrated in Figure 4, the offshore boundary of the 3D versions of the pre and post-project scenario models extended from the Ben of Howth to Dalkey and includes the Dublin Bay area. These 3D models were comprised of five discrete vertical sigma layers and were used to assess the sediment plumes generated during the various dredging operations within Dublin Port and the operational performance of the MP2 Project.

The bathymetry of the pre and post-project scenario models in the Dublin Port area is illustrated in Figure 2 and Figure 3 respectively. A Summary of the models that were developed for the MP2 Project assessment and their purpose is summarised in Table 1.

Table 1 Summary of the numerical models developed for the MP2 Project assessment and their purpose

| Numerical Model | 2D Version | 3D Version |
|---|---|---|
| Present day Dublin Bay | <ul style="list-style-type: none"> Initial Calibration | n/a |
| Pre-project scenario (Dublin Port with ABR Project in place) | <ul style="list-style-type: none"> Tidal regime Wave climate Sediment disposal | <ul style="list-style-type: none"> Tidal regime |
| Post-project scenario (Dublin Port with MP2 Project in place) | <ul style="list-style-type: none"> Tidal regime Wave climate Sediment disposal | <ul style="list-style-type: none"> Tidal regime Dredging & dispersion Operational performance of the MP2 Project |



Figure 2 Bathymetry of the Dublin Port pre MP2 Project (post ABR Project) model – levels illustrated to Mean Sea Level



Figure 3 Bathymetry of the Dublin Port post MP2 Project model with dredged pockets outlined in red – levels illustrated to Mean Sea Level

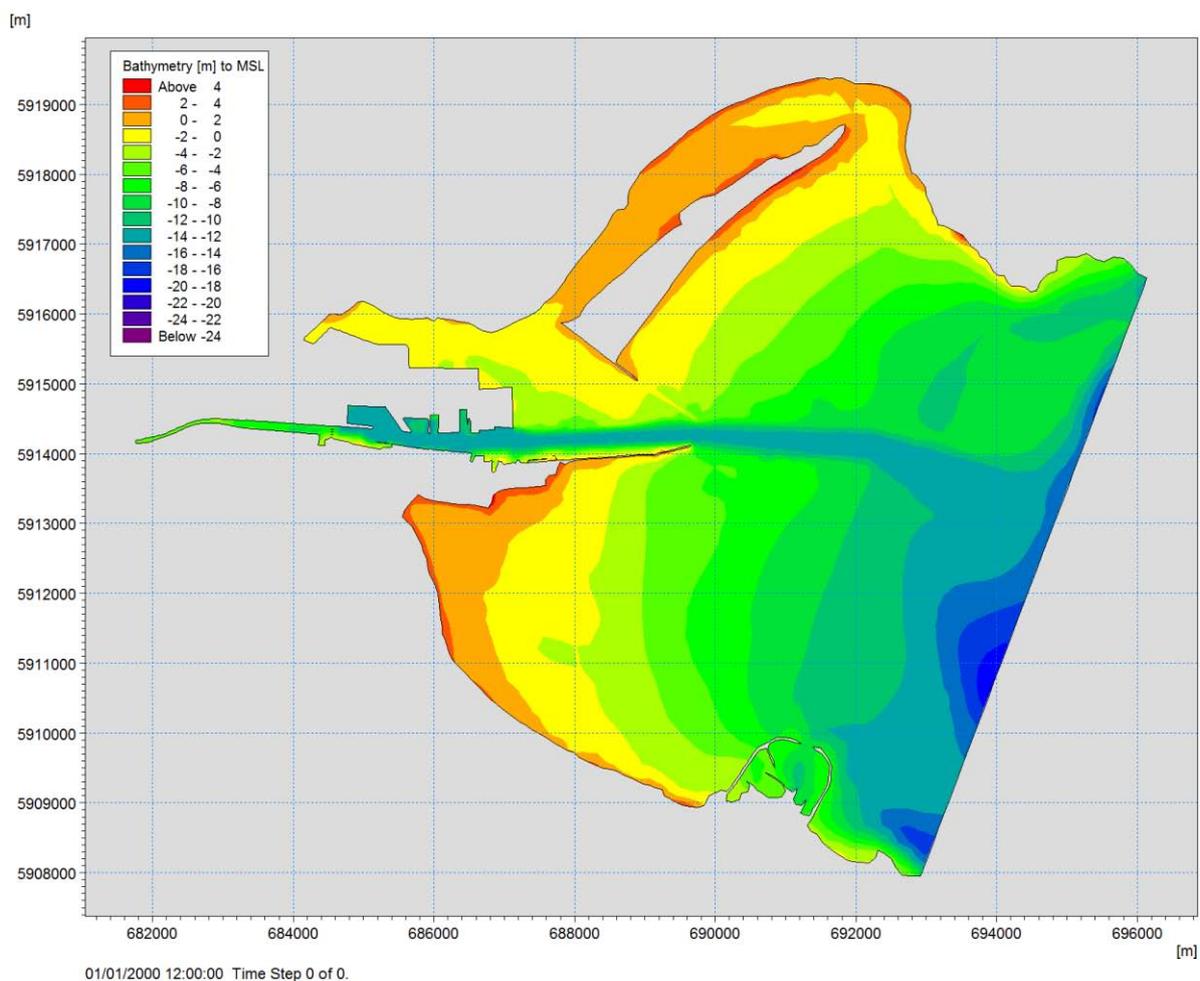


Figure 4 Extent and bathymetry of the 3D Dublin Port post MP2 Project model

In addition to the bathymetric survey of Dublin Port and the Tolka estuary area, a comprehensive sediment survey of the Tolka estuary was undertaken by Hydrographic Surveys Ltd in December 2017. This survey comprised sediment sampling at 18 locations for Particle Size Analysis (PSA). The results are presented in Appendix 12-2. Information from this survey was used to inform input parameters for the sediment transport simulations.

The 2017 survey data was complemented by current meter data recorded by two Acoustic Doppler Current Profilers (ADCPs) which were deployed in June 2013 as part of the ABR Project. These devices accurately record current speed, current direction and water depth. One ADCP device was located in the harbour channel in close proximity to buoy 16 and the other device to the north of the approach channel. The devices were deployed for over one month to record full spring and neap tidal cycles. Tidal current meter data recorded by an ADCP device that was deployed 500m west of Burford bank as part of previous study undertaken by DHI was also made available to this study (DHI, 2010).

The extent of the 2017 survey and location of the two ADCP devices that were deployed at part of the ABR Project is illustrated in Figure 5. Tidal current meter and surface elevation data from these hydrographic surveys was used to calibrate and validate the present-day Dublin Bay model. This calibration process is described in full detail in Appendix 12-1

Current velocities are also being continuously recorded at the centre of the dump site since September 2017. These recordings have also been used to validate the Dublin Bay model (reported in the Annual Environmental Report (AER) 2017 to the EPA under Dumping at Sea Permit S0024-01.

The model verification process confirmed that the present Dublin Bay model provides a very good representation of the coastal processes in the Dublin Port and Dublin Bay areas.

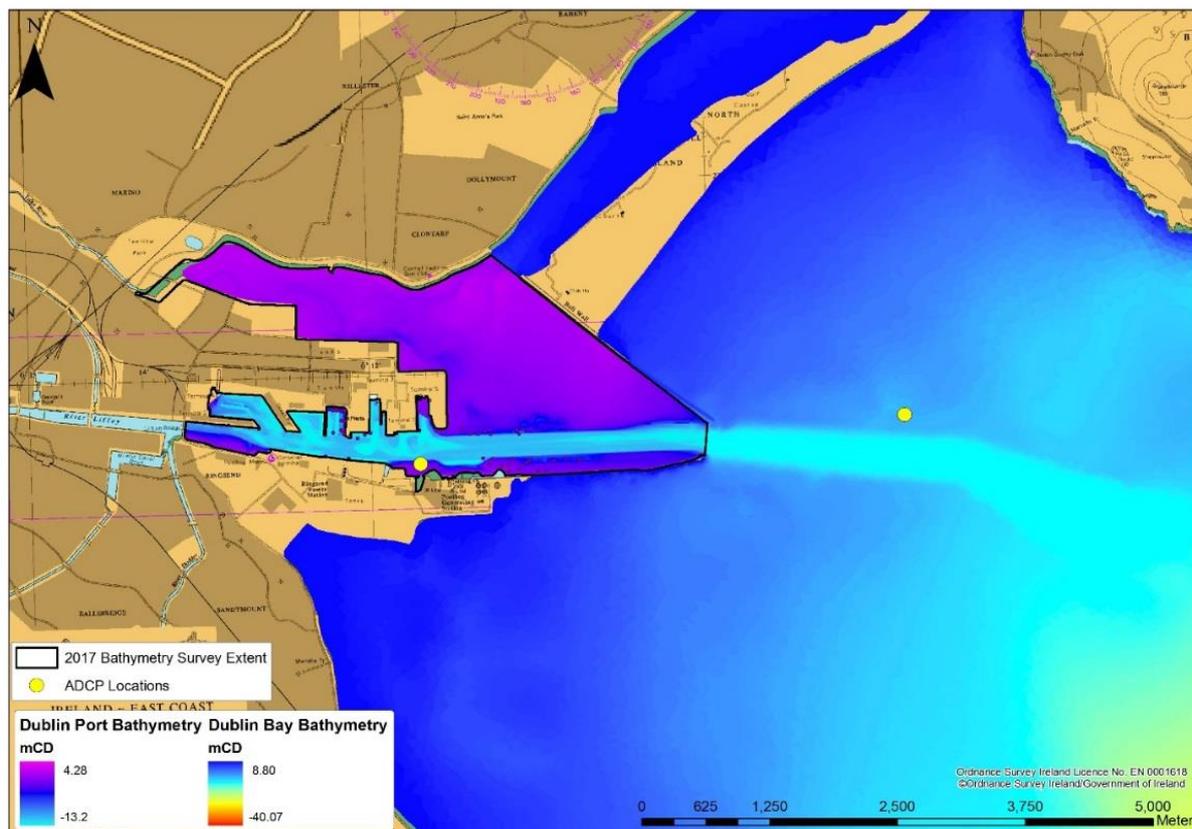


Figure 5 Location and coverage of the 2017 Bathymetric Survey

1.2.3.1 Boundary Conditions

The tidal boundary conditions for the 2D pre-project and post-project scenario models were taken from RPS' ICPSS tidal surge model. This model was developed using flexible mesh technology with the mesh size (model resolution) varying from circa 24km along the offshore Atlantic boundary to circa 200m around the Irish coastline. The extent and bathymetry of the ICPSS tidal surge model is presented in Figure 6. RPS also utilised their ICPSS east coast wave model to gather wave boundary data for the Dublin Bay model to ensure that the hydrodynamic influence of the offshore Kish and Codling banks were accounted for in the model. The extent and bathymetry of the ICPSS east coast wave model is presented in Figure 6.

Tidal boundary condition data for the 3D models were taken from the 2D pre-project and post-project scenario models.

All open sea boundaries were applied to the model as Flather boundaries whereby temporarily and spatially varying water level and current velocities are specified along the boundary. Flather boundaries are one of the most efficient boundary condition methods to downscale coarse model simulations to higher resolution areas as it avoids instabilities commonly associated with water level boundaries.

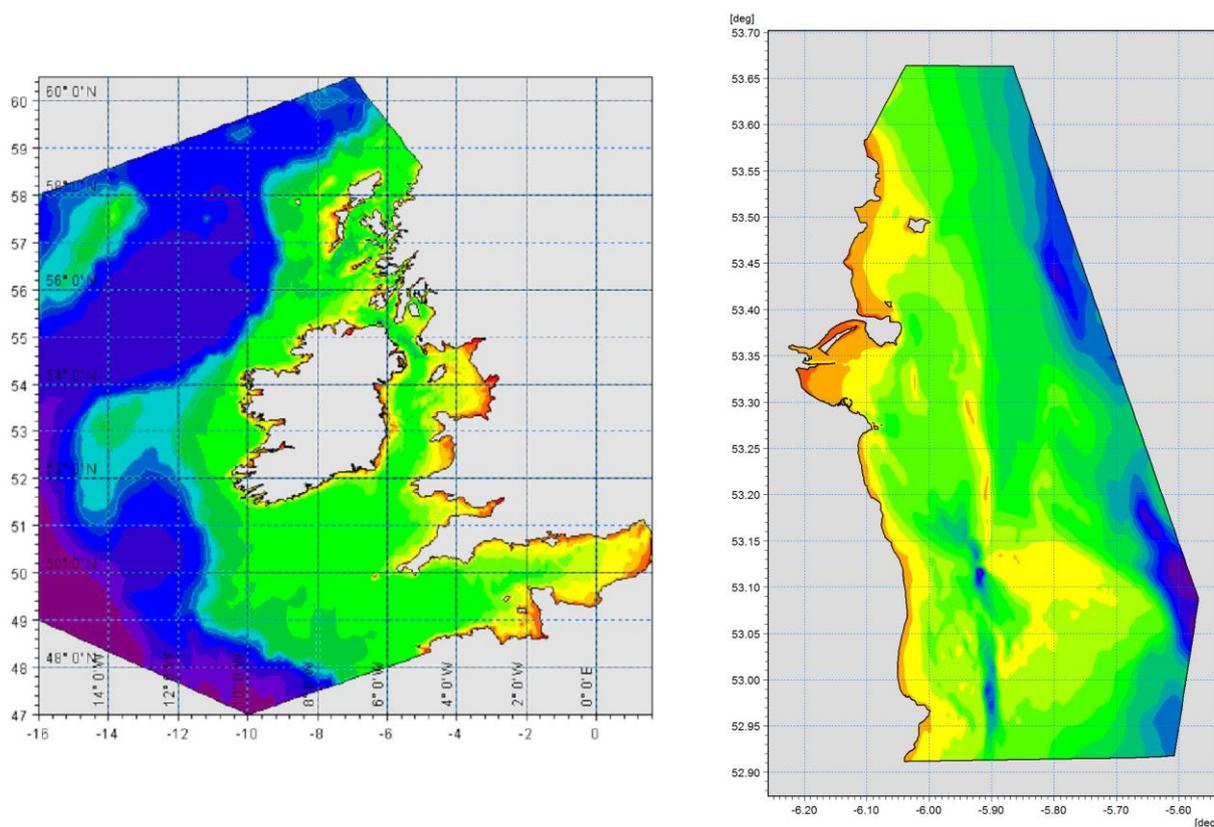


Figure 6 Extent and bathymetry of the ICPSS tidal surge model (left) and east coast wave model (right)

1.2.3.2 River Flows

The mean annual river flow values presented Table 2 in for the Liffey, Dodder and Tolka were used in the numerical model simulations of the tidal regime. Mean winter river flows were used to model the dispersion and fate of sediment plumes arising from the capital dredging works as dredging works are to be restricted to winter months only. Both the mean winter and annual river flows used for various rivers are presented in Table 2.

Table 2 Mean annual discharge rates from the Liffey, Dodder and Tolka used in the coastal process models

| Source | Mean annual discharge rate (m ³ /s) | Mean winter discharge rate (m ³ /s) |
|--------|--|--|
| Liffey | 15.6 | 25.0 |
| Dodder | 2.3 | 2.6 |
| Tolka | 1.4 | 1.6 |

1.3 Receiving Environment

In this section of the assessment, the pre-MP2 Project scenario (Dublin Port with ABR Project in place) tidal and wave patterns within Dublin Port and Bay are presented. This is undertaken with reference to both the simulated model data and, where applicable, hydrographic survey data (see Section 1.2.3) and site specific water quality monitoring data made available by Dublin Port Company's Monitoring Programme (ongoing for the ABR Project).

1.3.1 Tidal Regime within Dublin Port (pre-MP2 Project scenario)

The MIKE 21 Hydrodynamic module described in Section 1.2.3 was used in conjunction with the pre-MP2 Project scenario (Dublin Port with ABR Project in place) 2D model to derive baseline tidal regime information within Dublin Port.

Typical tidal flow patterns for a spring ebb and spring flood tide are presented in Figure 8. These tidal flow diagrams illustrate that the current speeds in the central navigation channel are marginally higher during mid-ebb conditions relative to mid-flood conditions owing to the contribution of flow from the Liffey, Dodder and Tolka.

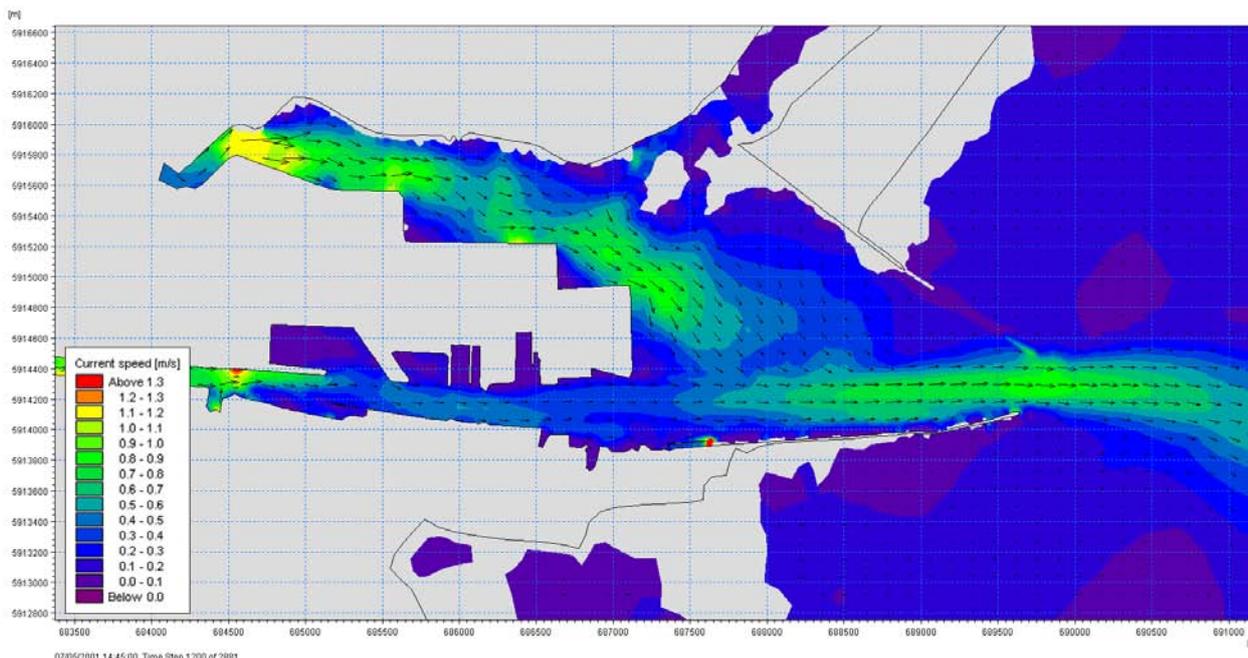


Figure 7 Typical spring mid ebb tidal flow patterns – Pre-MP2 Project

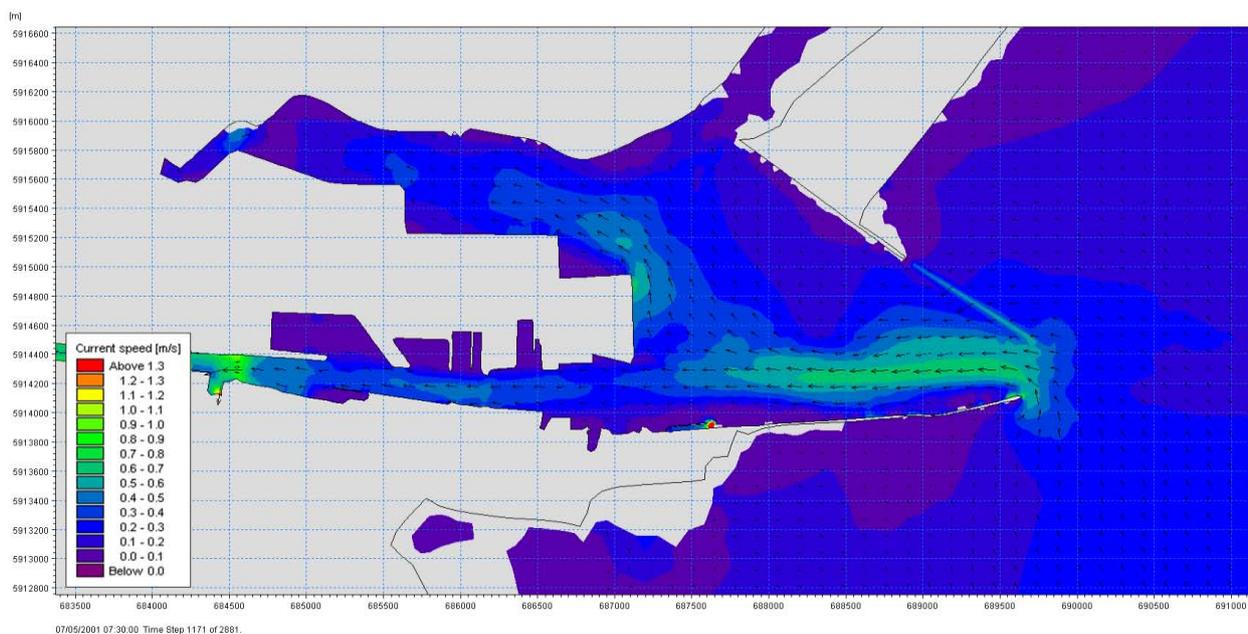


Figure 8 Typical spring mid flood tidal flow patterns – Pre-MP2 Project

1.3.2 Wave Climate within Dublin Port (pre-MP2 Project scenario)

Offshore wave data for points at 5.66°W, 55.50°N and 5.66°W, 55.25°N were taken from the UK Met Office European wave model used as a source to select the largest event for each of the north east, east and south east directions. The three hourly data included wind wave and swell wave components in the form of the significant wave height, mean wave period, peak wave period and mean wave directions. The offshore wave climate data used in the wave transformation simulations are summarised in

The MIKE 21 Spectral Wave module described in Section 1.2.3 was used in conjunction with the pre-MP2 Project scenario 2D model to transform the offshore wave conditions for the north easterly, easterly and south easterly storm events into the nearshore. These offshore wave conditions are summarised in Table 3.

It should be noted that the Spectral Wave module was considered the most appropriate method to assess the inshore wave climate as the alternative Boussinesq wave harbour disturbance model does not account for wind wave generation. This a particularly important factor for areas such as the Clontarf frontage where the wave climate is dominated by wind waves generated over short fetches.

Figure 9, Figure 10 and Figure 11 present the inshore wave heights in Dublin Bay at spring high tide during north easterly, easterly and south easterly storm events respectively. It will be seen from these figures that based on these simulations the largest waves that propagate into Dublin Port occur during easterly storm events at spring high water.

The wave climate is currently being continuously recorded at the centre of the dump site since September 2017. These recordings have also been used to validate the predictions of storm waves entering Dublin Bay (reported in the Annual Environmental Report (AER) 2017 to the EPA under Dumping at Sea Permit S0024-01.

Table 3 Offshore wave climate data used to simulate the inshore wave climate

| Storm Event | Significant wave height (m) | Peak wave period (s) | Mean wave direction (°N) |
|----------------|-----------------------------|----------------------|--------------------------|
| North Easterly | 4.6 | 8.9 | 29 |
| Easterly | 5.5 | 82 | 98 |
| South Easterly | 5.4 | 10.4 | 148 |

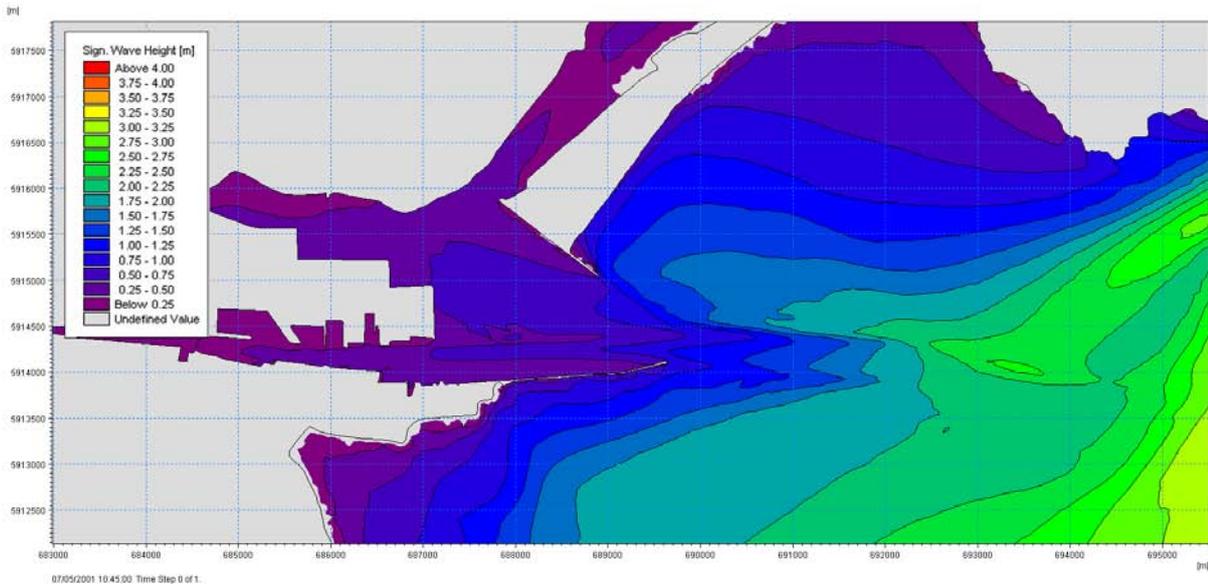


Figure 9 North Easterly storm wave heights at spring high water – Pre-MP2 Project

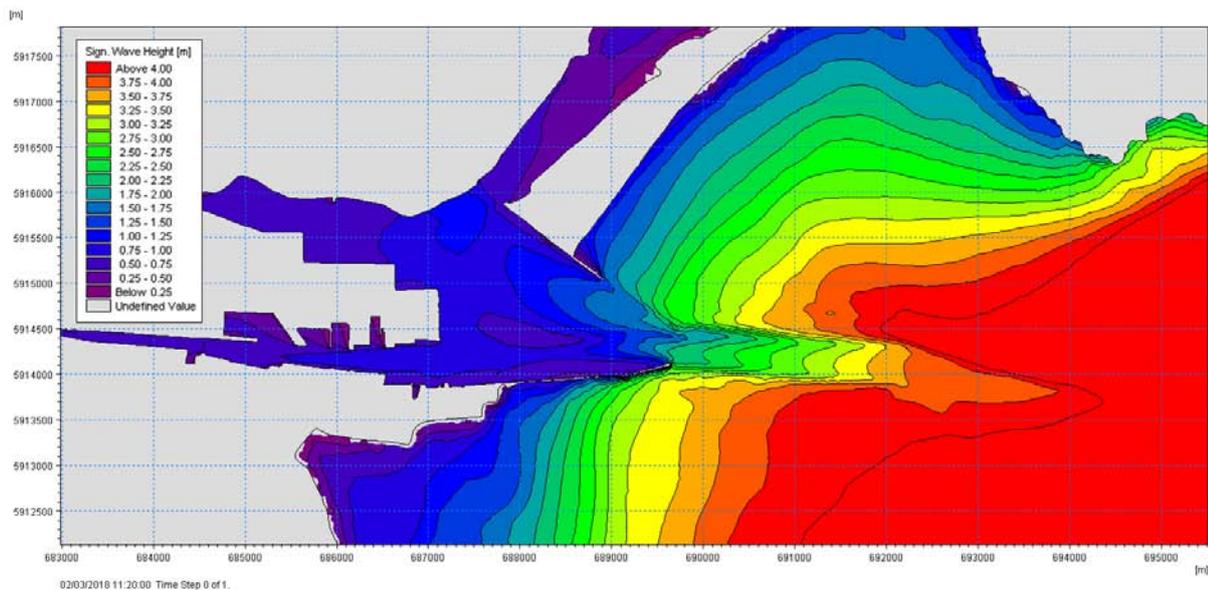


Figure 10 Easterly storm wave heights at spring high water – Pre-MP2 Project

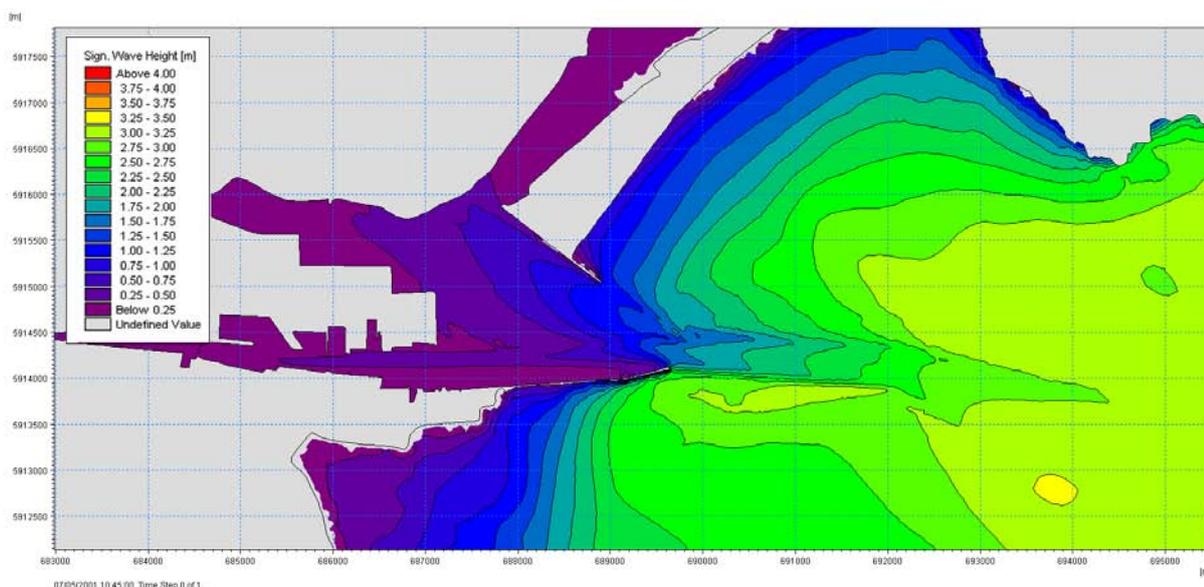


Figure 11 South Easterly storm wave heights at spring high water – Pre-MP2 Project

1.4 Likelihood of Impacts

The impact on coastal processes arising from the MP2 Project is assessed in relation to the construction phase of the project and the subsequent operational phase. Various elements of construction and operation and the types of impacts on the tidal, wave and sediment transport regimes that they could potentially result in are identified for assessment in the following sections.

The assessment has been informed by a robust numerical modelling programme and, where applicable, hydrographic survey data (see Section 1.2.3) and site specific water quality monitoring data made available by Dublin Port Company's Monitoring Programme (ongoing for the ABR Project).

1.4.1 Construction Phase Impacts

The major elements of the construction programme are outlined in Section 3 of the NIS. In context of coastal process, the elements of the MP2 Project that have the potential to result in construction phase impacts are outlined below:

- Capital Dredging and Disposal:
 - Capital dredging works in the navigation channel and berthing pockets
 - Disposal of dredge spoil at the dumping site

Temporary impacts on water quality have the potential to occur during the construction phase of the works. Mobilised suspended sediment release through capital dredging and disposal activities are the principal potential sources of environmental impact. The potential impacts from the increase in background suspended sedimentation concentrations and deposition levels as a result of the capital dredging and disposal operations during the construction phase are assessed in Section 1.5.1.

1.4.2 Operational Phase Impacts

Port development consisting of the construction of structures and/or changes in the configuration of the seabed bathymetry through capital dredging works has the potential to impact on coastal processes. In context of the MP2 Project, the following elements have the potential to impact on coastal processes:

- New Berth 53
- Re-alignment of the previously consented Berth 52
- Berth 50A extension
- The redevelopment of Oil Berth 3
- Infilling Oil Berth 4

In particular, these elements of work have the potential to impact the following coastal processes during the operational phase of the project:

- Tidal current patterns within Dublin Port and Dublin Bay
- Sedimentation and erosion patterns within Dublin Port and Dublin Bay
- The inshore wave climate within Dublin Port and surrounding area
- Prevailing water levels and the existing flood risk in Dublin Port and the surrounding area

The operational phase impacts in context of these coastal processes are assessed in Section 1.5.2.

1.5 Description of Potential Impacts

1.5.1 Construction Phase Impacts

1.5.1.1 Potential Impacts as a result of capital dredging works

As described in Section 3 of the NIS, the MP2 Project will include capital dredging to deepen the berthing pockets at Oil Berth 3/Berth 50A, facilitate construction of Berth 53 and the channel dredging works towards the south of the navigation channel as shown in Figure 12. The dredging operations will result in the removal of 424,844 m³ of marine sediments; a breakdown of the dredging requirements is presented in Table 4.

The process of dredging unavoidably causes disturbance of sediment on the channel bed and dispersal of some material in the water column. Disposal of dredge spoil at the licenced dumping site in Dublin Bay also results in sediment release. These losses may have potential impacts on marine life and water quality in the form of a suspended sediment plume within the water column. The potential impacts arising from these factors has therefore been assessed in the report.

It should be noted that chemical sediment analysis found that the sediments to be dredged from the Port's navigation channel and basins are suitable for conventional dumping at sea.



Figure 12 MP2 Dredging Areas

Table 4 Breakdown of dredging requirements for the MP2 Project

| Element of Work | Dredge Level | Dredge Requirements (m ³) |
|---|--------------|---------------------------------------|
| Berth 53 | -10.0 m CD | 159,595 |
| Channel widening area (south of Liffey channel) | -10.0m CD | 111,995 |
| Oli Berth 3 | -13.0 m CD | 83,414 |
| Berth 50A | -11.0 m CD | 69,640 |
| Total volume to be dredged | | 424,644 |

Particle Size Analysis described in Section 1.2.3 indicated that the material to be dredged as part of the MP2 Project is comprised of three discrete fractions with mean diameters of 200µm, 20µm and 3µm, with each fraction constituting approximately 1/3 of the total volume of sediment to be dredged.

Extensive water quality monitoring using real time turbidity measurements during previous dredging campaigns (AER 2017 and AER 2018) has shown that during disposal of dredged fine sands at the licensed disposal site, the fine sand falls rapidly to the bottom and any sediment plume is short lived and is not dispersed widely. However sediments to be dredged in the MP2 Project are finer and contain a substantial silt fraction.

Therefore, plume modelling was undertaken for the silt fractions with silt losses of 1% at the dredger head being introduced as a sediment source in the bottom layer of the model. The other key parameters relating to the dredging simulations presented in the following Sections of this Report are set out in Table 5.

As the Liffey channel in Dublin Port is influenced by a number of fresh water river inflows and by thermal inputs from three power station cooling water systems, stratification of the water column occurs under certain tidal conditions in the Liffey channel particularly in the central section of the harbour. Therefore, the plume modelling simulations were undertaken using the MIKE 3 Hydrodynamic model described in Section 1.2.3. This model was coupled with the Sediment Transport module and included temperature and salinity effects. The Tolka, Liffey and Dodder river flows were taken as the winter average flows (Table 2). The power station flow and temperature characteristics used in the model are shown in Table 6.

Three individual simulations were run to simulate the dredging operations at Berth 53, the channel widening area south of the channel, and at Oil Berth 3 and Berth 50A. Each simulation was run for one month to represent the full dredging operation in each area. The output from these simulations is presented in the following Sections of this Report.

Table 5 Dredging simulation input parameters

| Parameter | Value |
|--|-----------------------|
| Trailer Suction Hopper Dredger capacity | 4,100 m ³ |
| Ratio of sediment/entrained water during loading | 0.3 |
| Average density of material inside hopper | 1.65 t/m ³ |
| Average Trip Frequency between Dublin Port and Disposal site | 3.0 hours |
| Average Time to Fill Dredger Hopper | 1.5 hours |
| Time to release load | 90 seconds |
| Overspill Trailer Suction Hopper Dredger head | 0% |
| Sediment loss at Trailer Suction Hopper Dredger head | 1% of silts |

Table 6 Power Station discharge and temperature characteristics, Dublin Harbour

| Source | Discharge m ³ /s | ΔT degree C | Outlet | Intake |
|------------|-----------------------------|-------------|---------------|---------------|
| North Wall | 3.9 | 10 | Surface layer | Mid depth |
| Synergen | 7.6 | 6.6 | Surface layer | Mid depth |
| Poolbeg | 18.7 | 7.1 | Surface layer | Surface layer |

In line with the current Dredging Management Plan developed for the ABR Project and as set out in *Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018*, no over-spill from the dredger's hopper was included in any of the three model simulations. Other key relevant mitigation measures that will apply to each dredging campaign in the MP2 Project are presented in Section 1.6.1.

Dredging of Berth 53

The dispersion of silts during ongoing dredging is illustrated by a series of plume diagrams that show the suspended sediment concentration of silt in the water column resulting from the dredging operations. Figure 13 to Figure 16 represent the dispersion of silt material at times of low water, mid flood, high water and mid ebb at a time during the simulated dredging campaign when the suspended sediment concentrations may be expected to be at their highest values (i.e. when the dredger is active at the site).

These figures show that the suspended sediment concentration plumes are confined to the northern half of the navigation channel at all times. The sediment concentrations of the plumes are generally less than 25 mg/l beyond the immediate dredge area. The lateral extent of the 10mg/l plume envelope is generally less than 750m under most tidal conditions.

Monitoring of the Liffey and Tolka Estuaries between East Link Bridge and the entrance to the Port at Poolbeg Lighthouse has been undertaken by the ABR Project. Measurements of turbidity at the North Bank Light (adjacent to the Tolka Estuary) over the period 2017 – 2018 have ranged from 0 to 39.5 NTU with a mean of 2.6 NTU (n=17,533). This equates to a suspended solids range of 0 to 98 mg/l with a mean of 6.4 mg/l. While there is a relatively small and very local predicted increase in suspended solids due to dredging at Berth 53, this falls within the background range measured close to this location during normal Port operations.

The predicted deposition of the silt fractions lost to the water column during the dredging of Berth 53 at the end of a simulated one-month dredging campaign is presented in Figure 17. This Figure shows that the volume of material deposited outside of the dredge area is generally less than 0.40g/m² and that the deposition of sediment is generally confined to within the immediate area of the dredging operation. It should be noted that dredging proceeds until the specified design depth is reached and any material deposited within the dredge area will be removed by the dredger until the specification is met.

The estimated natural sediment load from the upstream Liffey catchment is estimated at about 200,000 tonnes per annum (DPC Maintenance Dredge AER 2017, Dumping at Sea Permit S0004-01). If dispersed over the Port area between East Link and Poolbeg Light and the Tolka Estuary this is roughly equivalent to a natural sediment load of 30 kg/m² in any year. The small level of deposition predicted as a result of dredging at Berth 53 is therefore highly unlikely to pose any risk through siltation.

It can, therefore, be concluded that the dredging operations required for Berth 53 will not result in any significant impact to either the water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition.

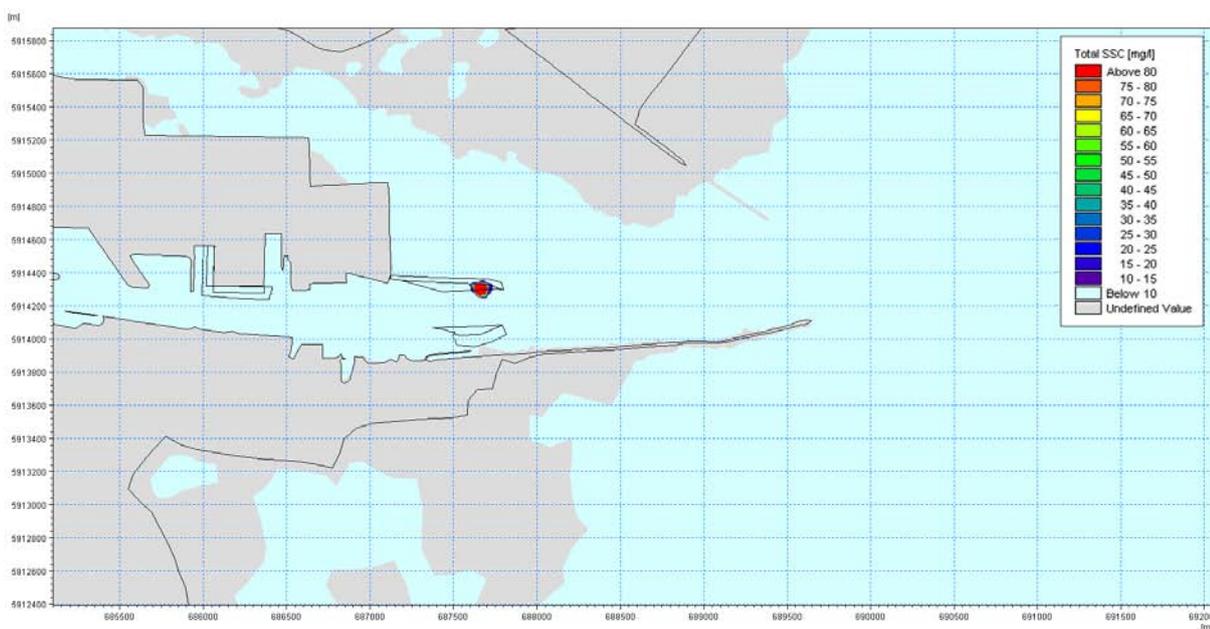


Figure 13 Suspended sediment concentration plume in the bottom layer during a typical low water phase of a spring tidal cycle whilst dredging Berth 53

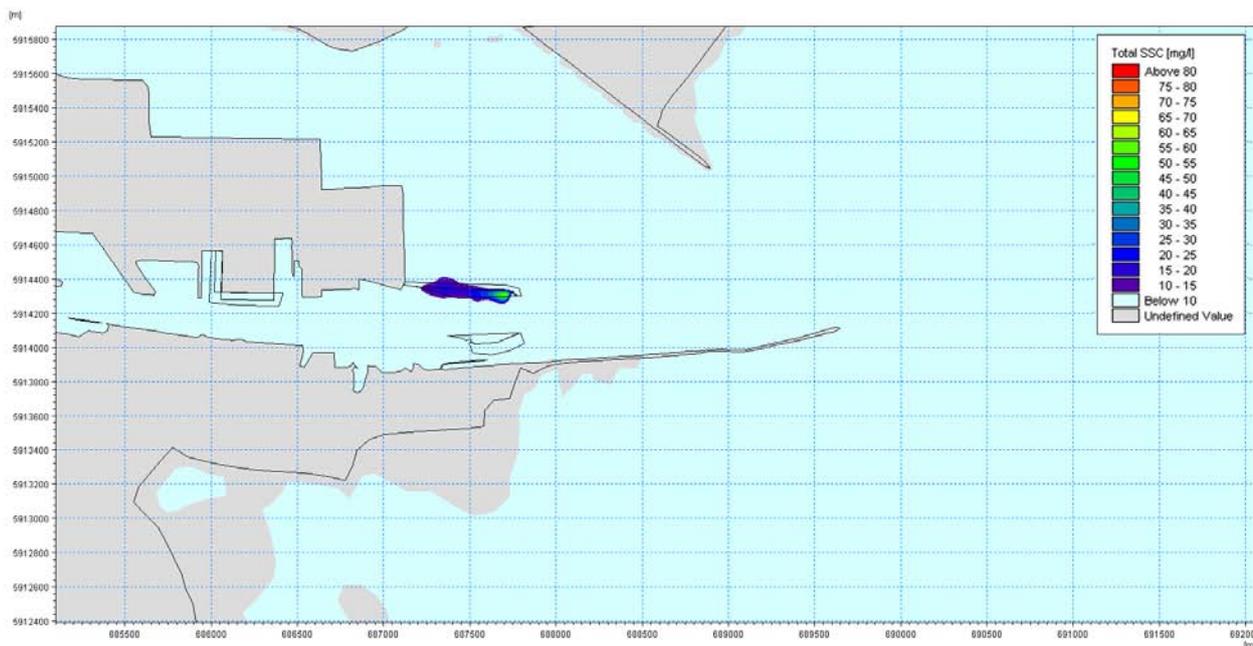


Figure 14 Suspended sediment concentration plume in the bottom layer during a typical mid flood phase of a spring tidal cycle whilst dredging Berth 53

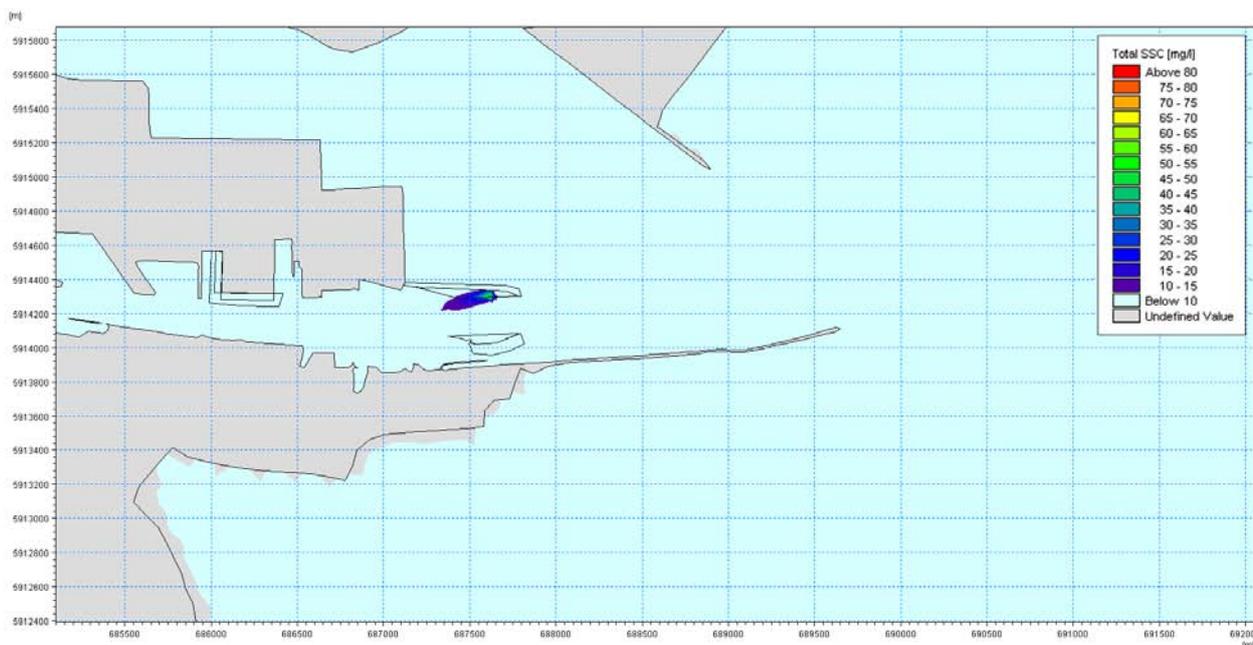


Figure 15 Suspended sediment concentration plume in the bottom layer during a typical high water phase of a spring tidal cycle whilst dredging Berth 53

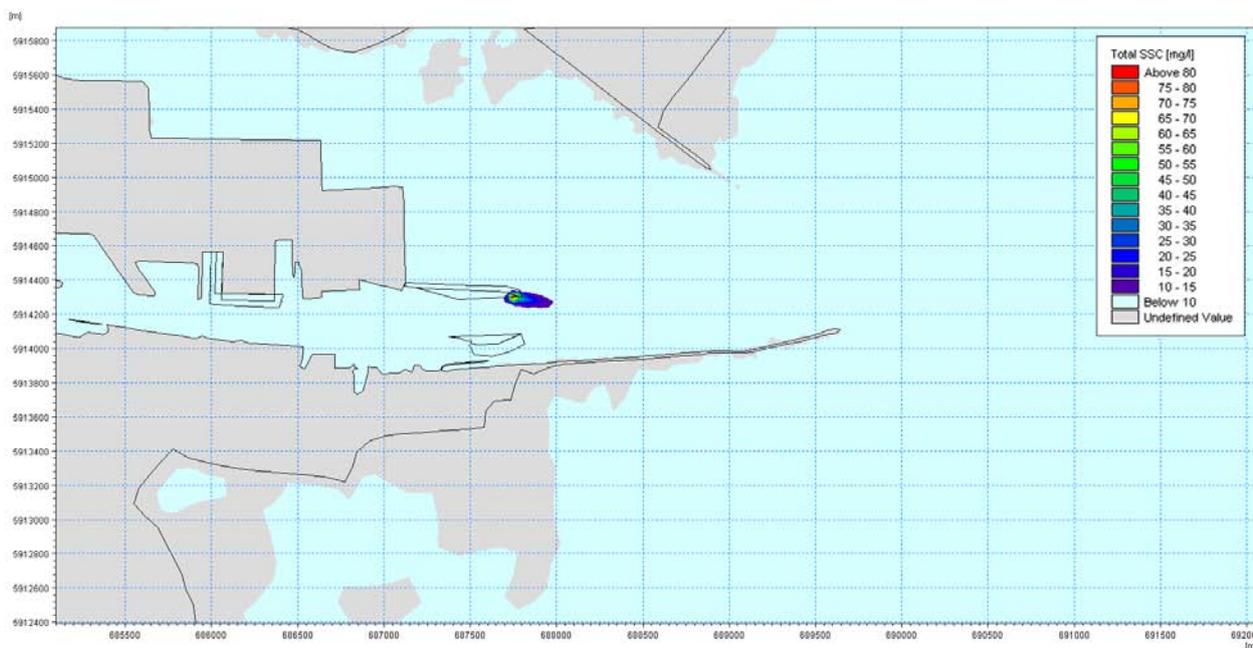


Figure 16 Suspended sediment concentration plume in the bottom layer during a typical mid ebb phase of a spring tidal cycle whilst dredging Berth 53

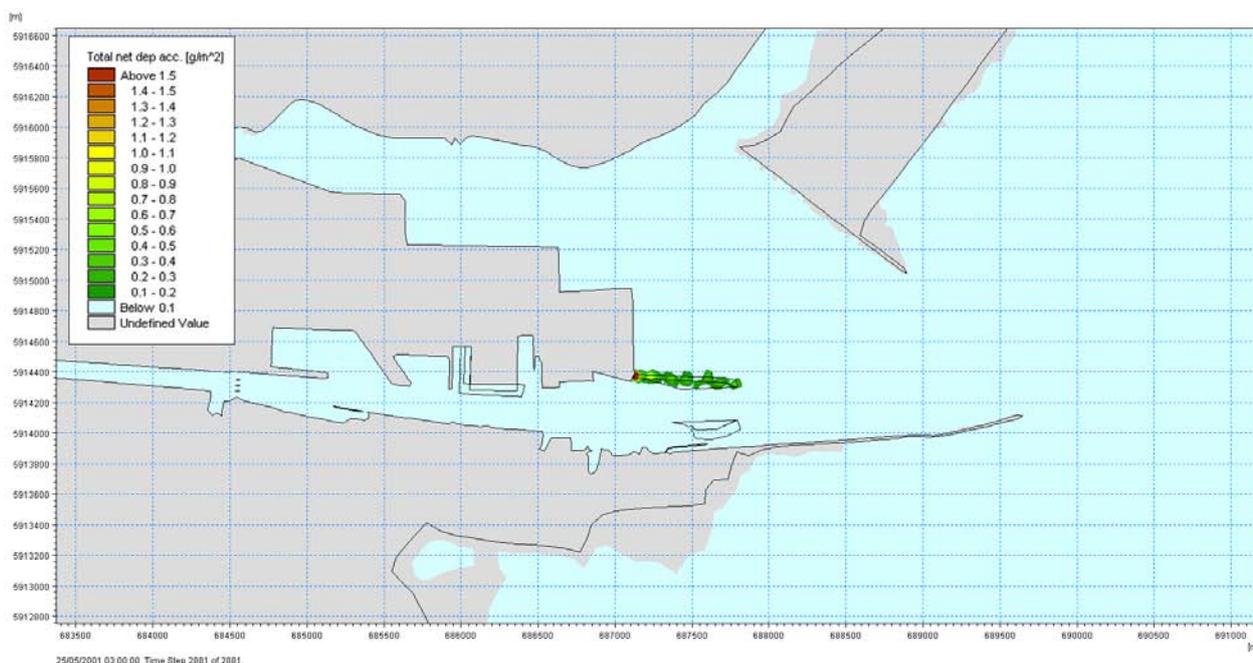


Figure 17 Deposition of sediment following the dredging operations at Berth 53

Channel Dredging Works

The impact of the silt dispersion on the suspended sediment concentration is shown by a series of plume diagrams. Figure 18 to Figure 21 represent the dispersion of silt material at times of low water, mid flood, high water and mid ebb at a time during the dredging operation when the suspended sediment concentrations may be expected to be at their highest values (i.e. when the dredger is active at the site).

It will be seen from these figures the suspended sediment concentration plumes are confined to the southern half of the navigation channel. The sediment concentration of the plumes is generally less than 25 mg/l beyond

the immediate dredge area. As set out in the previous section, this is a relatively small and very local predicted increase in suspended solids due to the channel dredging works and is well within the background range experienced at this location during normal Port operations. The lateral extent of the 10mg/l plume envelope is generally less than 600m under most tidal conditions.

The predicted deposition of the silt fractions lost to the water column during the channel dredging works at the end of a simulated one month dredging campaign is presented in Figure 22. This Figure shows that the volume of material deposited outside of the dredge area is generally less than 0.30g/m² and that the deposition of sediment is generally confined to within the immediate area of the dredging operation. By comparison with natural background sediment loads (previous section) such a small level of deposition is highly unlikely to pose any risk through siltation and no further mitigation is required. Again, any material deposited within the dredge area will be removed by the dredger until the specification is met.

It can, therefore, be concluded that, when considered in terms of background conditions, the dredging operations required for the channel dredging works will not result in any significant impact to either the water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition. No further mitigation is required.

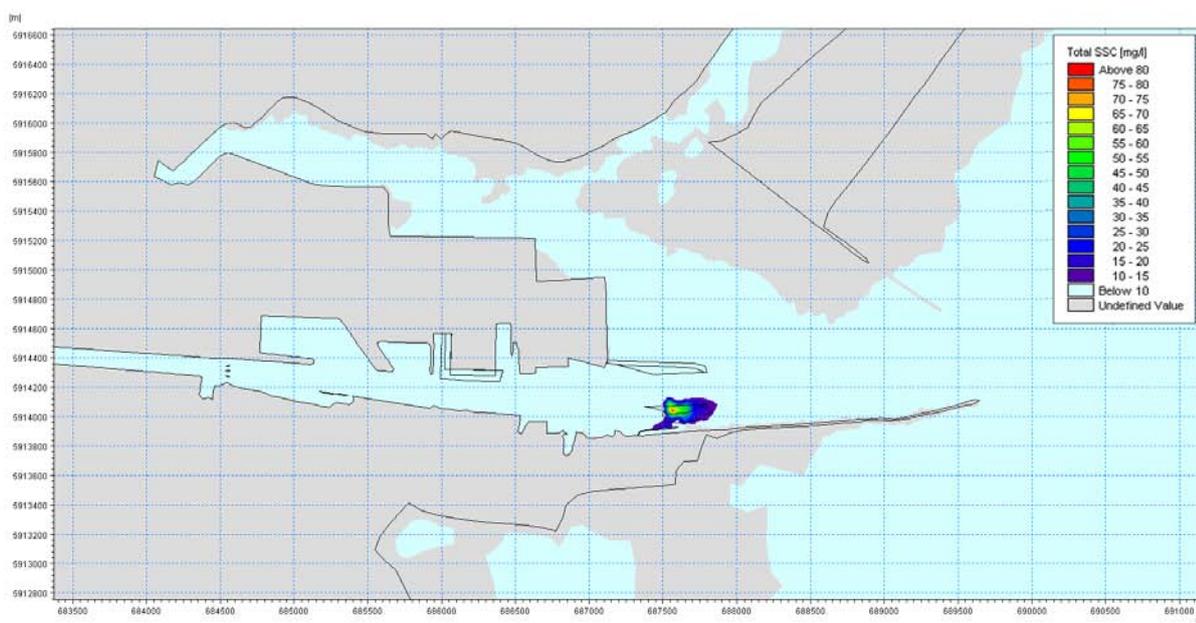


Figure 18 Suspended sediment concentration plume in the bottom layer during a typical low water phase of a spring tidal cycle during the Channel Dredging Works

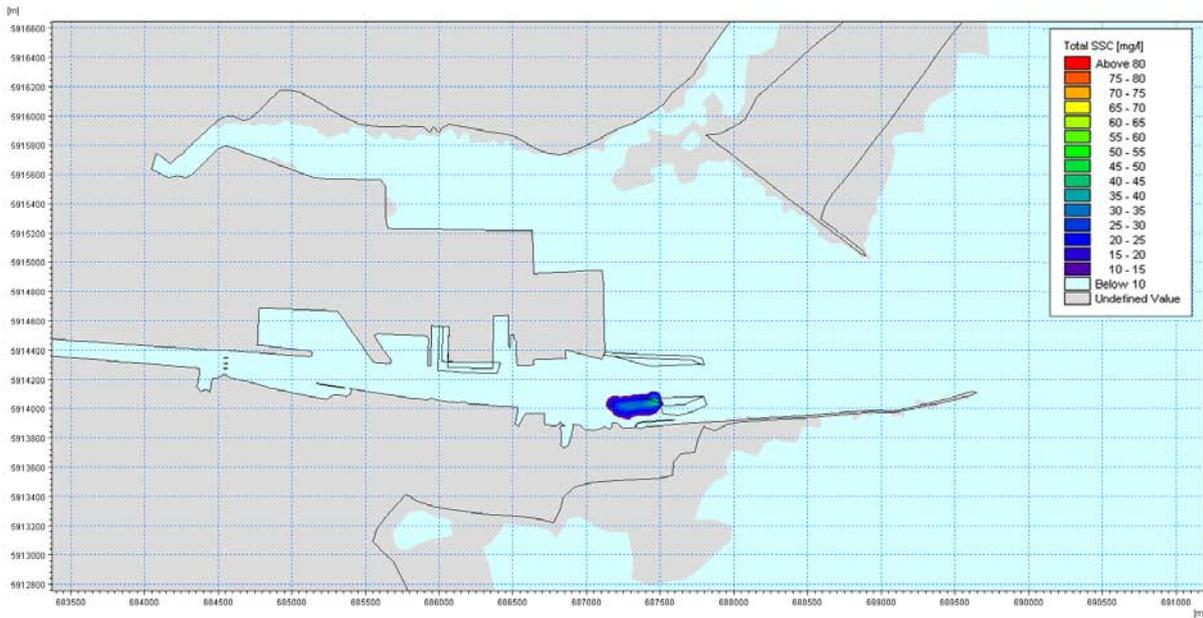


Figure 19 Suspended sediment concentration plume in the bottom layer during a typical mid flood phase of a spring tidal cycle during the Channel Dredging Works

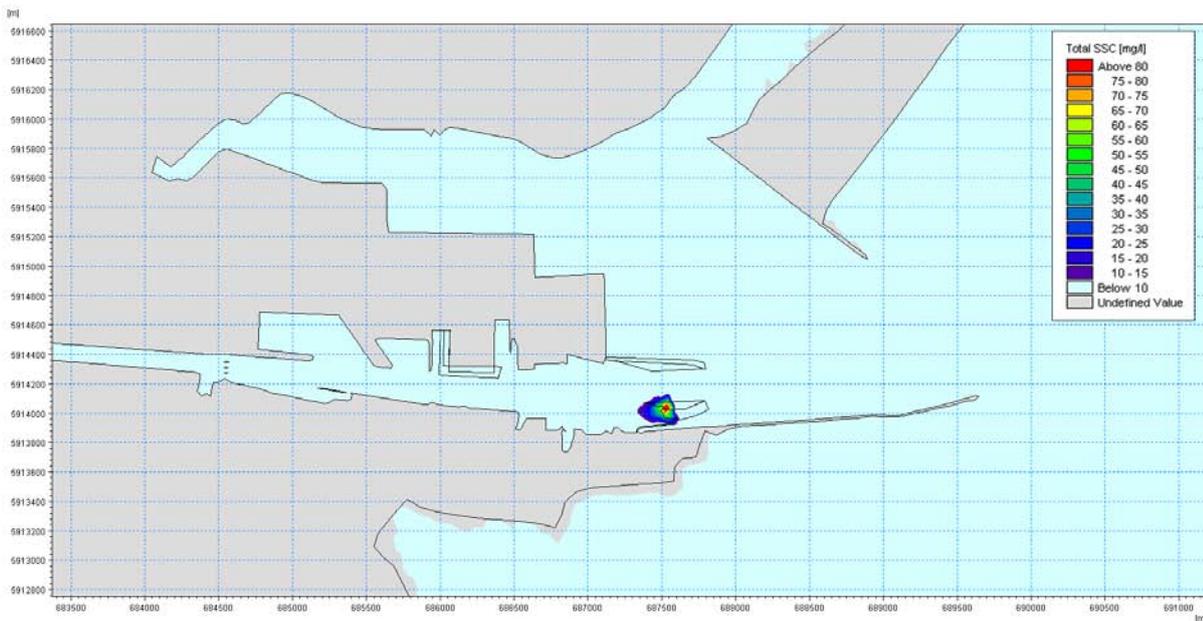


Figure 20 Suspended sediment concentration plume in the bottom layer during a typical high water phase of a spring tidal cycle during the Channel Dredging Works

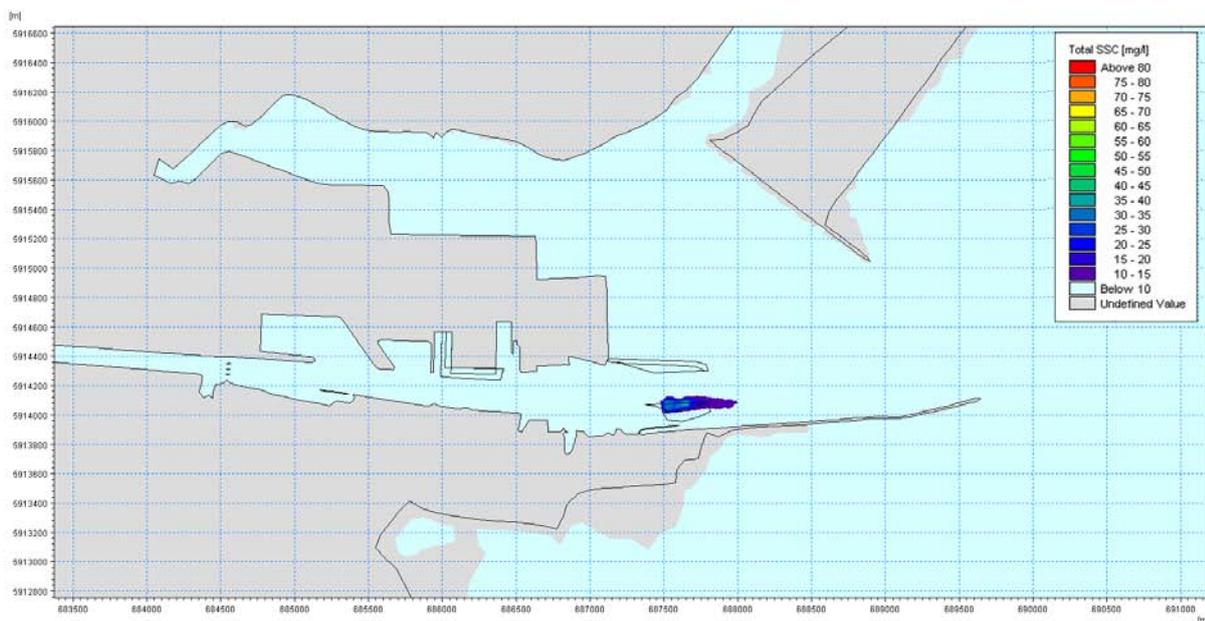


Figure 21 Suspended sediment concentration plume in the bottom layer during a typical mid ebb phase of a spring tidal cycle during the Channel Dredging Works

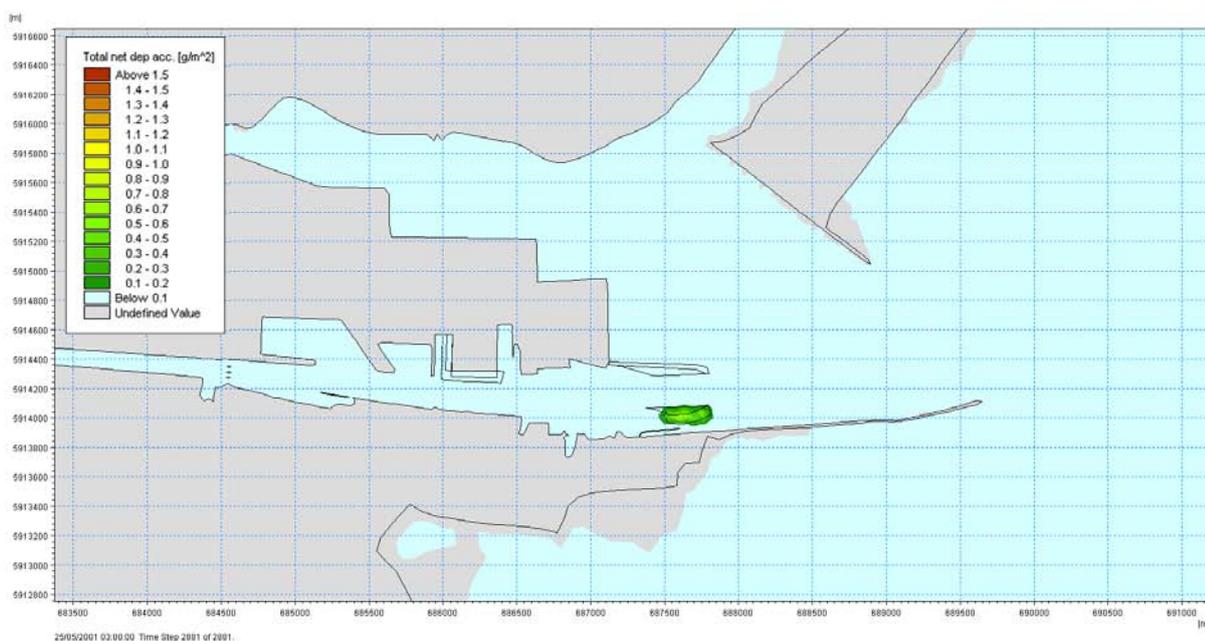


Figure 22 Deposition of sediment following the Channel Dredging Works

Dredging of the Oil Berth 3 and Berth 50A

The impact of the silt dispersion on the suspended sediment concentration is shown by a series of plume diagrams. Figure 24 to Figure 26 represent the dispersion of silt material at times of low water, mid flood, high water and mid ebb at a time during the dredging operation when the suspended sediment concentrations may be expected to be at their highest values (i.e. when the dredger is active at the site).

It will be seen from these figures that the suspended sediment concentration plumes are confined to within Oil Berth 3 and the northern half of the navigation channel. The sediment concentrations of the plumes are generally less than 35 mg/l beyond the immediate source point. While there is a relatively small and very local predicted

increase in suspended solids due to dredging at Oil Berth 3 and Berth 50A, this is well within the background range experienced at these locations during normal Port operations.

The predicted deposition of the silt fractions lost to the water column during the dredging of Oil Berth 3 and Berth 50A at the end of the one month dredging campaign simulation is presented in Figure 27. This Figure shows that the volume of material deposited outside of the dredge area is generally less than 8g/m² and that the deposition of sediment is generally confined to within the immediate area of the dredging operation. As with the previous dredging operations, any material deposited within the dredge area would be removed by the dredger until the final design depth is reached. It can be concluded that the silt material lost to the water column during the dredging of the Oil Berth 3 and Berth 50A will be contained within the Dublin Port.

It can, therefore, be concluded that the dredging operations required for the Oil Berth 3 and Berth 50A will not result in any significant impact to either the water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition. No further mitigation is required.

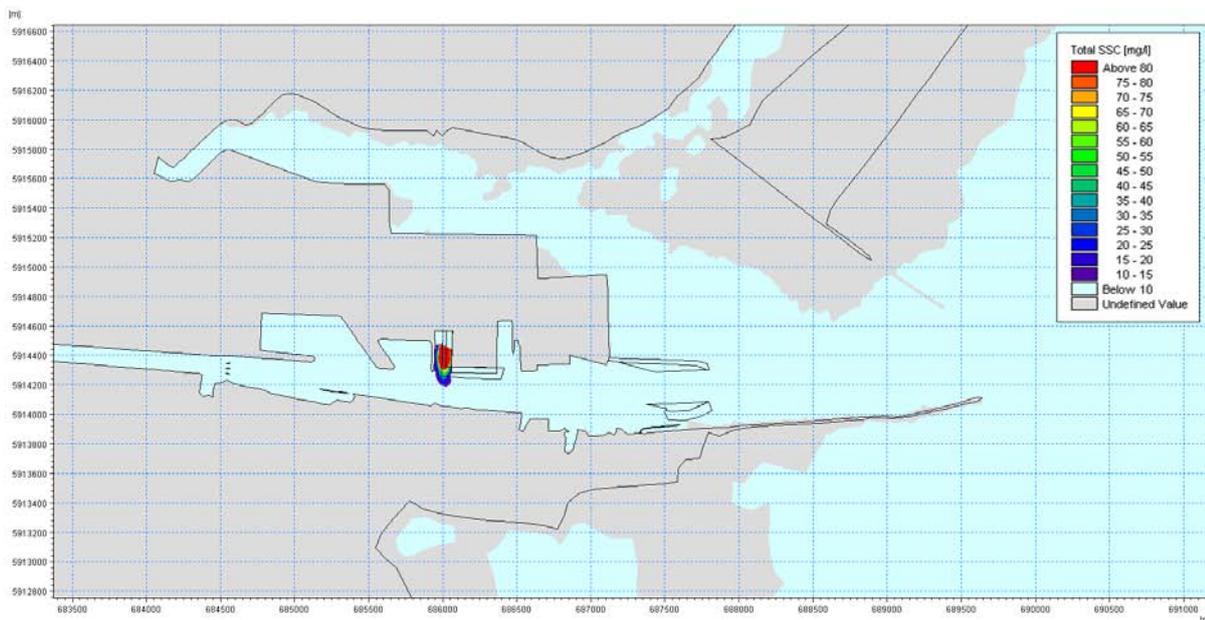


Figure 23 Suspended sediment concentration plume in the bottom layer during a typical low water phase of a spring tidal cycle whilst dredging the Oil Berth 3 and Berth 50A

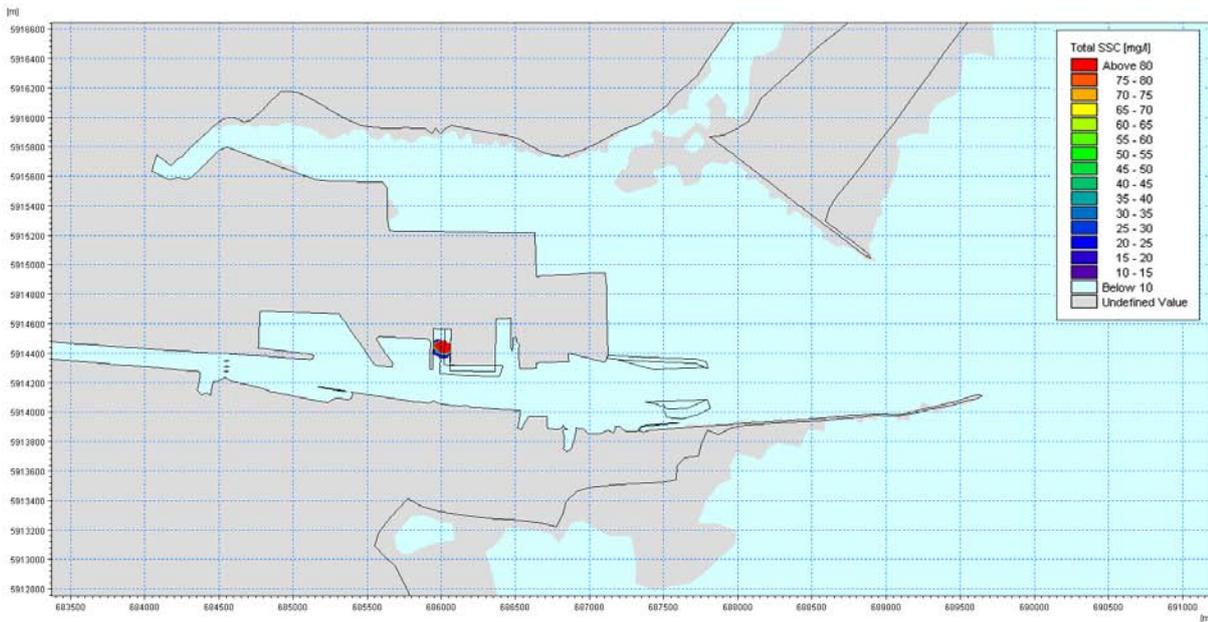


Figure 24 Suspended sediment concentration plume in the bottom layer during a mid flood phase of a spring tidal cycle whilst dredging the Oil Berth 3 and Berth 50A

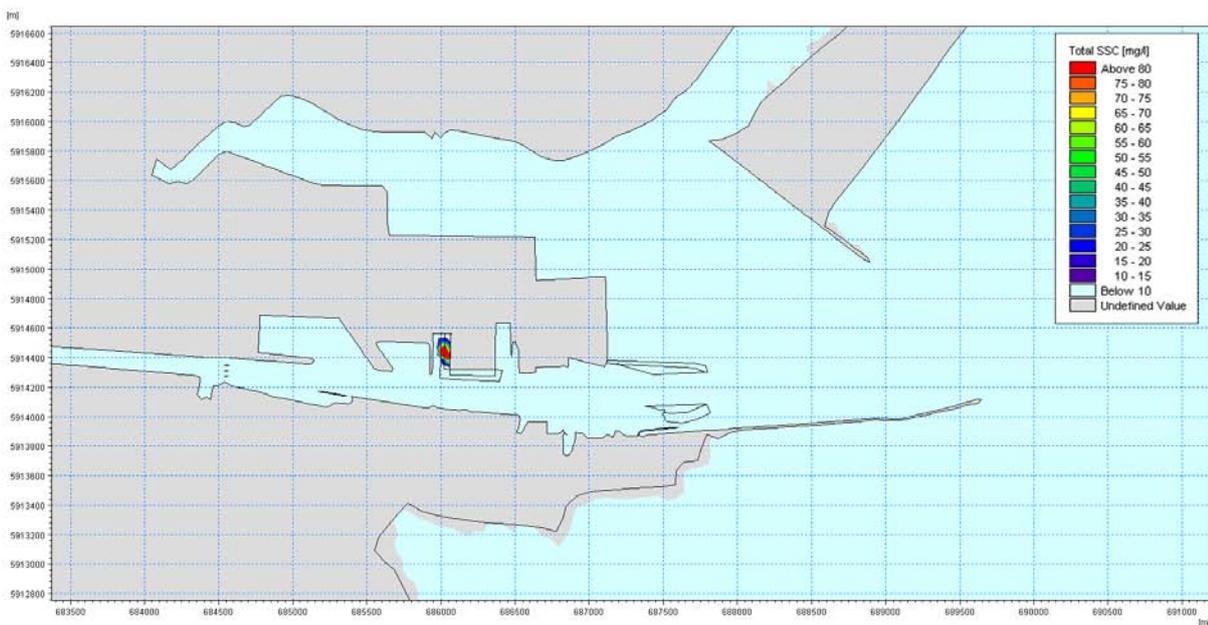


Figure 25 Suspended sediment concentration plume in the bottom layer during a typical high water phase of a spring tidal cycle whilst dredging the Oil Berth 3 and Berth 50A

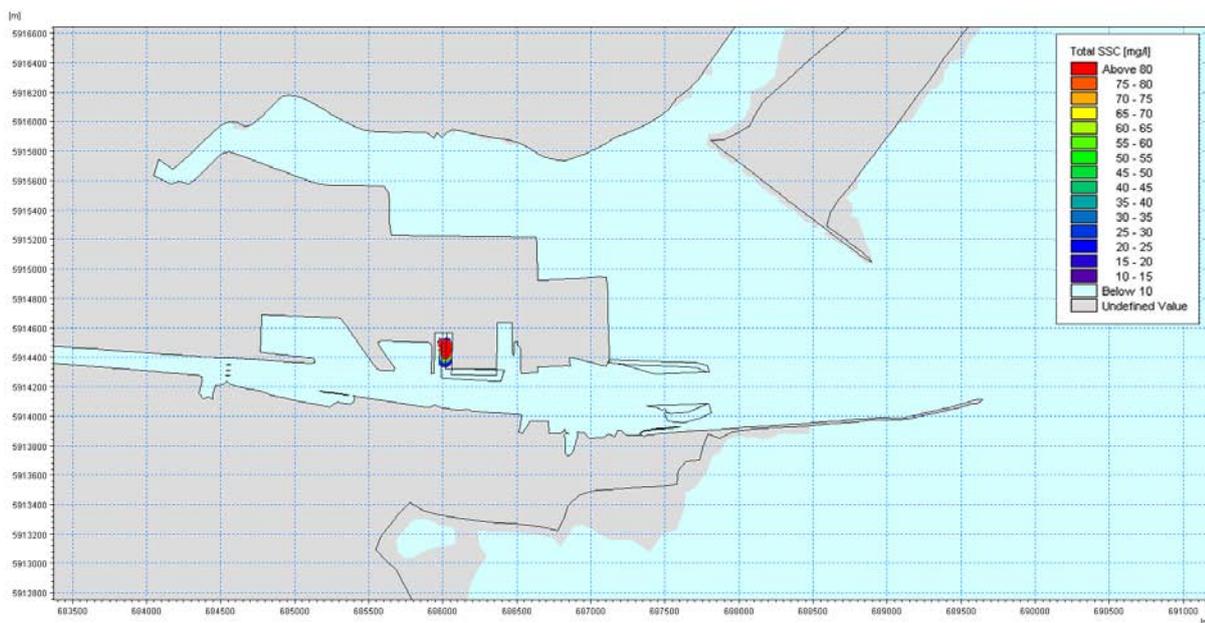


Figure 26 Suspended sediment concentration plume in the bottom layer during a typical mid ebb phase of a spring tidal cycle whilst dredging the Oil Berth 3 and Berth 50A

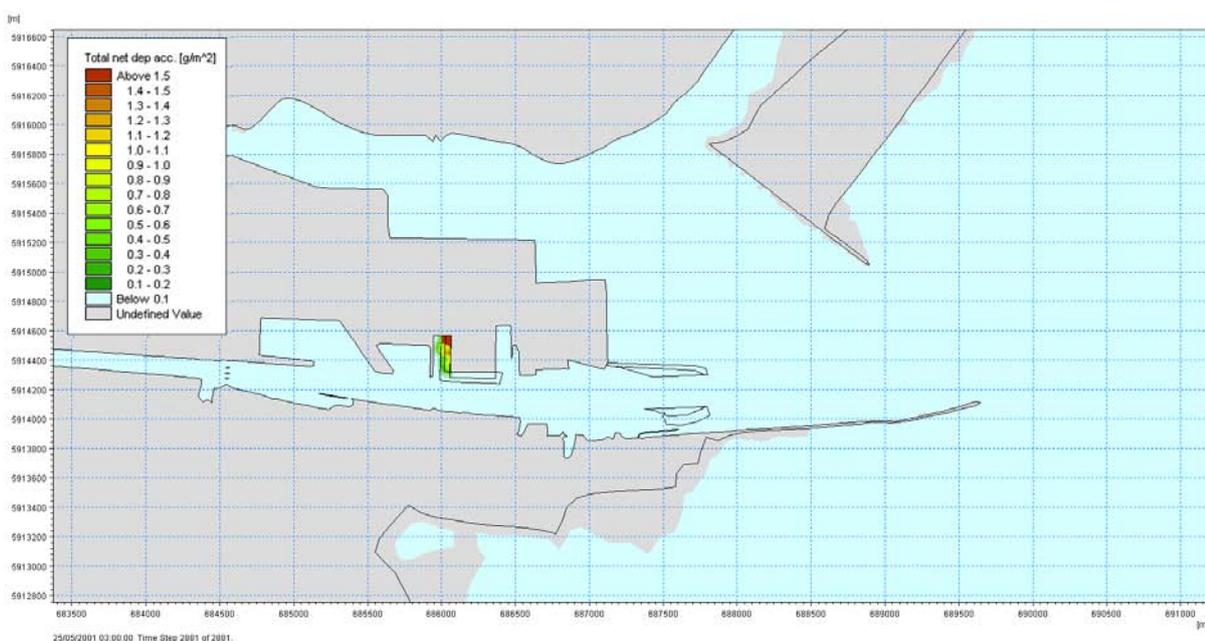


Figure 27 Deposition of sediment following the dredging operations at Oil Berth 3 and Berth 50A

Impact of dredging on existing outfalls and power station cooling water systems

Water from the Liffey is abstracted by 4 power plants within the Dublin Port area: the North Wall Station; Synergen – Dublin Bay Power Plant; Covanta Waste to Energy Plant and Poolbeg Power Station. The water is abstracted as part of the electricity generation process and/or for cooling water components. High levels of suspended solids in cooling water has the potential to impact upon the plants cooling system and may result in an increase in operation and maintenance costs.

The Ringsend Waste Water Treatment Plant is also located on the southern bank of the River Liffey. This plant discharges treated effluent into the Liffey Estuary via a cooling water discharge channel to the north east of

Poolbeg Generating Station whilst a storm water overflow is located to the north of the storm tanks about 800m upstream. High levels of suspended solids and the ingress of settling material during periods of low flow may have the potential to impact the operational performance of this outfall.

The location of the various power station cooling water intake systems and the Ringsend Waste Water outfall is illustrated in Figure 28.

In order to determine whether any of the dredging operations associated with the MP2 Project would impact upon any of these cooling water intake systems or outfall, RPS analysed the modelling results from the dredging simulations described in the previous three sections to calculate the peak and average suspended sediment concentrations due to dredging at each point of interest illustrated in Figure 28. These peak and average suspended sediment concentrations due to additional dredging loads are presented in Table 7. Also included in the table for comparison are the peak and average background suspended sediments levels based on Dublin City Council and ABR Project monitoring in the interval 2015 to 2017.

The results of the simulations show that the increased levels of suspended sediment concentrations at the power station intakes and Ringsend WwTW outfall are generally very small by comparison with background levels in the Liffey Estuary and are unlikely to have any effect on the quality of intake waters at power stations in terms of suspended solids content. It is customary practice that DPC notifies the power station operators in advance of each dredging campaign. This allows the operations to temporarily stop abstracting water from the Liffey for a short duration in the event that dredging is required within the immediate vicinity of their intake works. The communication between DPC and the power station operators has enabled previous dredging campaigns, where dredging has taken place closer to the intakes, to be undertaken with minimal disruption.

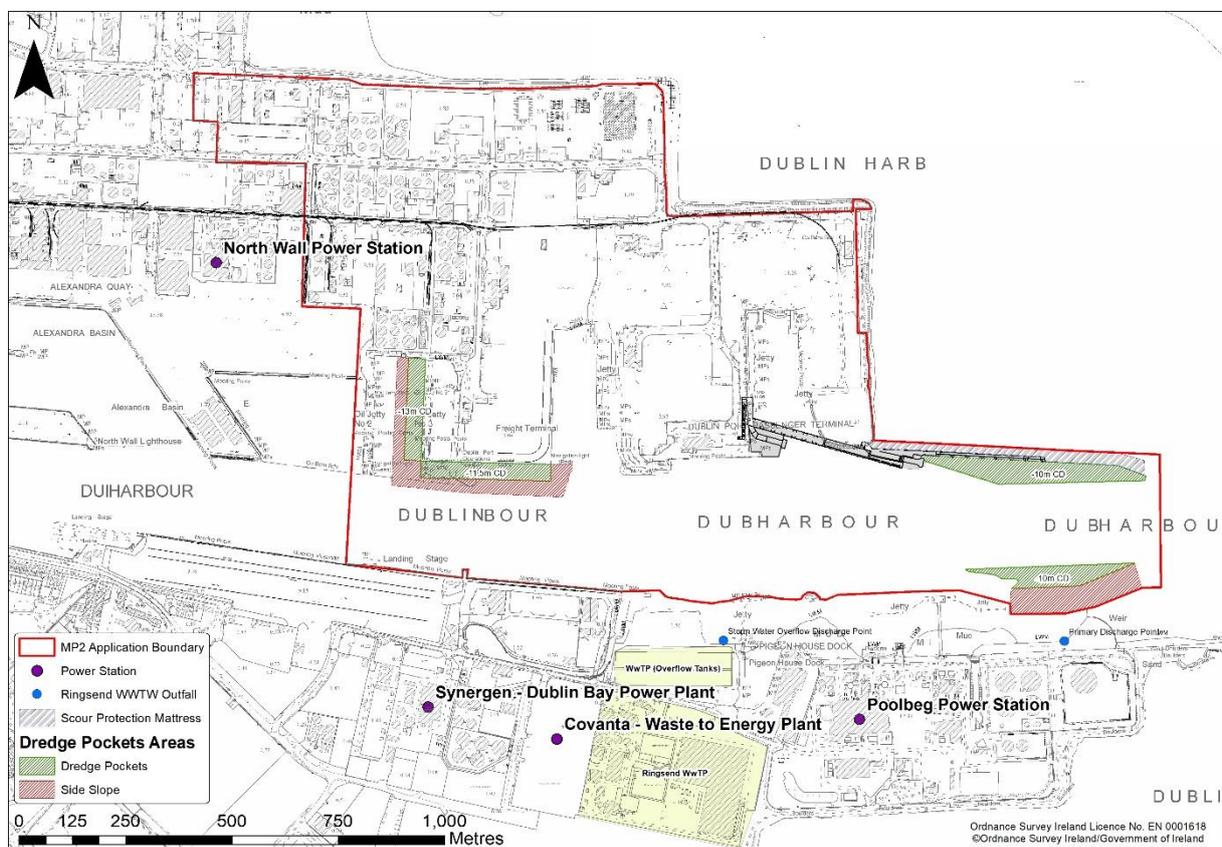


Figure 28 Locations of relevant intakes/outfalls within Dublin Port

Table 7 Peak and average Suspended Sediment Concentrations at various intakes and outfalls in Dublin Port

| Intake | Dredging Location/Scenario | Peak Concentration (mg/litre) | Average Concentration over 1 month (mg/litre) |
|-------------------------------------|---|-------------------------------|---|
| WwTW | Oil Berth 3/Berth 50A | 4.00 | 1.51 |
| | Berth 53 | 2.77 | 0.87 |
| | Channel Dredging Works | 24.18 | 2.07 |
| Poolbeg Power Station | Oil Berth 3/Berth 50A | 4.86 | 1.83 |
| | Berth 53 | 3.37 | 1.06 |
| | Channel Dredging Works | 29.15 | 2.51 |
| Synergen – Dublin Bay Power Plant | Oil Berth 3/Berth 50A | 6.23 | 2.30 |
| | Berth 53 | 4.31 | 1.23 |
| | Channel Dredging Works | 7.10 | 1.58 |
| North Wall station | Oil Berth 3/Berth 50A | 8.11 | 2.78 |
| | Berth 53 | 3.54 | 1.22 |
| | Channel Dredging Works | 2.65 | 1.17 |
| Covanta – Waste to Energy Plant | Oil Berth 3/Berth 50A | 6.23 | 2.30 |
| | Berth 53 | 4.31 | 1.23 |
| | Channel Dredging Works | 7.10 | 1.58 |
| SS Monitoring Results (2015 - 2017) | Liffey Estuary (Est Link to Poolbeg Light) Representing Background Levels | 150 | 24.5 |

1.5.1.2 Potential Impacts as a result of disposing dredge material at sea

A programme of sediment quality sampling and analysis within the Tolka Estuary and Dublin Port area has shown that the sediments to be dredged from the Port's navigation channel and basins are suitable for conventional dumping at sea (subject to the granting of a Dumping at Sea Permit by the EPA). The closest and preferred site is located at the approaches to Dublin Bay to the west of the Burford Bank as presented in Figure 29. This disposal option is preferred because it keeps the sand element of the dredge material within the natural Dublin Bay sediment cell.

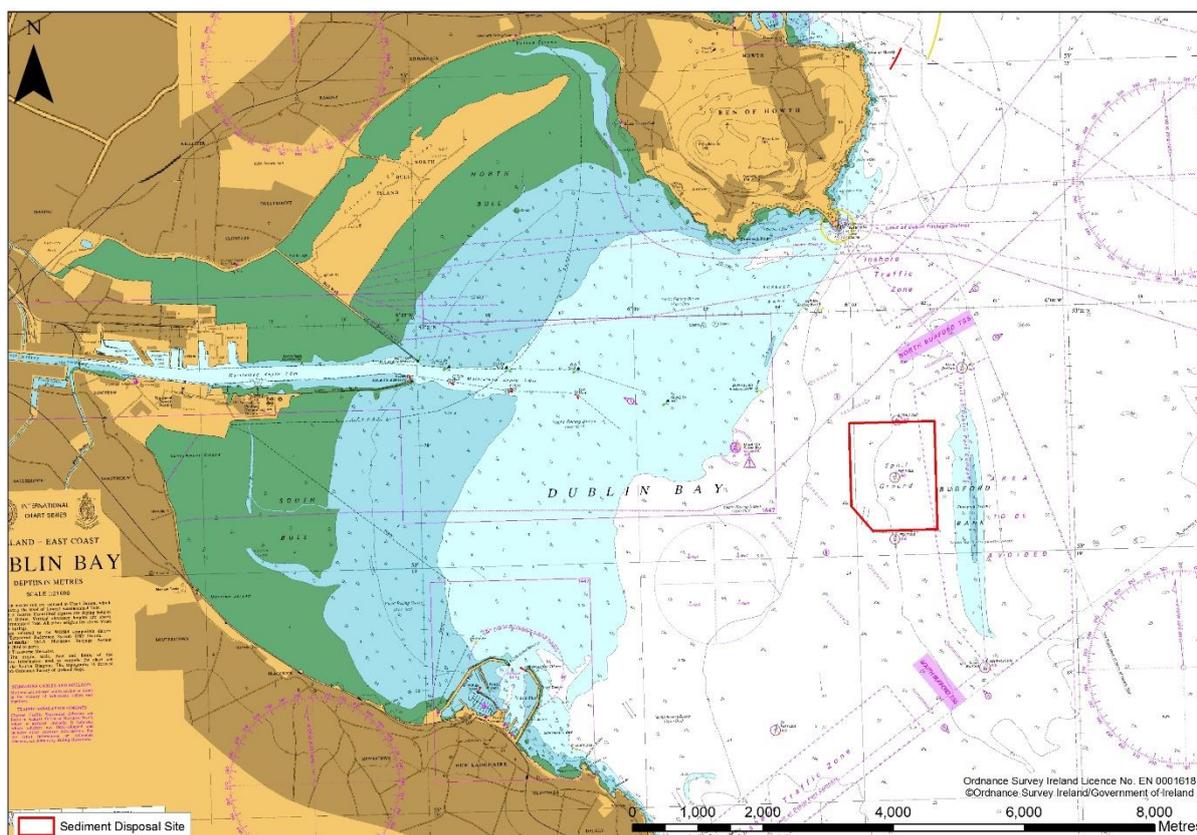


Figure 29 Location of the licensed dredged spoil disposal site

The disposal of sediments at sea has the potential to cause a temporary increase in suspended sediments and turbidity levels during the disposal operations and, under certain conditions, could have adverse effects on marine biota (for example, through siltation of benthic communities), changes to sediment structure, or interference with feeding in reduced visibility.

To assess the impact of the MP2 Project disposal operations at the licensed offshore disposal site, a coupled MIKE 21 Hydrodynamic and Sediment Transport model was used to determine the dispersion of the sediment material during the disposal operations.

It was assumed that the Trailer Suction Hopper Dredge would discharge material over the disposal site every c. 3 hours and that the equivalent of approximately of 2,030 tonnes (wet weight) would be released per dump. Key parameters relating to the sediment dumping simulations are outlined Table 8.

Table 8 Disposal simulation input parameters

| Parameter | Value |
|--|-----------------------|
| Trailer Suction Hopper Dredger capacity | 4,100 m ³ |
| Ratio of sediment/entrained water during loading | 0.3 |
| Average density of material inside hopper | 1.65 t/m ³ |
| Average Trip Frequency between Dublin Port and Disposal site | 3.0 hours |
| Average Time to Fill Dredger Hopper | 1.5 hours |
| Time to release load | 90 seconds |

The model simulations were run for the disposal of the dredged material over the course of a complete lunar month, which includes the full range of spring and neap tidal flow conditions. The characteristics of the sediment modelled in this simulation are equivalent to those used in the dredging simulations described in the previous section of this report. As such, the sediment material was characterised by three discrete fractions with mean diameters of 200µm, 20µm and 3µm, with each fraction constituting 1/3 of the total volume of silt to be dredged.

The sediment material was introduced into the surface of the model as a point source that moved across the dump site area during the disposal operation. The model then simulated the dispersion, settlement and re-erosion of each fraction of the silt in response to the tidal currents throughout the model area.

The coarser fraction of the sediment, i.e. the sand fraction that had a mean grain size of 200µm, was found to behave differently relative to the two finer silt fractions that had mean grain diameters of 20µm and 3µm. The sand fraction remained on the dump site, whereas the two finer silt fractions were carried away by the tidal currents.

The results of the simulations are given in terms of maximum total suspended sediment concentrations envelope in Figure 30, which depicts the maximum level of the suspended sediment concentration which occurs in each cell at any time during the simulation and is thus an envelope covering all the sediment plume excursions. It will be seen from Figure 30 that the sediment plume outside the area of the dump site is less than 200mg/l and does not extend further than 750m to the north or south of the dump site.

Based on these results, it can be concluded that the disposal operations associated with the MP2 Project will not result in any significant increases to the background level of suspended sediments and will not, therefore, impact the existing water quality in the greater Dublin Bay area.

NOTE - Mean turbidity measured in Dublin Bay (4 monitoring buoys - 3 at dumpsite and 1 background) is 10.25 NTU. Based on the relationship established for fine sands in Dublin Bay this is equivalent to a Total Suspended Solids (TSS) concentration of 16.5 mg/l or based on finer silts/sands of Liffey Estuary to a TSS concentration of 25.6 mg/l. Note that these measurements cover periods of maintenance and capital dredging.

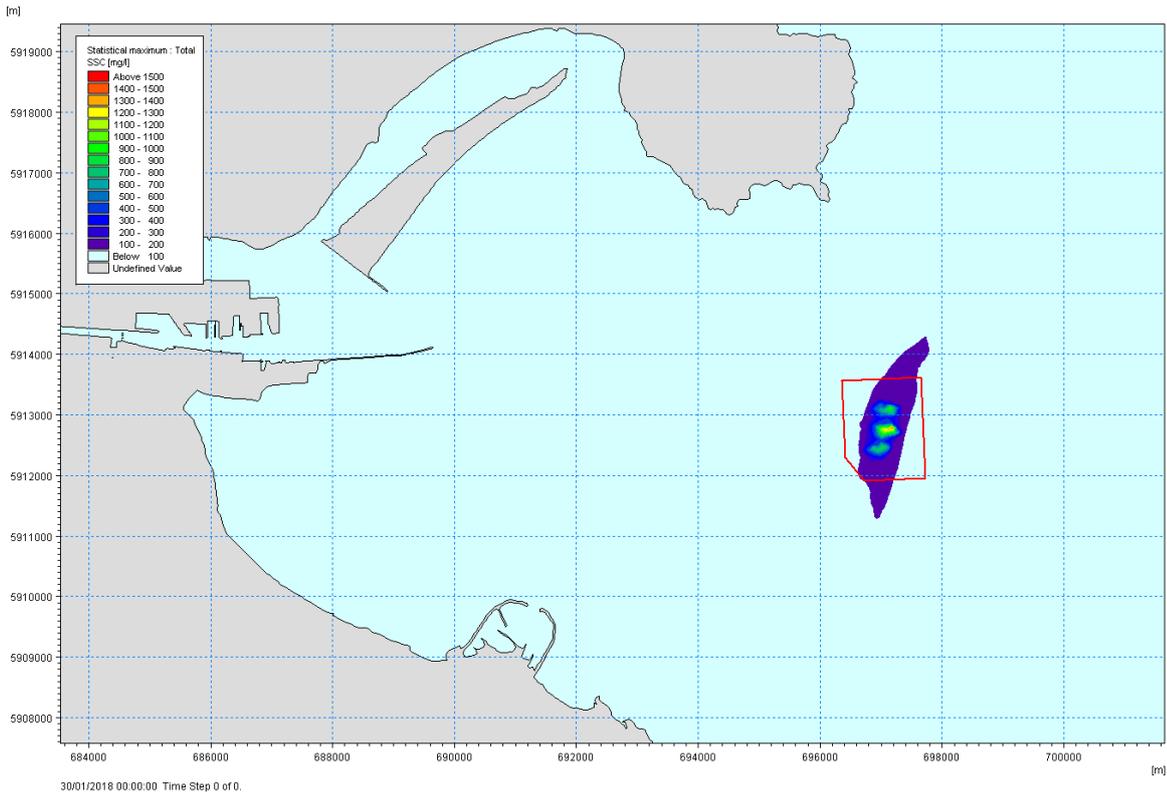


Figure 30 Maximum Total Suspended Solids Concentration envelope using a Trailer Suction Dredger dumping circa 2,030 tonnes wet weight at 3 hourly intervals on average within each winter capital dredging season

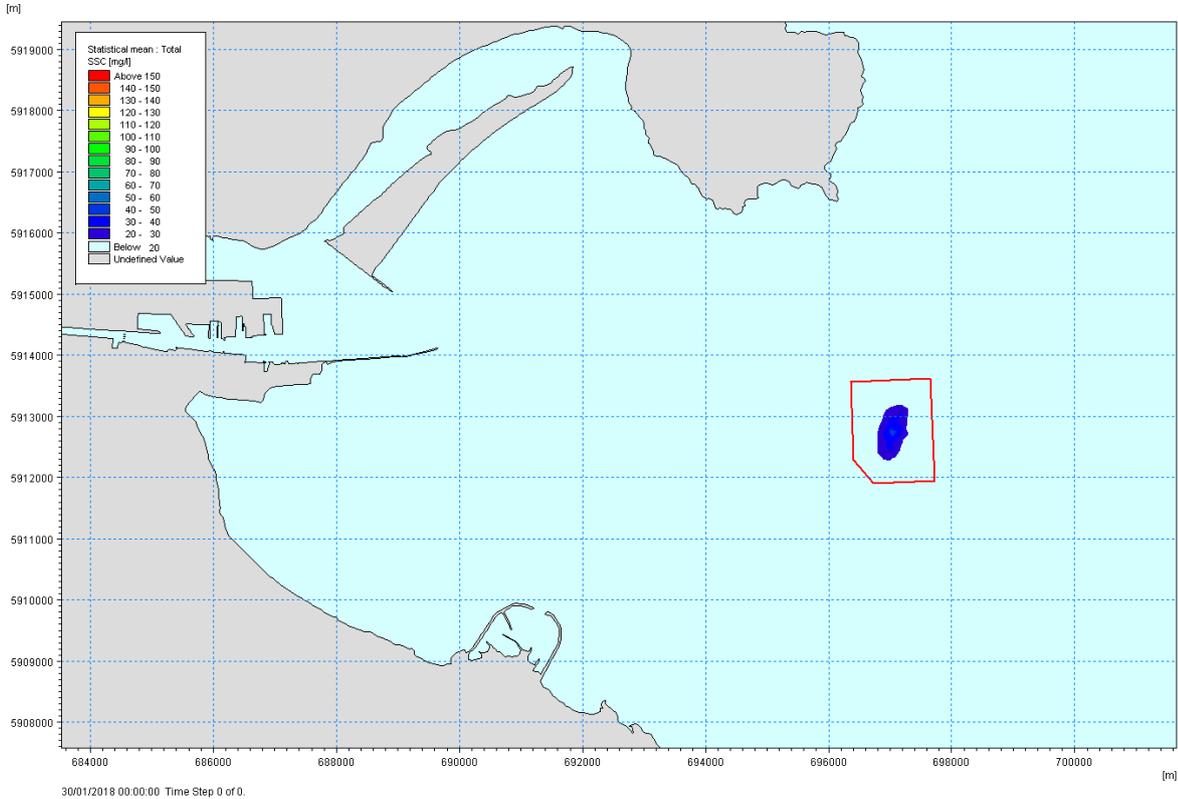


Figure 31 Mean Total Suspended Solids Concentration envelope using a Trailer Suction Dredger dumping circa 2,030 tonnes wet weight at 3 hourly intervals on average within each winter capital dredging season

1.5.2 Operational Phase Impacts

1.5.2.1 Potential changes to the existing tidal regime

The potential for changes with the elements of the scheme in place was assessed to consider the potential for operational phase impact. The MIKE 21 Hydrodynamic module described in Section 1.2.3 was used in conjunction with the post-MP2 Project scenario (i.e., Dublin Port, including ABR Project, with MP2 Project in place) 2D model to simulate the tidal regime in the Dublin Port following the implementation of the MP2 Project. Typical tidal flow patterns for a spring ebb and spring flood tide from the post-MP2 Project simulation are presented in Figure 32 and Figure 33.

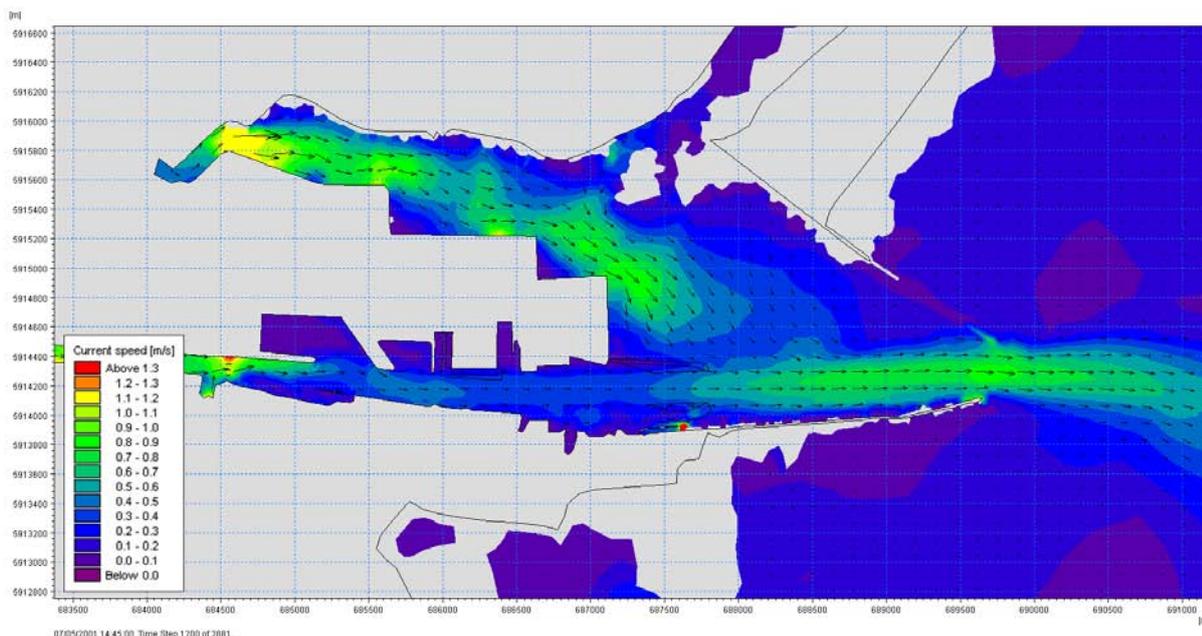


Figure 32 Typical spring mid ebb tidal flow patterns – Post MP2 Project

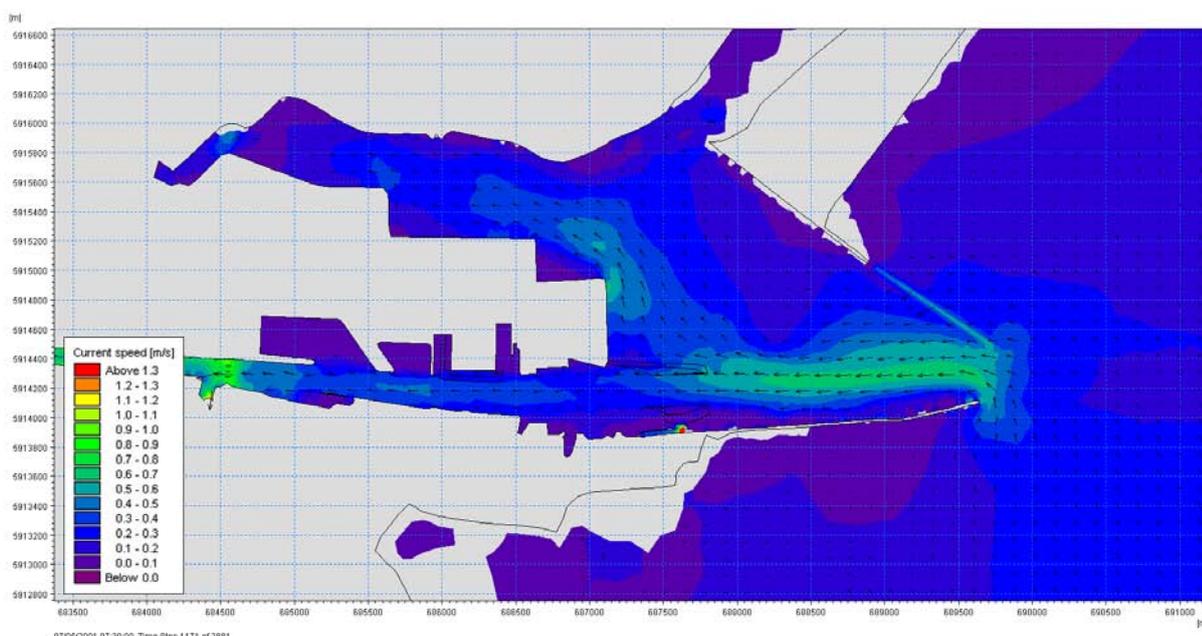


Figure 33 Typical spring mid flood tidal flow patterns – Post MP2 Project

The difference in modelled current velocities for the pre and post MP2 Project simulations have been computed for the mid spring ebb and the mid spring flood tides, and are presented in Figure 34 and Figure 35. Spring tides are periods of greatest current velocities. It shows that current velocity remains substantially unchanged throughout most of the Port area. The maximum predicted change to the mid-ebb or flood current speeds is less than $\pm 0.25\text{m/s}$. The greatest changes are confined to within the footprint of the proposed works at Berth 50A (velocity increased by 0.20 to 0.25m/s) and Berth 53 (velocity decreased by 0.15 to 0.20m/s) where existing mid-flood and mid ebb currents are approximately 0.40m/s. Predicted changes in current speed reduce rapidly outside the proposed works areas and changes to mid-ebb or mid-flood current speeds are less than $\pm 0.15\text{m/s}$ within 50 - 150m of the proposed works. No notable changes to the tidal regime were detected outside of Dublin Port.

The net difference in the mean current velocity over an entire spring tidal cycle (i.e. c.12.44hrs) is presented in Figure 36. This figure clearly shows that any predicted changes in current velocity resulting from the proposed MP2 Project will be limited to relatively small areas in the vicinity of works. Net changes of 0.15 to 0.20m/s are only predicted in very small areas within the footprint of the proposed works. There are no predicted net changes to the mean current velocity over an entire spring tidal cycle outside of the footprint of the proposed works.

Therefore, the tidal regime is predicted to remain substantially unchanged post MP2 Project. Given the localised nature and small absolute magnitude of any predicted changes in tidal current velocity it is unlikely that there will be any significant change in net scouring or deposition of sediments within the Liffey Estuary or Dublin Bay resulting from the MP2 Project.

The risk of impact is determined to be negligible and no mitigation is required.

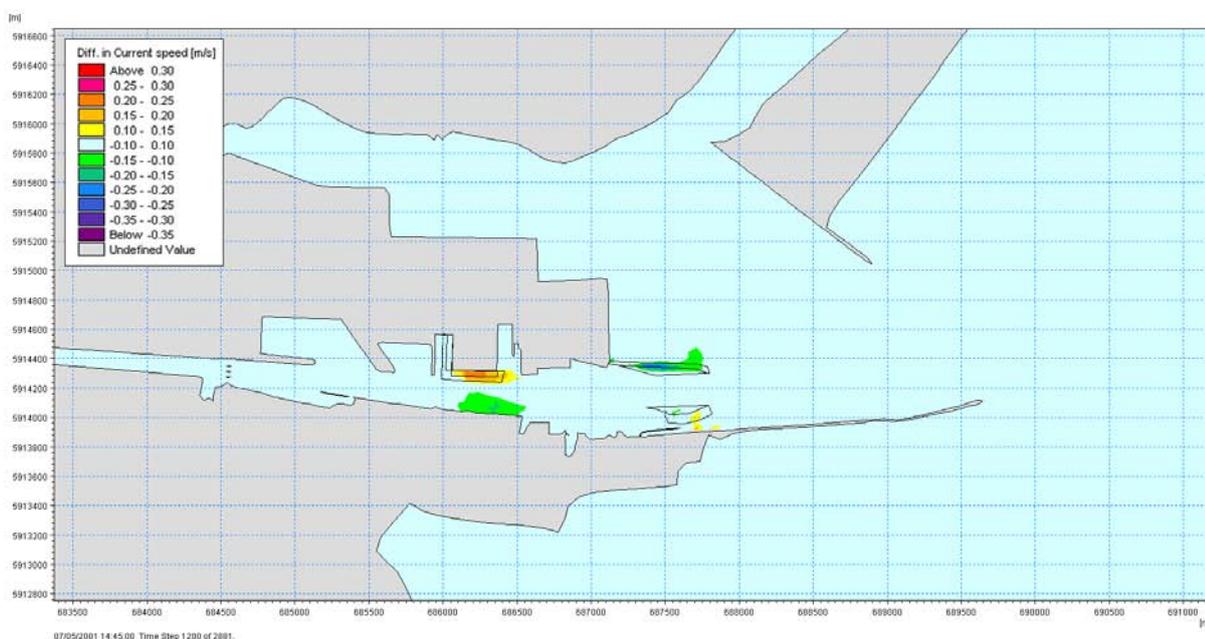


Figure 34 Difference in typical spring mid tidal flow patterns as a result of the MP2 Project

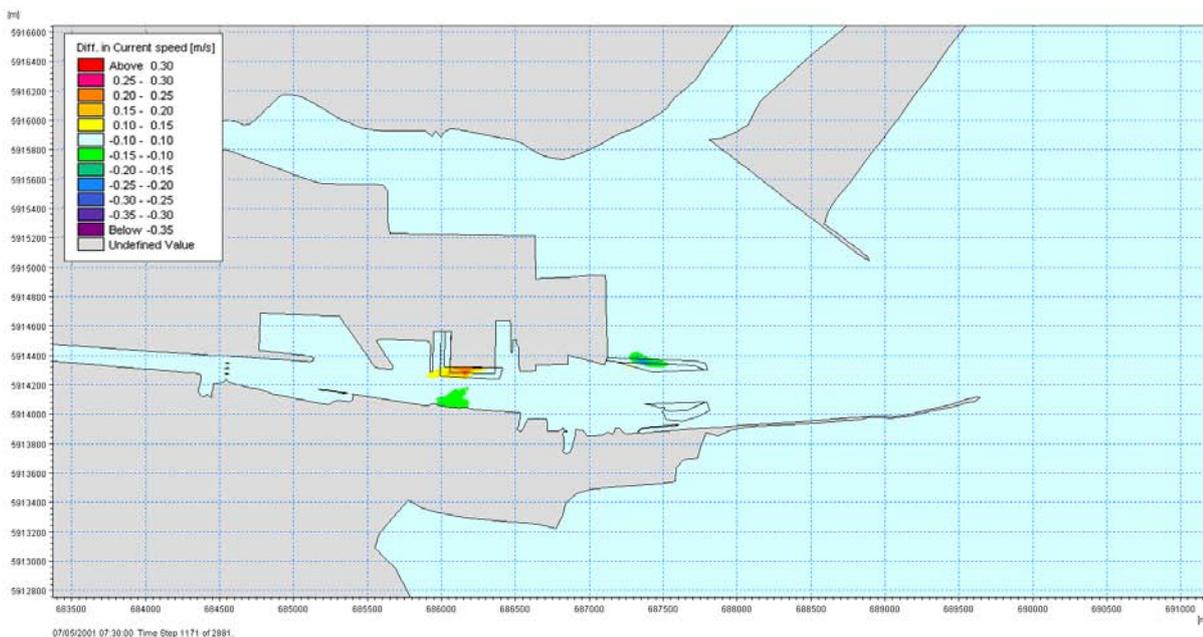


Figure 35 Difference in typical spring flood (bottom) tidal flow patterns as a result of the MP2 Project

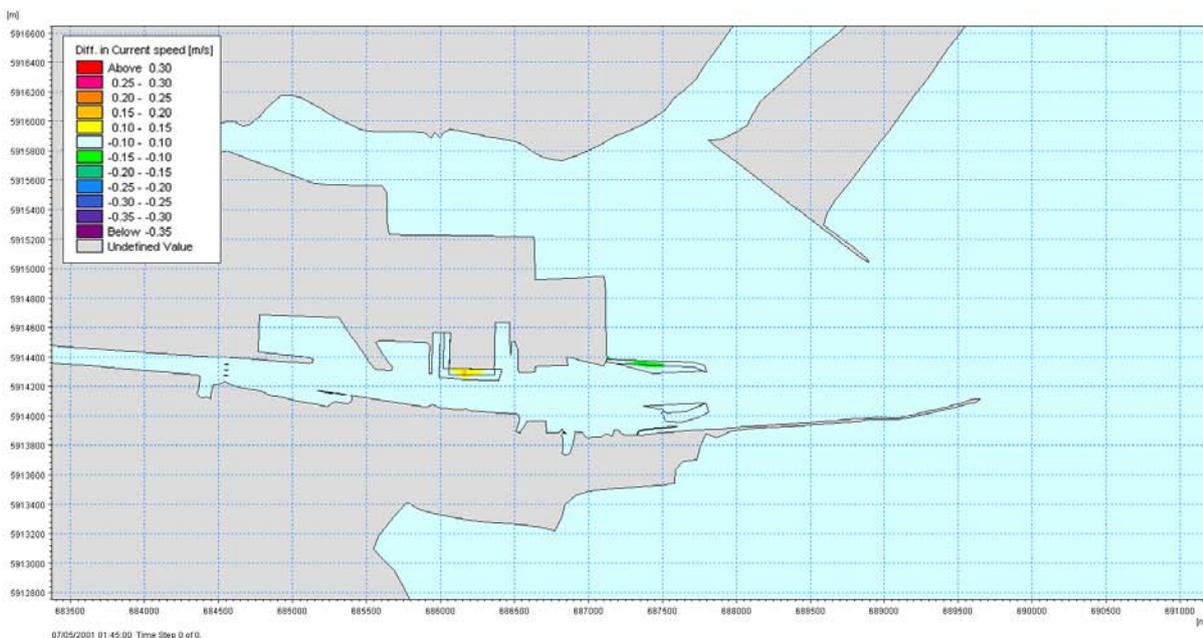


Figure 36 Difference in mean spring tidal flow patterns across an entire tidal cycle as a result of the MP2 Project

1.5.2.2 Potential changes to the existing inshore wave climate

Operational phase impacts also considered included potential alteration to wave climate (and its associated possible impact on flood risk). The MIKE 21 Spectral Wave module described in Section 1.2.3 was used in conjunction with the post-MP2 Project scenario 2D model to re-run the offshore wave climate simulations in Dublin Bay based on various wave directions as described in Section 1.3.2.

The simulated inshore wave climate in Dublin Port and the adjacent Dublin coastline post MP2 Project is illustrated in Figure 37 to Figure 39 for north easterly, easterly and south easterly storm events at spring high tide respectively.

Wave height difference plots are presented for the three storm events in Figure 40 to Figure 42 to highlight the changes to the inshore wave climate as a result of the MP2 Project. The results show that, during all storm events modelled, only small changes in the wave climate in Dublin Port are predicted and no discernible change in the adjacent coastline areas i.e. Clontarf, Tolka Estuary, Sandymount.

During north easterly storm events, wave heights at Berth 50A are likely to increase by 0.10m or less. During south easterly storm events, similar changes are predicted at Berth 50A but wave height is also predicted to decrease by 0.075m or less at Berth 53 under these storm conditions. During easterly storm events, predicted differences in the wave climate extend further into Dublin Port but are confined to the area adjacent to Alexandra Basin where changes in wave height of less than 0.075m are predicted.

Changes in bathymetry due to dredging activities have the potential to alter the energy with which waves break and could conceivably result in wave overtopping of structures and flood defences. However, consideration of changes to the wave climate due to the MP2 Project presented above show no discernible change in relevant proximate areas such as Clontarf, Fairview and Ballybough bordering the Tolka Estuary. Changes in wave height within the Port beyond the immediate footprint of the MP2 Project works is predicted to be less than $\pm 0.075\text{m}$ during typical storm conditions. These changes are not considered significant and will not impact operations within the Port. Therefore the risk of potential coastal flooding due to the MP2 Project in these areas is determined to be negligible and no mitigation is required.

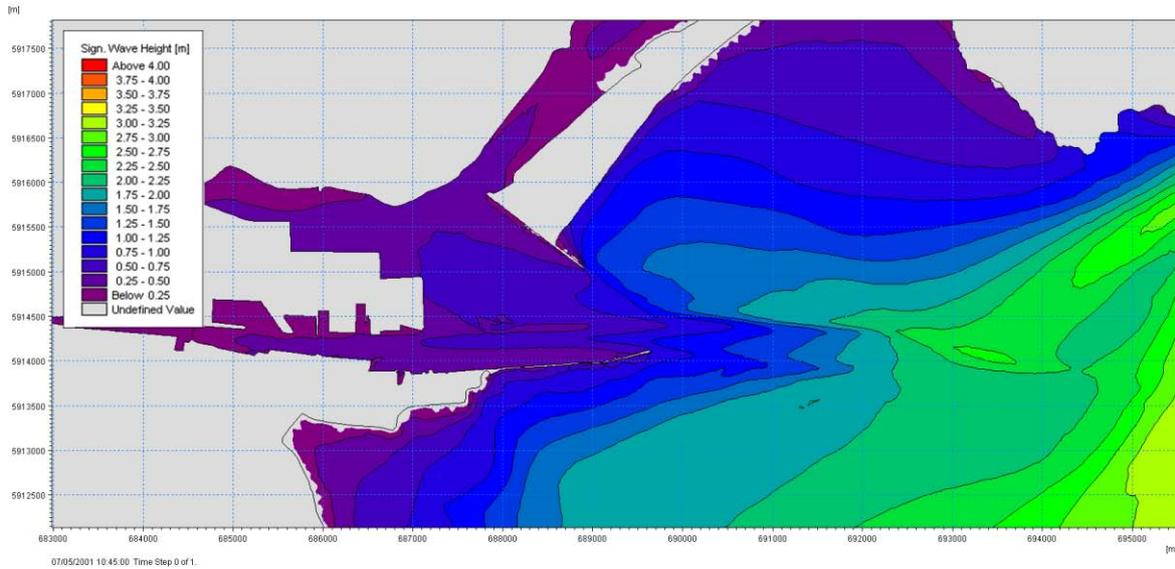


Figure 37 North Easterly storm wave heights at spring high water – Post MP2 Project

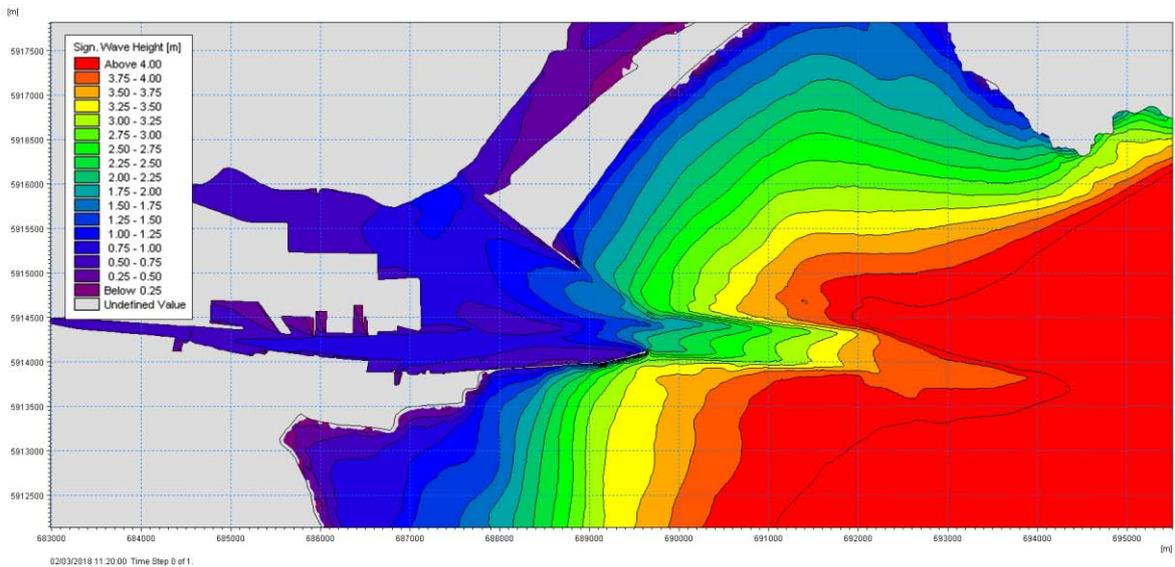


Figure 38 Easterly storm wave heights at spring high water – Post MP2 Project

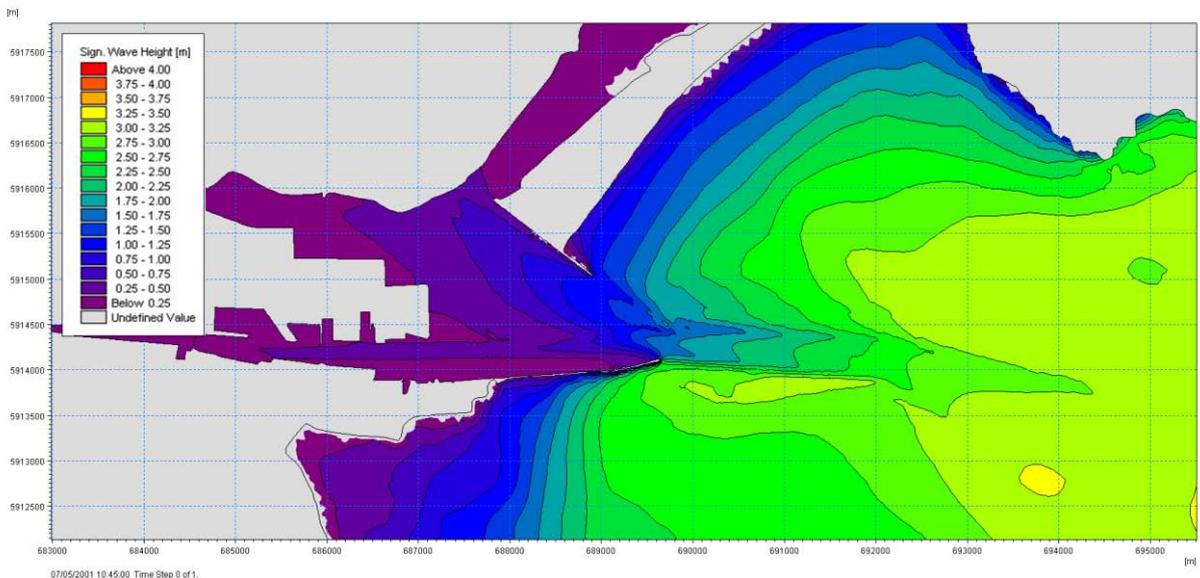


Figure 39 Easterly storm wave heights at spring high water – Post MP2 Project

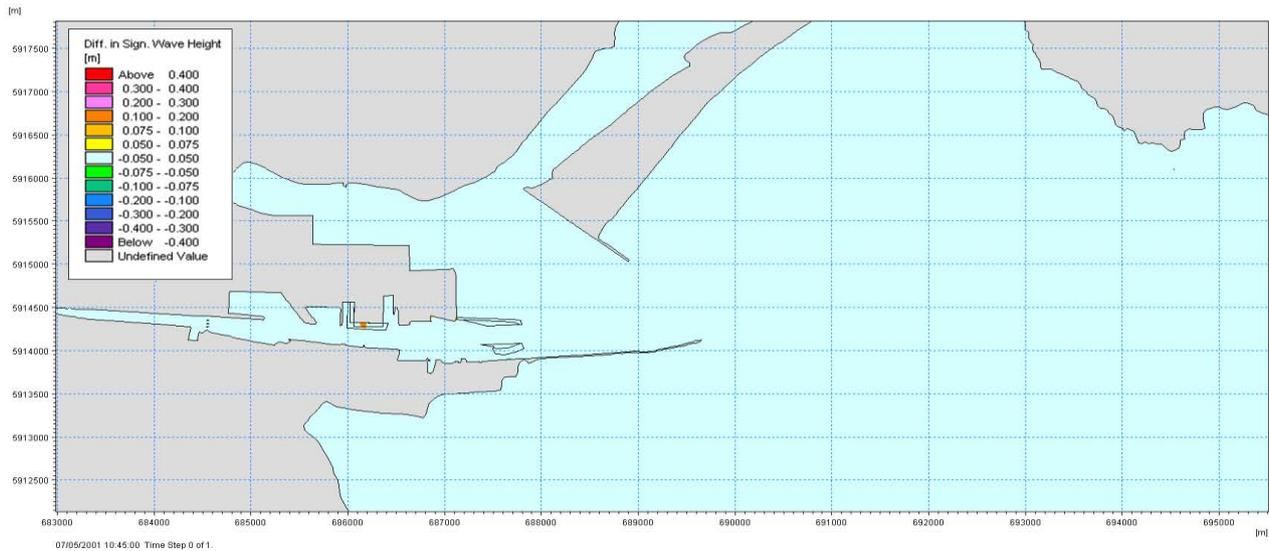


Figure 40 Difference in wave heights during a north easterly storm event as a result of the MP2 Project

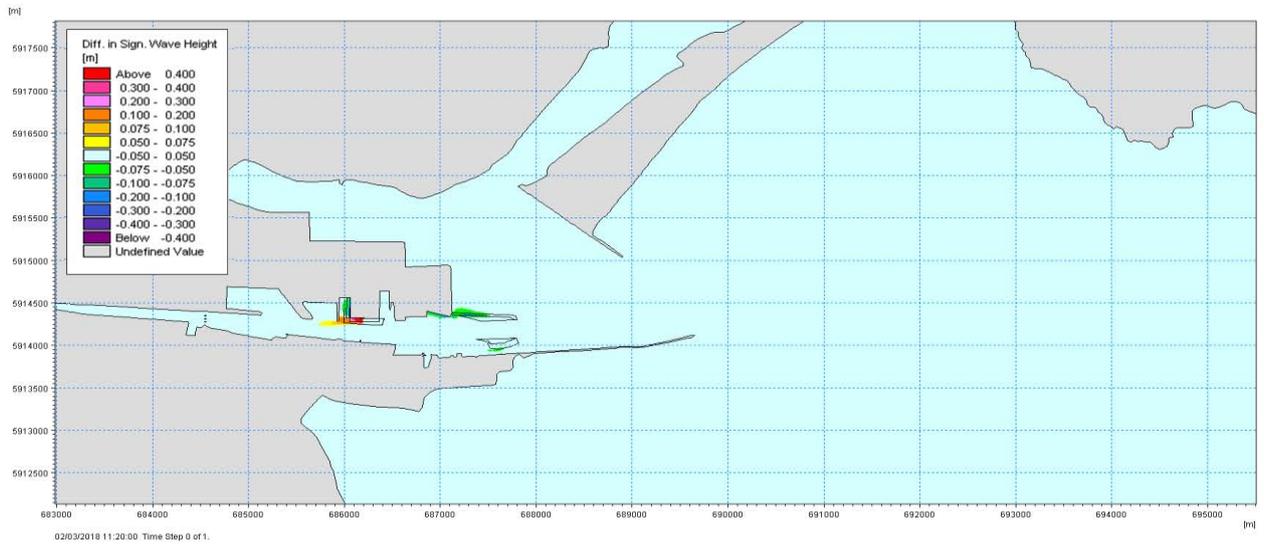


Figure 41 Difference in wave heights during an easterly storm event as a result of the MP2 Project

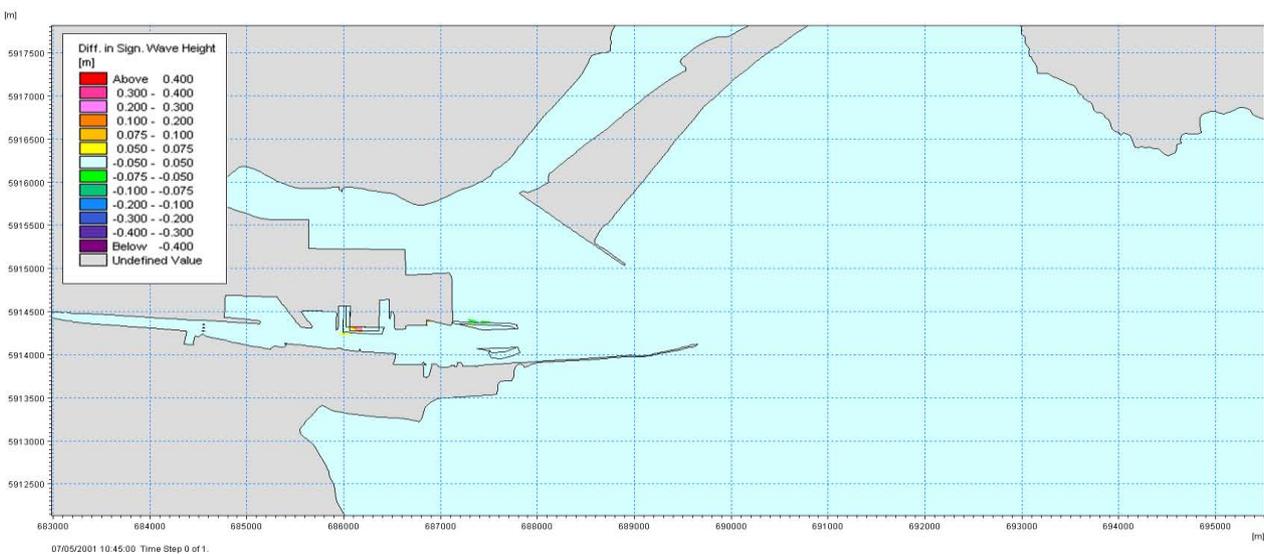


Figure 42 Difference in wave heights during an easterly storm event as a result of the MP2 Project

1.5.2.3 Potential changes to the sediment transport regime

As shown in Figure 43, the MP2 Project site is bounded to the North and East by the South Dublin Bay and Tolka Estuary Special Protection Area (SPA). It was, therefore, important to provide sediment transport regime information for the purposes of the relevant Habitats Directive appraisals. Moreover, it is important to consider whether either the Berth 53 structure or subsequent ship movements from this berth would impact the winter foraging areas within the Tolka Estuary during low tide.

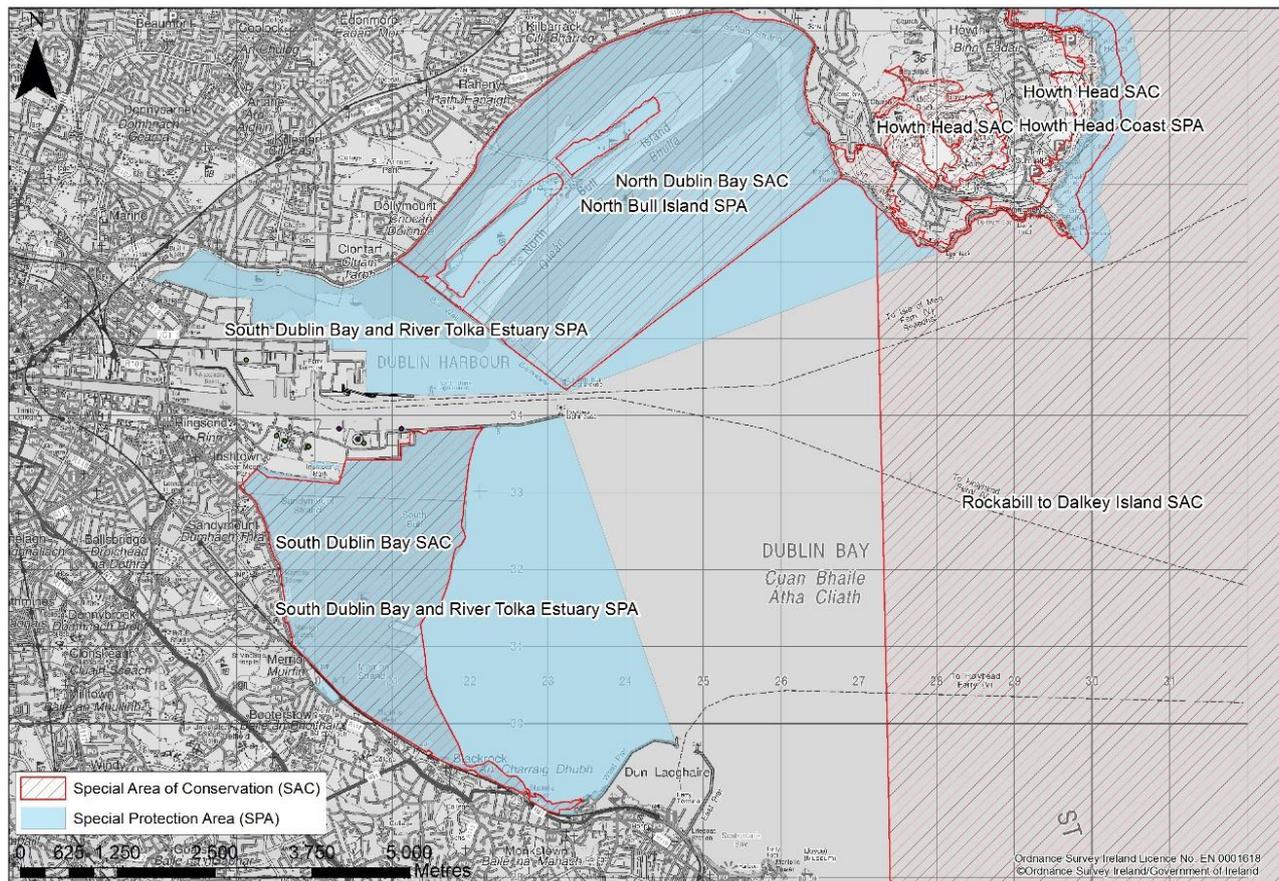


Figure 43 European sites surrounding Dublin Port

To assess the potential operational phase impact of ship movements in the area of Berth 53, propeller and thruster jet scour calculations were undertaken for representative ship manoeuvres from navigational simulation studies undertaken by HR Wallingford, 2018 in relation to the MP2 Project. The scour calculations were undertaken in accordance with the following documents: “Guidelines for protecting berthing structures from scour caused by ships” (PIANC, 2015); and the “Principles for the Design of Bank and Bottom Protection for Inland Waterways (BAW, 2010).

This assessment found that, when ship bow thrusters operated at 100%, the resultant peak axial velocity at the boundary of the SPA will be c. 4.3m/s and that this velocity would likely result in scour of the neighbouring SPA area. This was considered potentially significant as it could impact the long term stability of the dredged side slope at Berth 53 and thus, in the longer term, potentially affect bed levels and modify the position of the lowest astronomical tide across the winter foraging areas within the Tolka Estuary.

Measures were therefore developed to mitigate this risk which are presented and assessed in Section 1.6.1 of this Report.

1.6 Mitigation Measures

1.6.1 Construction Phase Mitigation Measures

Dublin Port Company completed its first winter dredging season (October 2017 – March 2018) as part of the ABR Project. This dredging campaign was fully compliant with the requirements of the Dumping at Sea, Foreshore and Planning Consents as confirmed by high resolution environmental monitoring results reported in the Annual Environmental Report submitted to the Office of Environmental Enforcement (OEE) in March 2018.

A Dredging Management Plan was developed for the ABR Project and is set out in *Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018*. The mitigation for dredging operations in the MP2 Project has been informed by ABR Project monitoring and experience working in the same locations.

The following mitigation measures will apply to each dredging campaign in the MP2 Project:

- Loading will be carried out by a backhoe dredger or trailing suction hopper dredger (TSHD).
- The capital dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- No over-spilling from the vessel will be permitted while the dredging activity is being carried out within the inner Liffey Channel.
- The TSHD pumps will be switched off while the drag head is being lifted and returned to the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment.
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control suspended solids released at the dumping site. This is equivalent to a maximum quantity per trip of 2,030 tonnes (wet weight).
- Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).
- A documented Accident Prevention Procedure will be put in place prior to commencement
- A documented Emergency Response Procedure will be put in place prior to commencement
- A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.

- When any dredging is scheduled to take place within a 500m radius of power station intakes, the relevant stakeholders will be notified so that precautionary measures can be taken if deemed necessary.

Assuming the above mitigation measures are employed during capital dredging and disposal operations, the potential risk to receiving water environment will be negligible thus reducing the significance of environmental impact to Imperceptible.

1.6.2 Operational Phase Mitigation Measures

To mitigate the potential operational impact of the MP2 Project as described in Section 1.5.2.3, a wash protection structure has been designed to reduce scouring associated with manoeuvring vessels within the Berth 53 area. The design and performance of this wash protection structure was assessed and quantified through an extensive numerical modelling programme.

The sediment transport regime was simulated using the 3D coupled MIKE 3 Hydrodynamic and Sediment Transport model described in Section 1.2, in conjunction with the post-project scenario model with the wash protection structure *in situ*. The morphological response of the seabed in the area of Berth 53 was assessed over a typical month of tides. The seabed in this area was represented by gravely sandy silt, sandy gravel and fine sand in the wider Tolka estuary area. This distribution of sediments is illustrated in Figure 44 and was based on information derived from the Particle Size Analysis described in Section 1.2.3.

The assessment found the wash protection structure effectively reduced propeller and thruster jet velocities caused by manoeuvring ships and therefore reduced scour in the area of Berth 53.

To determine if the morphological response of the seabed in the area of Berth 53 with the wash protection structure *in situ* would impact on foraging areas within the Tolka Estuary, the position of the LAT mark following one month of typical tides were compared for pre-project scenario and post-project scenario model runs. The predicted change to the position of LAT is presented in Figure 45. This figure shows that the change to the position of LAT as a result of the MP2 Project will be negligible.

The only predicted change was localised accretion immediate behind the wash protection structure at levels below LAT.

In circumstances where the above mitigation measure will be implemented, the operational impact of the MP2 Project to the nearby foraging areas within the Tolka Estuary regime will therefore be imperceptible.

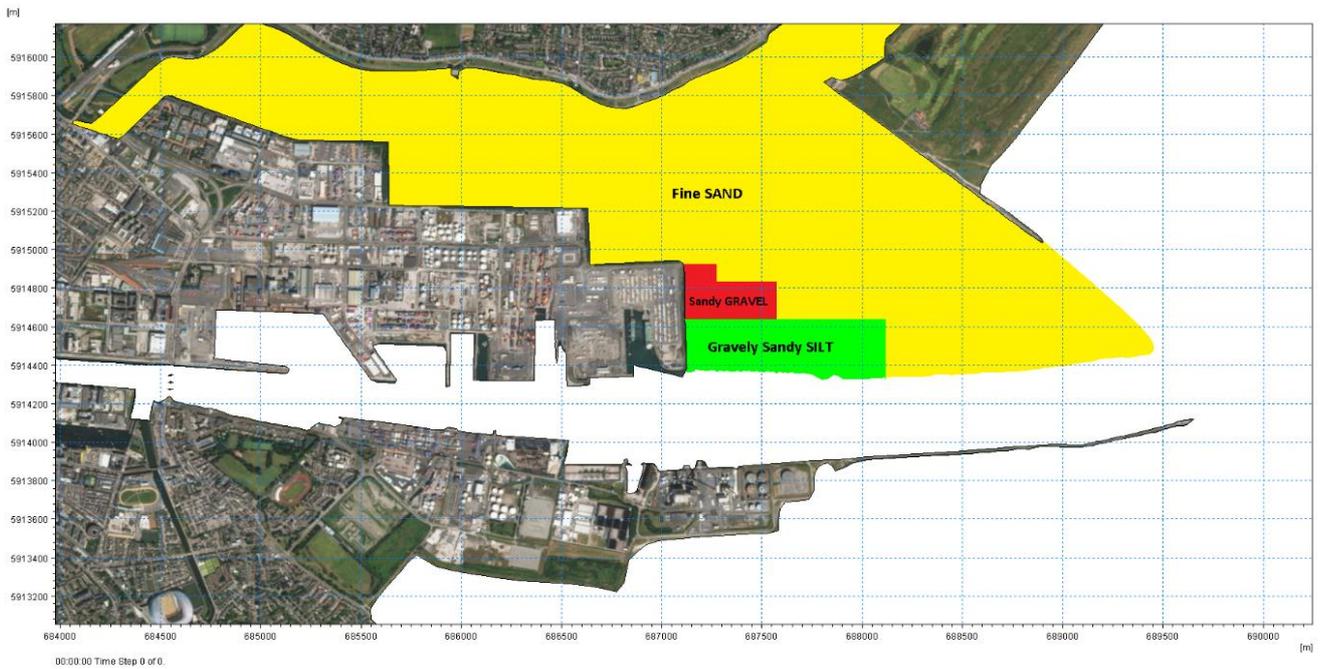


Figure 44 Distribution of sediments in the area of Berth 53 based on the 2017 PSA results



Figure 45: Position of the Lowest Astronomical Tide mark post ABR (red line) and post MP2 Project with the wash protection structure included (green line)

1.7 Monitoring

A water quality monitoring programme is proposed to provide additional safeguards to the receiving environment and to confirm the effectiveness of the mitigation measures implemented to address any potential environmental impacts to the receiving environment during the construction phase of the works.

Monitoring will continue during construction to confirm the effectiveness of the mitigation measures identified in this report. Regular, confirmatory visual monitoring and environmental audits will also be undertaken during the construction phase of the works.

In addition the Port's existing Environmental Management System (EMS), which is accredited to ISO 14001 standard, will monitor the operational activities to confirm that measures to address operational impacts are effective and provide adequate protection to the sensitive receiving waters.

1.8 Conclusions

The assessment of coastal processes was based on an extensive numerical modelling programme which was undertaken using RPS' in-house suite of MIKE coastal process modelling software developed by the Danish Hydraulic Institute (DHI). Baseline models were calibrated and verified against a range of project specific hydrographic data and subsequently used to assess the construction and operational impacts of the MP2 Project.

The assessment concluded that dredging operations required for the MP2 Project will not result in any significant impact to either water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition with mitigation measures in place.

In respect to the power station intakes and Ringsend WwTW outfall, any increase in the suspended sediment concentrations was generally very small by comparison with background levels in the Liffey Estuary. The dredging operations are therefore unlikely to have any effect on the quality of intake waters in terms of suspended solids content. However, as customary, DPC will continue to notify the power station operators in advance of each dredging campaign. This will allow operators to temporarily stop abstracting water from the Liffey for a short duration in the event that dredging is required within the immediate vicinity of their intake works.

The assessment of disposal of dredge spoil arising from the MP2 Project at the licenced offshore disposal site located to the west of the Burford Bank at the approaches to Dublin Bay concluded that the disposal operations will not result in any significant increases to the background level of suspended sediments and will not, therefore, impact the existing water quality in the greater Dublin Bay area.

The tidal regime is predicted to remain substantially unchanged post MP2 Project. The risk of impact to the existing tidal regime is therefore determined to be negligible and no mitigation is required.

The assessment of potential changes to the inshore wave climate found that the maximum change in wave heights in Dublin Port during storm events from the north east, east and south east did not exceed $\pm 0.10\text{m}$. These changes were confined primarily to Berth 50A and Berth 50; and there was no discernible change in the wave climate due to the MP2 Project in relevant proximate areas such as Clontarf, Fairview and Ballybough bordering the Tolka Estuary.

These changes to the wave climate are not considered significant and will not impact operations within the Port. Furthermore, the change in risk of potential coastal flooding due to the MP2 Project at neighbouring sites is considered to be negligible and no mitigation is required.

The assessment of potential changes to the morphology of the Tolka Estuary due to the construction and operation of Berth 53 concluded that the open-piled design of the jetty and the incorporation of a wash protection structure to reduce propeller and thruster jet velocities successfully mitigated the potential impact on waterbird foraging areas within the Tolka Estuary. No significant change to the position of the Lowest Astronomical Tide mark would arise as a result of the construction and operation of the MP2 Project.

In circumstances where the mitigation measures are fully implemented during the construction and operational phases, the impact of the MP2 Project on the coastal processes within Dublin Port and Dublin Bay will consist of small scale, low magnitude changes in the tidal regime and wave climate.

APPENDIX 5: DRAFT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)



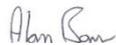
DRAFT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)



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1 INTRODUCTION

1.1 Objectives of the Construction Environmental Management Plan (CEMP)

This document comprises a draft Construction Environmental Management Plan (CEMP) for the MP2 Project. It is a 'live' document and will be updated as the project progresses, including incorporating the requirements of conditions attached to statutory consents granted in respect of the MP2 Project.

This draft CEMP sets out the **minimum requirements** which will be adhered to during the construction phase of the MP2 Project.

Dublin Port Company (DPC) is the promoter of the MP2 Project. DPC seeks to achieve the highest possible standards of environmental management during both the construction and operation of the proposed port infrastructure redevelopment.

The CEMP comprises two main parts

Summary of Mitigation Measures (Chapter 2)

All mitigation measures and monitoring requirements proposed within the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS) are contained in this Section. In addition, the requirements of conditions attached to statutory consents granted in respect of the MP2 Project, including the Foreshore Licence/Lease/Ministerial Consent and the Dumping at Sea Permit, will also be inserted post consent.

This part of the CEMP will form part of the Contract Documents for the construction stage to ensure that the Contractor undertakes the works required to implement the mitigation measures.

Management of Environmental Impact (Chapter 3)

The objective of this part of the CEMP is to prepare a suite of Construction Phase Management Plans which will be finalised upon the grant of development consents. The content of these Management Plans is presented in draft form in the application documentation and will be finalised through discussion and agreement of Dublin City Council.

2 SUMMARY OF MITIGATION MEASURES

2.1 Mitigation Measures arising from the EIAR

The EIAR assesses the likely significant impacts arising from the MP2 Project. Integration of the engineering design team with the planning and environmental team from an early stage in the Project has enabled mitigation by design to be used, causing many likely significant impacts to be eliminated or reduced to an acceptable level during the preliminary design stage.

Table 2-1 summarises the mitigation measures and monitoring recommended within the EIAR. All mitigation measures proposed within the NIS have been captured by the EIAR.

Table 2-1 Mitigation measures and monitoring recommended within the EIAR

| Potential Impact | Summary of Proposed Mitigation |
|--|--|
| Chapter 6 RISKS OF MAJOR ACCIDENTS & DISASTERS | |
| Potential for loss of life or injury to employees, Contractors, visitors and local residents. | <ul style="list-style-type: none"> The design of the MP2 Project has been informed by a COMAH land use planning assessment, the purpose of which was to examine the development in the context of the Health and Safety Authority’s COMAH land use planning guidance, and to identify the types of development that may be compatible with the COMAH risk zones around the Calor (and other COMAH) establishments. Based on this conservative assessment, it is considered that the final design layout of the MP2 Project would satisfy the HSA’s criteria under its land use planning guidelines. The MP2 Project will therefore not increase the risk of major accidents and disasters. To remain vigilant, DPC has developed a comprehensive Emergency Management Plan (see Appendix 6 of this EIAR) that caters for the range of accident and emergency events that may occur within its estate (or that may occur outside of the estate and that are likely to have a direct, knock on effect). In the event of an incident, DPC would activate its plan accordingly, in which case people would be directed away from the source of the hazard. DPC’s Emergency Management Plan competencies are continuously enhanced through participation in training and exercises at different levels. |
| Potential for damage to the environment. | |
| Potential for damage to the facilities, plant and equipment of DPC, its commercial partners, tenant companies and neighbours. | |
| Chapter 7 BIODIVERSITY, FLORA & FAUNA | |
| No regulated invasive plant species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as | <ul style="list-style-type: none"> An Invasive Alien Species (IAS) Management Plan will be implemented for the duration of the proposed construction works. A draft IAS Management Plan which includes an initial IAS Assessment is presented in Section 3.5.2 of this CEMP. The IAS Management Plan |

| Potential Impact | Summary of Proposed Mitigation |
|---|--|
| <p>amended, were identified on site during baseline habitat surveys of the site in 2018 and 2019. Nevertheless, a precautionary approach will be undertaken to prevent the importation and spread of Invasive Alien Species</p> | <p>links into the Construction Waste Management Plan and Construction Traffic Management Plan to prevent the introduction or spread of IAS. The Plan outlines containment and eradication measures to be implemented if any IAS are identified.</p> <p><u>Prevention</u></p> <ul style="list-style-type: none"> • Prevention measures will range from raising awareness of IAS and the potential for their dispersal, to ensuring best practice in relation to the movement of materials into, within or out of the operations area. Measures to be implemented shall include: <ul style="list-style-type: none"> – Ensuring that rock armour, gravels, sand or soils to be imported to the site are sourced from authorised/licensed quarry operators; – Specifying that such material should be free of invasive plant species and their propagules; – Implementing a waste management plan for the proper storage and controlled movement of waste materials; – Implementing a materials handling plan for the proper storage and controlled movement of materials; – Implementing a construction traffic management plan for control of vehicle and plant access and movements, including wheel wash and plant inspection at site entrance; – Ensuring that all vehicles and construction plant arriving on site are reasonably clean and free of significant deposits of mud and plant debris (particularly tyres, wheel arches, excavator buckets and tracks) that might be a vector for spread of IAS; – Cordoning off any IAS locations on site identified and mapped in the initial IAS assessment; – Washing down machinery that has operated in IAS infested areas in designated locations before moving within the site or leaving the site; – Inclusion of IAS awareness in toolbox talks using visual aids to identification for the most likely species to be encountered prepared by the initial IAS assessment; – Notification of any suspected new occurrences of IAS to the Environmental Facilities Manager. <p><u>Containment / Treatment</u></p> <ul style="list-style-type: none"> • If any IAS is identified on the construction site, the management plan will contain its spread in the first instance and subsequently eradicate it if possible from the site. This will include implementation of the following measures: |

| Potential Impact | Summary of Proposed Mitigation |
|---|---|
| | <ul style="list-style-type: none"> – Cordoning off any invasive species infestations to limit movement of people / machinery in infested area and relevant buffer zones; – Confirmation of the identification of the species concerned, and collation of relevant information; – Selection of the most appropriate best practice methods for control / treatment; – Prioritisation of treatment areas; – Undertaking physical or chemical control measures as appropriate in line with best practice guidance and in compliance with health and safety requirements; – Ensuring control measures are undertaken by suitably qualified personnel; – Handling and disposal of treated material appropriately to prevent further spread. |
| <p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to birds in the area of operations</p> | <ul style="list-style-type: none"> • A Bird Management Plan will be implemented for the duration of the proposed construction works. A draft Bird Management Plan is presented in Section 3.5.7 of this CEMP.. • The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to nesting and breeding birds in the area of operations <ul style="list-style-type: none"> – Black Guillemots –nest-boxes and other artificial nest sites will be provided prior to construction; – Breeding Terns – the capital dredging scheme will be confined to the winter months (October – March) when the terns have migrated from the site. • The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to non-breeding waterbirds in the area of operations <ul style="list-style-type: none"> – Construction of Berth 53 and heritage installations will temporarily cease during periods of greatest low spring tides when bird feeding grounds adjacent to Berth 53 in the Tolka Estuary are exposed to avoid disturbance of birds; – Gates will be used at the site of the Greenway to control the movement of people during the periods of low spring tides above, again, to avoid disturbance at feeding grounds within the Tolka Estuary. <p><u>Monitoring</u></p> <ul style="list-style-type: none"> • DPC is committed to continuing a programme to monitor Black Guillemots, Common Tern and Arctic Tern in Dublin Port throughout the construction phase of the MP2 Project and for a period of two years |

| Potential Impact | Summary of Proposed Mitigation |
|--|--|
| | <p>after the completion of such works. The results of this monitoring programme will be submitted to Dublin City Council at 12-monthly intervals to maintain a public record.</p> <ul style="list-style-type: none"> • DPC will also continue to undertake a programme to monitor winter wetland birds in the adjacent European Sites at the South Dublin Bay and River Tolka Estuary Special Protection Area. This monitoring programme will continue throughout the construction phase and for a period of two years after the completion of such works, with monthly surveys from October to March. The results of this monitoring programme will be submitted to Dublin City Council at 12-monthly intervals to maintain a public record. |
| <p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine ecology and fisheries in the area of operations</p> | <ul style="list-style-type: none"> • A Marine Ecology Management Plan will be implemented for the duration of the proposed construction works. A draft Marine Ecology Management Plan is presented in Section 3.5.7 of this CEMP. • A Dredging Management Plan will also be implemented for the duration of the proposed construction works. A draft Dredging Management Plan is presented in Section 3.5.10 of this CEMP. • The following key mitigation measures apply to the Capital Dredging Scheme to minimise the impact of the proposed works on marine ecology <ul style="list-style-type: none"> – No over-spilling at the surface of the dredger for all dredging activities within the inner Liffey Channel will be permitted; – The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey; – The dredging of sediments within the navigation channel will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations; – A trailer suction head dredger (TSHD) or Back-hoe dredger will be used for the capital dredging works. When operating in the River Liffey Channel, the TSHD pumps will be switched off when the drag head is being lifted and returned from the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment; – A maximum of 4,100m³ of sediment and entrained water will be loaded into the dredger's hopper for each loading/dumping cycle, equivalent to approximately of 2,030 tonnes (wet weight). • The following key mitigation measures apply to piling activities to |

| Potential Impact | Summary of Proposed Mitigation |
|--|--|
| | <p>minimise the impact of the proposed works on fisheries:</p> <ul style="list-style-type: none"> - No piling will take place along the riverside of the Liffey channel during the three months of the year when smolts are likely to run in their highest numbers (i.e. March to May inclusive). This recognises the smaller size of smolts compared to returning adults and lamprey. It also takes account of the fact that smolts have a swim bladder which likely makes them more susceptible than lamprey to pressure trauma due to piling noise. |
| <p>Precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine mammals in the area of operations</p> | <ul style="list-style-type: none"> • A Marine Mammals Management Plan will be implemented for the duration of the proposed construction works. A draft Marine Mammals Management Plan is presented in Section 3.5.6 of this CEMP. • The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine mammals in the area of operations in line with National Parks and Wildlife Service (NPWS) Guidelines (2014) <ul style="list-style-type: none"> - A trained and experienced Marine Mammal Observer (MMO) will be put in place during piling, dredging, demolition and dumping operations. The MMO will scan the surrounding area to ensure no marine mammals are in a pre-determined exclusion zone in the 30-minute period prior to operations. The NPWS exclusion zone is 500m for dredging and demolition works and 1,000m for piling activities. - Noise-producing activities will only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring is not possible, the sound-producing activities will be postponed until effective visual monitoring is possible. Visual scanning for marine mammals (in particular harbour porpoise) will only be effective during daylight hours and if the sea state is WMO Sea State 4 (≈Beaufort Force 4 conditions) or less. - For piling activities, where the output peak sound pressure level (in water) exceeds 170 dB re: 1µPa @ 1m, a ramp-up procedure will be employed following the pre-start monitoring. Underwater acoustic energy output will commence from a lower energy start-up and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20-40 minutes. - If there is a break in piling / dredging activity for a period greater than 30 minutes then all pre-activity monitoring measures and ramp-up (where this is possible) will recommence as for start-up. - Once normal operations commence (including appropriate ramp-up procedures), there is no requirement to halt or discontinue the |

| Potential Impact | Summary of Proposed Mitigation |
|---|---|
| | <p>activity at night-time, nor if weather or visibility conditions deteriorate, nor if marine mammals occur within a radial distance of the sound source that is 500m for dredging and demolition works, and 1,000m for piling activities.</p> <ul style="list-style-type: none"> – Any approach by marine mammals into the immediate (<50m) works area will be reported to the National Parks and Wildlife Service. • The MMO will keep a record of the monitoring using a ‘MMO form location and effort (coastal works)’ available from the National Parks and Wildlife Service (NPWS) and submit to the NPWS on completion of the works. • In line with best international practice, a combination of visual and acoustic mitigation techniques will be used to ensure there are no significant impacts on all Annex II marine species, including harbour porpoise, grey seal and harbour seal. Static Acoustic Monitoring (SAM) through the deployment of CPODs will be used. SAM monitoring sites will be established and maintained throughout the project and for two years post-construction. This technique is to complement and not replace visual techniques. • The deployment of a SAM system will complement and extend the extensive database currently being collected as part of the ABR Project environmental monitoring programme. |
| Chapter 8 SOILS, GEOLOGY, HYDROGEOLOGY | |
| <p>The potential risk to construction workers from contaminants during the earthworks is low.</p> | <ul style="list-style-type: none"> • Fill material will be sourced from authorised quarries and will have minimal potential to introduce contamination onto the site. |
| Chapter 9 WATER QUALITY and FLOOD RISK | |
| <p>Mobilised suspended sediment and cement release through construction and demolition activities are the principal potential sources of water quality impact during the construction phase of the works.</p> | <ul style="list-style-type: none"> • A Water Quality Management Plan will be implemented for the duration of the proposed construction works. A draft Water Quality Management Plan is presented in Section 3.5.9 of this CEMP. • The following precautionary measures will be undertaken to minimise the risk of impacting on water quality within the receiving environment: <ul style="list-style-type: none"> – sound design principles will be followed to adhere to relevant Irish guidelines and recognised international guidelines for best practice; – appropriate erosion and sediment controls during construction to prevent sediment pollution will be implemented; – Where preferential surface flow paths occur, silt fencing or other suitable barriers will be used to ensure silt laden or contaminated |

| Potential Impact | Summary of Proposed Mitigation |
|---|--|
| | <p>surface runoff from the site does not discharge directly to a water body or surface water drain.</p> <ul style="list-style-type: none"> – In the event that dewatering of foundations or drainage trenches is required during construction and/or discharge of surface water from sumps, a treatment system prior to the discharge will be used; silt traps, settlement skips etc. This measure will allow additional settlement of any suspended solids within storm water arising from the construction areas. • Management and auditing procedures, including tool box talks to personnel will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions. • Existing and proposed surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants. • A draft project specific Pollution Incident Response Plan has been prepared and suitable training will be provided to relevant personnel detailed within the Pollution Incident Response Plan (see Section 3.5.11 of this CEMP). |
| <p>Accidental release of highly alkaline contaminants from concrete and cement may arise during the demolition of buildings and structures and the construction of hardstand areas, waterside berths, quay walls, jetties, bridging structures, etc.</p> <p>Concrete and cement pollution may give rise to significant impacts on water quality in the absence of mitigation.</p> | <ul style="list-style-type: none"> • The following precautionary measures will be undertaken to minimise the risk of impacting on water quality within the receiving environment <ul style="list-style-type: none"> – Breaking of concrete (associated with structure demolition) has the potential to emit alkaline dust into the receiving environment. Where necessary a barrier between the dust source and the sensitive receptor (the water body in this case) will be erected to limit the possibility of dust contacting the receptor; – Concrete use and production shall adhere to control measures outlined in Guidance for Pollution Prevention (GPP5): Works and maintenance in or near water (2017). Any on-site concrete production will have the following mitigation measures: bunded designated concrete washout area; closed circuit wheel wash etc.; and initial siting of any concrete mixing facilities such that there is no production within a minimum of 10 metres from the aquatic zone; – The use of wet concrete and cement in or close to any water body will be carefully controlled so as to minimise the risk of any material entering the water, particularly from shuttered structures or the washing of equipment. |

| Potential Impact | Summary of Proposed Mitigation |
|--|---|
| | <ul style="list-style-type: none"> - Where concrete is to be placed under water or in tidal conditions, specific fast-setting mix is required to limit segregation and washout of fine material / cement. This will normally be achieved by having either a higher than normal fines content, a higher cement content or the use of chemical admixtures. |
| <p>General water quality impacts may arise associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals.</p> <p>There is the potential for spillage or release of fuel oil and other dangerous substances to result in moderate to significant impacts on water quality in the absence of mitigation.</p> | <ul style="list-style-type: none"> • The following precautionary measures will be undertaken to minimise the risk of impacting on water quality within the receiving environment <ul style="list-style-type: none"> - The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example leakages/spillages of fuels, oils, other chemicals and waste water) will be controlled through good site management and the adherence to codes and practices, - Management and auditing procedures, including tool box talks to personnel, will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions; - Existing and proposed surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants, - Fuel, oil and chemical storage will be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. The control measures in GPP2: Above Ground Oil Storage Tanks and PPG 26 “Safe storage – drums and intermediate bulk containers” (Environment Agency, 2011) shall be implemented to ensure safe storage of oils and chemicals; - The safe operation of refuelling activities shall be in accordance with PPG 7 “Safe Storage – The safe operation of refuelling facilities” (Environment Agency, 2011). |
| <p>Drainage systems need to be designed to prevent the release of polluted water to the receiving waters.</p> | <ul style="list-style-type: none"> • The following precautionary measures will be undertaken to minimise the risk of impacting on water quality within the receiving environment <ul style="list-style-type: none"> - Storm water runoff will be collected in a dedicated storm water drainage system and will not be permitted to discharge directly into the marine environment from new jetties and hardstanding areas. The surface water drainage system will consist, inter alia, of heavy duty gullies cast into the reinforced concrete deck, with concrete pipes cast into the in-situ concrete deck structure. These pipes will carry the storm water into an appropriate full retention oil |

| Potential Impact | Summary of Proposed Mitigation |
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| | <p>separator which will trap oils and silts prior to being discharges into the harbour waters through a non-return flap valve. A readily and safely accessible monitoring chamber will be provided on the storm water pipeline as appropriate to allow for inspection and sampling of the storm water being discharged,</p> <ul style="list-style-type: none"> - The oil interceptors on the surface water drainage network will be selected and sized based on the pollution prevention guideline: "Use and design of oil separators in surface water drainage systems: PPG3" (Environment Agency, 2006) and BS EN 858 which is the European Standard for the design, performance, testing, marking and quality control of separators within the EU. All separators must comply with this standard. In accordance with PPG3 a class 1 bypass separator will be required for general and car parking areas of the site whilst a class 1 full retention separator will be required for the HGV parking and loading area. Notwithstanding this, full retention separators are proposed for each phase of the development and will be sized in accordance with a design flow of 590l/s for a six hour duration storm and the drainage area to be serviced. |
| Monitoring Measures | <ul style="list-style-type: none"> • A water quality monitoring system has been designed to ensure robust protection of the marine environment and for users of the inner Liffey channel during the construction phase of the MP2 Project. <ul style="list-style-type: none"> - It is proposed to maintain the four water quality monitoring stations already in position for the ABR Project - The specification is based on state of the art 24/7 real time monitoring with water quality monitoring sensors giving high resolution data with respect to the following parameters <ul style="list-style-type: none"> ○ Turbidity ○ -Dissolved Oxygen ○ Temperature ○ Salinity ○ - pH (additional proposed parameter) - Water level is also measured at one monitoring station to provide information on tidal state. Turbidity is measured as a surrogate for suspended solids. Site specific tests have previously been undertaken by the ABR Project to define the relationship between Turbidity and suspended solids, - A data acquisition and transfer system is being used to enable the transmission of high resolution data at approximately 15 minute intervals. |

| Potential Impact | Summary of Proposed Mitigation |
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| | <ul style="list-style-type: none"> - The following trigger levels that will prompt investigation are proposed: <ul style="list-style-type: none"> o Dissolved Oxygen level falling below 6 mg/l. o Peak Suspended Solids level rising more than 100mg/l above background (Based on the Turbidity v Suspended Solids relationship previously established this is equivalent to an Turbidity increase of 40 NTU above background) - The Dissolved Oxygen trigger level has been selected to safeguard fish-life. - The monitoring network infrastructure has been in place since 2016 and will continue for the duration of the construction phase of the MP2 Project. - This monitoring system has already generated a robust water quality baseline within the inner Liffey channel with the ability to identify water quality trends. The continuation of the monitoring system will serve to further strengthen the knowledge of water quality trends, a key indicator of the health of the marine environment. - The water quality data currently being collected is circulated to Dublin City Council on a monthly basis. It is proposed that this transfer of information continues for the duration of the construction phase of the MP2 Project - The data collected is also being shared with research organisations (Dublin City University, Maynooth University and University College Cork). |
| Chapter 10 AIR QUALITY & CLIMATE | |
| <p>Construction works have the potential to result in local impacts through dust nuisance at the nearest sensitive receptors and also to sensitive ecosystems</p> | <ul style="list-style-type: none"> • A draft dust minimisation plan has been prepared based upon the industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities' (Section 3.5.5 of this CEMP). • The following precautionary measures will be undertaken to minimise the potential nuisance caused by dust at the nearest sensitive receptors and on sensitive ecosystems <ul style="list-style-type: none"> - Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall be restricted to essential traffic only; - Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust |

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| | <p>potential);</p> <ul style="list-style-type: none"> - All HGVs and other site vehicles exiting the site will make use of a wheel wash facility prior to entering onto Dublin Port estate roads and public roads, to ensure mud and other wastes are not tracked onto the roads. Wheel washes will be self-contained systems that do not require discharge of the wastewater to water bodies. - Wheel washes shall be self-contained systems that do not require discharge of the wastewater to water bodies; - Public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary; - Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind; - Water misting, or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; - All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage on the public road; - It will be required that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum; and - Monthly monitoring of dust deposition levels each month for the duration of construction for comparison with the guideline of 350mg/m²/day (for non-hazardous dusts). This monitoring will be carried out at a minimum of four locations at sensitive receptors around the proposed works. Where dust levels are measured to be above this guideline, the mitigation measures in the area will be reviewed as part of a Dust Minimisation Plan. |
| <p>The potential exists for odour generation and nuisance to occur during the construction phase.</p> | <ul style="list-style-type: none"> • A draft Odour Management Plan (OMP) has been prepared and follows the guidance presented in the Environment Agency of England and Wales “Odour Management Guidance” (H4 Guidance, 2011) (see Section 3.5.5 of this CEMP). The odour monitoring and investigation aspects of the OMP will follow the EPA “Odour Impact Assessment Guidance for EPA Licenced Sites”. The OMP will achieve the following: <ul style="list-style-type: none"> - Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution; - Prevent unacceptable odour releasing incidents or accidents by anticipating them and planning accordingly. • The plan considers sources, releases and impacts of odour and uses these to identify opportunities for odour management. The OMP will also include a periodic odour audit of the facility by a suitably qualified |

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| | <p>expert to identify all sources on site together with nature and scale of the odour release and associated construction details. In addition, the plan includes for complaint recording and investigation to ensure that all complaints received at the site are suitably addressed.</p> |
| <p>Emissions of construction generated Green House Gases (GHG) will arise from embodied emissions in site material, direct emissions from plant machinery /equipment as well as emissions from vehicles delivering material and personnel to the construction site.</p> | <ul style="list-style-type: none"> • Mitigation measures to minimise CO₂ emissions from the construction phase include the following: <ul style="list-style-type: none"> – Consultation with a wider variety of internal and external stakeholders to ensure all relevant information is included in the development of the plans; – Implementation of a Traffic Management Plan which will form part of the specification for the construction works. This will outline measures to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads; – Reducing the idle times by providing an efficient material handling plan that minimizes the waiting time for loads and unloads. Reducing idle times could save up to 10% of total emissions during construction phase; – Turning off vehicular engines when not in use for more than five minutes. This restriction will be enforced strictly unless the idle function is necessary for security or functionality reasons; – Regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they will perform the most efficiently. • Materials with a reduced environmental impact will be incorporated into the construction design through re-use of materials or incorporation of recycled materials in place of conventional building materials. The following materials will be considered for the construction phase:- <ul style="list-style-type: none"> – Ground Granulated Blast Furnace Slag (GGBS) & Pulverised Fuel Ash - Used as replacements for Portland cements to increase sustainability and carbon footprint of civil and structural works; – Steel - The recovery rates associated with using recycled steel are high and research exists which shows that 99% of structural steel arising from demolition sites is recycled or re-used. The carbon emissions emitted during the production of virgin steel can be higher than some other structural materials on a tonne by tonne basis, and recycled steel will be used where possible. • An The Energy Management system will include the following measures as:- <ul style="list-style-type: none"> – The use of thermostatic controls on all space heating systems in site buildings to maintain optimum comfort at minimum energy |

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| | <p>use;</p> <ul style="list-style-type: none"> – The use of sensors on light fittings in all site buildings and low energy lighting systems; – The use of adequately insulated temporary building structures for the construction compound fitted with suitable vents; – The use of low energy equipment and “power saving” functions on all PCs and monitors in the site offices; – The use of low flow showers and tap fittings; – The use of solar/thermal power to heat water for the on-site welfare facilities and contamination unit (sinks and showers). |
| Chapter 11 NOISE & VIBRATION | |
| <p>There is the potential for noise impacts associated with the construction phase of the proposed development at the nearest noise sensitive receptors.</p> | <ul style="list-style-type: none"> • A Noise Management Plan will be implemented for the duration of the proposed construction works. A draft Noise Management Plan is presented in Section 3.5.4 of this CEMP. • <i>British Standard BS5228:2009+A1:2014 – Noise and vibration control on construction and open sites: Part 1 - Noise</i> outlines a range of measures that will be used to reduce noise impacts at the nearest noise sensitive receptors. The measures, which will be applied, include: <ul style="list-style-type: none"> – Ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order, – Careful selection of quiet plant and machinery to undertake the required work where available, – All major compressors will be ‘sound reduced’ models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use, – Any ancillary pneumatic percussive tools will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use, – Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers, – Machines in intermittent use will be shut down in the intervening periods between work, – Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations, in order to cause minimum noise disturbance, |

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| | <ul style="list-style-type: none"> – Handling of all materials will take place in a manner which minimises noise emissions, – Audible warning systems will be switched to the minimum setting required by the Health and Safety Authority, – A complaints procedure will be operated by the Contractor throughout the construction phase and all efforts will be made to address any noise issues at the nearest noise sensitive properties. |
| <p>There is potential for underwater noise as a result of piling activities.</p> | <ul style="list-style-type: none"> • The use of vibratory piles for a substantial portion of the piling requirements will reduce impact driving. • Pile driving activity will be carried out as efficiently as possible to reduce the duration of the piling activity. Piling will only take place for a portion of each working day and will not be carried out at night. |
| <p>Monitoring Measures</p> | <ul style="list-style-type: none"> • Continuous terrestrial noise monitoring will be undertaken for the duration of the construction works in accordance with BS7445: Description and Measurement of Environmental Noise. <ul style="list-style-type: none"> – All measurements will be made using Type 1 precision digital sound levels meters and associated hardware. The following parameters will be recorded as a minimum: LAeq, LAm_{ax}, LAm_{in}, LA10 & LA90. – The number and location of noise meters will be agreed with Dublin City Council. These will operate for the entire duration of the construction phase. A permanent secure noise monitoring station has previously been established at the marina adjacent to Pigeon House Road as part of the ABR Project. It is representative of nearest sensitive noise receptors and may prove to be an appropriate location for the MP2 Project subject to approval as above. A second monitoring station is proposed at Clontarf, representative of nearest sensitive noise receptors to the north of the MP2 Project site. – All data will be collected and analysed on a weekly basis and the analysed data will be fed back to DPC and the Contractors with a view to reviewing the compliance of construction phase activities in the context of any relevant conditions in planning approval if granted, and the thresholds/requirements included in the draft Noise Management Plan. This will also include any liaison requirement with Dublin City Council in this regard. – Any noise nuisance issues associated with the construction phase activities will be immediately assessed and analysed in relation to the recorded noise levels and all correspondence with DPC, the Contractor, Dublin City Council and the residents will be |

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| | <p>conducted with the appropriate level of urgency. This will include the appropriate liaison with DPC and the Contractor to control activities to ensure that the construction phase activities are in line with any relevant planning conditions and the CEMP.</p> <ul style="list-style-type: none"> – Interim synoptic reports will be produced on a regular basis, usually calendar months, and submitted to Dublin City Council and the project liaison group. – Summary data and graphical outputs for each year of the construction phase will form part of an Annual Environmental Report. The data will be prepared in an analytical output that will aim to provide a concise representation of the construction phase noise levels from the port and will aim to avoid presentation of lengthy datasets. • Underwater noise surveys will be undertaken during the construction phase of the works: <ul style="list-style-type: none"> – The underwater noise surveys will complement the existing underwater noise level measurements which have been recorded during the impact piling carried out inside Alexandra Basin West for the ABR Project. This will provide additional validation of the underwater noise modelling and to ensure the underwater noise levels are contained within the operations area of the port, – Underwater noise surveys will be undertaken during the construction period at a minimum of 2 locations upriver and two locations downstream of the works when being carried out in the navigation channel. Monitoring will be carried out at the commencement of the piling activity. |
| Chapter 12 COASTAL PROCESSES | |
| <p>Potential impact of Berth 53 upon tidal current speeds resulting in erosion of bed levels and a localised modification of the lowest astronomical tide mark. This has the potential to impact upon the winter foraging areas within the South Dublin Bay and Tolka Estuary SPA.</p> | <ul style="list-style-type: none"> • The potential impact of Berth 53 on tidal currents and the movement of sediments was modelled and this process informed the final open piled berth design to mitigate any impact on the morphology of the South Dublin Bay and Tolka Estuary SPA. • A wash protection structure has been designed to reduce high thruster jet velocities associated with manoeuvring vessels, again to mitigate any impact on the morphology of the South Dublin Bay and Tolka Estuary SPA. • This mitigation by design has reduced the potential impact of the MP2 Project on coastal processes to an imperceptible level. |
| Chapter 13 TRAFFIC & TRANSPORT | |
| <p>There will be an increase in construction traffic during the</p> | <ul style="list-style-type: none"> • A Construction Traffic Management Plan will be implemented for the duration of the proposed construction works. A draft Construction |

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| <p>construction phase of the development.</p> | <p>Traffic Management Plan.is presented in Section 3.5.1 of this CEMP. The following mitigation measures will be applied:</p> <ul style="list-style-type: none"> – Adhering to the Dublin City Council HGV Management Strategy; – A pre-defined haulage route will be agreed with Dublin City Council to avoid construction traffic through sensitive road networks at critical times; – Time restrictions will be implemented relating to construction vehicles on the adopted road network, – Temporary warning signage will be installed, as necessary, – Wheel washing, roadside cleaning, load checking and general maintenance of larger vehicles will be in place, – Appropriate parking facilities for site operatives and visitors within the site will be provided with all parking areas clearly signed and monitored. |
| <p>Chapter 14 CULTURAL HERITAGE (including Industrial & Archaeological)</p> | |
| <p>There is a need for an overarching Archaeology and Cultural Heritage Management Plan to be implemented during the construction phase</p> | <ul style="list-style-type: none"> • An Archaeology and Cultural Heritage Management Plan will be implemented for the duration of the proposed construction works. A draft Archaeology and Cultural Heritage Management Plan.is presented in Section 3.5.8 of this CEMP. |
| <p>Ground disturbance activities have the potential to expose elements of the 19th Century Breakwater which are assumed to remain undisturbed beneath Breakwater Road.</p> | <ul style="list-style-type: none"> • Archaeological monitoring licensed by the National Monument Service will be conducted of all ground disturbance activities, including site investigations, with the proviso to resolve fully any archaeological material observed at that point. |
| <p>The construction of Oil Berth 3 will necessitate the reclamation of the sea pocket that accommodates the Pilot Boat pontoon, and the five ship’s timber and one metal piece that are in temporary storage under the pontoon.</p> | <ul style="list-style-type: none"> • There are five ship’s timbers and one metal piece located in temporary wet storage under the Pilot Boat pontoon which will be removed to the secure Heritage Zone area for the ABR Project, where they will be placed in water-filled tanks. |
| <p>It is necessary to demolish the Breakwater terminus or Pier Head to facilitate the construction of Berth 50A.</p> | <ul style="list-style-type: none"> • Prior to demolition works commencing, the 3D record of existing structure and associated features will be amended where necessary to ensure that the permanent outputs can produce metrically accurate plan, elevation and section drawing information at 1:20 scale. • Archaeological monitoring licensed by the National Monuments Service will be conducted of all ground disturbances, with the proviso to resolve fully any archaeological material observed at that point. The archaeologist will be facilitated by DPC to complete a comprehensive record of any archaeological features that become exposed in the |

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| | course of the construction works. |
| <ul style="list-style-type: none"> The extension of capital dredging into the south side of the localised channel widening area represents direct and permanent impacts on what appears to be previously undredged locations. It is an area of high archaeological potential and the recovery of shipping debris and/or shipwreck must be anticipated. | <ul style="list-style-type: none"> Archaeological monitoring licensed by the National Monument Service will be conducted of all seabed disturbances that might take place prior to construction, including site investigation, with the proviso to resolve fully any archaeological material observed at that point. Archaeological monitoring of all dredging activities and associated seabed disturbance activities conducted within the berth pockets and the localised channel widening area will be carried out, with the proviso to resolve full any material of archaeological significance observed at that point. |
| Monitoring Measures | <ul style="list-style-type: none"> Retaining an Archaeologist: <ul style="list-style-type: none"> An archaeologist experienced in maritime archaeology will be retained for the duration of the relevant works. Retaining a Heritage Architect: <ul style="list-style-type: none"> A heritage architect experienced in maritime and industrial heritage will be retained for the duration of the relevant works, to advise specifically in relation to works associated with the Breakwater terminus Pier Head. Archaeological Licences: <ul style="list-style-type: none"> Archaeological licences will be required to conduct the on-site archaeological works. Licence applications require the inclusion of detailed method statements, which outline the rationale for the works, and the means by which the works will be resolved. Archaeological Monitoring: <ul style="list-style-type: none"> Monitoring will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by the Department of Culture, Heritage and the Gaeltacht. Archaeological monitoring will be conducted during all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the development. The monitoring will be undertaken in a safe working environment that will facilitate archaeological observations and the retrieval of objects that may be observed and that require consideration during the course of works. The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland. Time Scale: <ul style="list-style-type: none"> The time scale for the construction phase will be made available |

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| | <p>to the archaeologist, with information on where and when ground disturbances will take place.</p> <ul style="list-style-type: none"> • Discovery of Archaeological Material: <ul style="list-style-type: none"> – In the event of archaeologically significant features or material being uncovered during the construction phase, machine works will cease in the immediate area to allow the archaeologist/s to inspect any such material. • Archaeological Material: <ul style="list-style-type: none"> – Once the presence of archaeologically significant material is established, full archaeological recording of such material will be recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will be a matter for discussion between DPC and the licensing authorities. • Archaeological team: <ul style="list-style-type: none"> – It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation. • Archaeological Dive Team: <ul style="list-style-type: none"> – It is recommended that an archaeological dive team is retained on standby for the duration of any in-water disturbance works on the basis of a twenty-four or forty-eight hour call-out response schedule, to deal with any archaeologically significant/potential material that is identified in the course of the seabed disturbance activities. • A Site Office: <ul style="list-style-type: none"> – A site office and facilities will be provided by DPC on site for use by archaeologists. • Secure Wet Storage: <ul style="list-style-type: none"> – Secure wet storage facilities will be provided on site by DPC to facilitate the temporary storage of artefacts that may be recorded during the course of the site work. • Buoying/Fencing: <ul style="list-style-type: none"> – Buoying/fencing of any such areas of discovery will be necessary if discovered and during excavation. • Machinery Traffic: <ul style="list-style-type: none"> – Machinery traffic during construction will be restricted to avoid any identified archaeological site/s and their environs. • Spoil: |

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| | <ul style="list-style-type: none"> – Spoil will not be dumped on any of the selected sites or their environs. • Post-construction Project Report and Archive: <ul style="list-style-type: none"> – It is a condition of archaeological licensing that a detailed project report is lodged with the DCHG within 12 months of completion of site works. The report should be to publication standard and should include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland. |
| Chapter 15 LANDSCAPE & VISUAL | |
| <p>There are no significant landscape or visual impacts predicted for the MP2 Project.</p> | <ul style="list-style-type: none"> • The following measures have been incorporated within the engineering design to offset the landscape and visual impact: <ul style="list-style-type: none"> – Integration of constructed elements with existing elements such as existing roads and building sites; – Appropriate colour of fencing and structures; – Use of directional lighting. |
| Chapter 16 POPULATION & HUMAN HEALTH | |
| <p>Embedded mitigation measures</p> | <ul style="list-style-type: none"> • Monitoring of dust, odour and noise during the construction phase will act as precursors to any health impact, thereby enabling a monitoring regime that enables intervention before any manifest adverse health outcome. • As part of annual reporting, DPC already monitors numbers of employees and several financial Key Performance Indicators (KPIs) (such as turnover, profit, tax contributions) to measure year-on-year progress. The continued measurement of these will ensure that financial socio-economic benefits of the MP2 Project construction phase are captured. |
| Chapter 17 WASTE | |
| <p>Waste will be generated during the demolition phase of the works</p> | <p><u>Main Works Contractor</u></p> <ul style="list-style-type: none"> • A Main Works Contractor (MWC) Environmental Co-ordinator/Waste Manager will be appointed. The MWC will ensure that demolition wastes will be collected by an appropriately licensed waste management Contractor and that all proposed management routes comply with the European waste hierarchy of prevention, preparing for reuse, recycling, and recovery with disposal being the last and final option and with other legal requirements. All waste materials leaving |

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| | <p>the site will be transported and disposed or recovered through licenced operators and in accordance with national waste legislation.</p> <p><u>Demolition Survey</u></p> <ul style="list-style-type: none"> • A Demolition Survey is required prior to any demolition work being undertaken. The Demolition Survey will set out all high value waste materials, such as metals, that will be removed from buildings and segregated for possible onward reuse or recycling to maximise recovery. The Demolition Survey will also include intrusive surveying with sampling which will identify the exact extent and location of any asbestos containing materials (ACMs) in the building. Removal offsite of any ACMs from the buildings to be demolished will be required prior to demolition. <p><u>Segregation & Storage of demolition materials</u></p> <ul style="list-style-type: none"> • Demolition debris will be separated into five waste streams on-site: <ul style="list-style-type: none"> – Construction debris (i.e. ceramics, tiles, plasterboard), – Masonry materials (i.e. brick, concrete blocks) – Metals, – Timber, – Universal waste (i.e. fluorescent bulbs, ballast and mercury containing switches). • On-site segregation of all hazardous waste materials into appropriate categories will be undertaken: <ul style="list-style-type: none"> – Waste oils and fuels; – Paints, glues, adhesives and other known hazardous substances. • The storage and reuse of demolition or excavation wastes on site may be subject to a number of waste licensing requirements. If these wastes are to be stored on site, prior to potential reuse or recovery during construction, this activity will be subject to a Waste Management Licence Exemption with a limited tonnage of material permitted to be stored on site. Storage will take place in a secure area on-site and the Contractor will monitor the amount of waste stored to ensure that the permitted limits of the Exemption are not exceeded. DPC and its appointed Contractor will consult with the EPA prior to construction to ensure that the appropriate Waste Management Licence or Exemption is in place. <p><u>Reuse of demolished material on-site</u></p> <ul style="list-style-type: none"> • In order to divert waste from landfill, possibilities for reuse of inert demolition material as fill on site will be considered, following appropriate testing to ensure materials are suitable for their proposed end purpose. |

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| | <ul style="list-style-type: none"> • Under certain circumstances and in order that uncontaminated excavated soil and stone is beneficially used on-site, DPC and its MWC may decide in accordance with the conditions of article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011 that such material is a by-product and not a waste and will notify the Environmental Protection Agency for a determination. • It is proposed the following areas will be infilled using engineered fill material and suitable CDW arising from demolition works within the footprint of the development: <ul style="list-style-type: none"> – Basin of Oil Berth 4, – Void between the existing Oil Berth 3 and the proposed new sheet pile wall, – Bridging structure in Berth 50A. • A waste permit will be required for the infilling of <50,000 tonnes of CDW into Oil Berth 4. • CDW may be subject to treatment at the site prior to recovery in Oil Berth 4. Mobile plant may be installed to crush and screen suitable CDW. The operations will be as follows: <ul style="list-style-type: none"> – Loading; – Crushing and grinding; – Screening; – Unloading; – On-site off-site transfer of CDW; – Stockpiles; and – Recovery of waste into Oil Berth 4. • A permit for the recovery operation will be required which is subject to planning. • Masonry units from the 19th Century Eastern Breakwater which currently supports the Port Operations Centre are of industrial heritage importance and will be carefully removed and salvaged for relocation elsewhere on site for future heritage gain projects. The quantity of masonry units is estimated to be approximately 7,000m³. • DPC and its appointed Contractor will consult with the EPA prior to construction to ensure that the appropriate licences, permits and exemptions are in place prior to initiation. |
| <p>There is likely to be an increase in the amount of waste produced during the construction phase of the works.</p> | <ul style="list-style-type: none"> • The current Dublin Port Ship's Waste Management Plan (see Appendix 17 of this EIAR) underpins all waste related operations at Dublin Port. DPC will continue to review and implement any required changes in the waste management plan in order to avoid and minimise the potential |

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| | <p>effects of vessel generated wastes.</p> <ul style="list-style-type: none"> • DPC will continue to provide adequate reception facilities and remove, as far as is practicable, any disincentives to landing waste in the port. DPC will continue to encourage the responsible management of waste, including minimisation and recycling, at the point of generation on ships, reception in ports/harbours, transportation and disposal, and ensure that port and harbour employees and users dispose of wastes responsibly in facilities provided. • The Ship's Waste Management Plan will continuously evolve to effectively capture materials generated to help ensure that recyclable materials are handled and diverted accordingly. Developing a clear waste management plan that incorporates a customer-facing recycling and organics collection program will help divert materials from landfill. • A draft MP2 Project specific Construction Waste Management Plan (CWMP) has been prepared (see Section 3.5.3 of this CEMP) and includes the following specific requirements: <ul style="list-style-type: none"> – Building materials will be chosen with an aim to 'design out waste'. – Control measures and attention to materials quantity requirements will avoid over-ordering and generation of waste materials. – Agreements with materials suppliers will reduce the amount of packaging or to participate in a packaging take-back Scheme where possible. – A 'just in time' materials delivery system will be implemented where possible to avoid materials being stockpiled, which increases the risk of the damage and disposal as waste. – Waste arisings will be managed appropriately in line with the Port's waste management hierarchy in accordance with best practice in order to achieve good recycling performance and high landfill diversion. – Waste materials will be segregated on-site into appropriate categories. In addition to recyclable items such as paper and drinks bottles, separation of food and food contaminated packaging and consumable items for composting will be implemented, as well as the requirement for more specialist streams (for example, electrical items, hazardous materials). – Appropriate receptacles and recycling bins will be clearly labelled for the collection and segregation of each of these waste materials and will be provided throughout the development and open space areas, as appropriate. Wastes will be stored in these receptacles in a designated, easily accessible area of the site until collection by an appropriately licensed waste management Contractor. |

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| | <ul style="list-style-type: none"> – All waste types and amounts will be recorded and reviewed at regular intervals, to allow for continuous analysis and review of procedures that will be made to reduce waste to landfill, increase the percentage of recycling and reduce waste overall as much as possible. • All wastes generated will be managed in accordance with appropriate waste management legislation and policy, and will be transported and recovered / disposed of by licensed waste management Contractors. • In order to ensure that these operations are carried out effectively, all staff will receive training as part of their induction to the site including: instructions on the appropriate segregation, handling, recycling and reuse methods to be employed by all parties on-site for wastes generated. Furthermore, the waste management strategy and relevant environmental procedures will be communicated to staff, Contractors and suppliers and it will be a requirement that suppliers, and Contractors promote the adoption of environmentally sound practices. <p><u>On-site waste management</u></p> <ul style="list-style-type: none"> • The MP2 Project design will incorporate adequate dedicated space to cater for the segregation and storage of all various waste streams within the site. This waste storage compound will allow for waste segregation, handling activities such as bailing of cardboard and plastic and sufficient waste storage. • All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all staff will be provided with training regarding the waste management procedures on commencement of the project. • Construction waste materials shall be segregated on-site for recycling into the following categories: <ul style="list-style-type: none"> – Timber – Metal – Cardboard & paper – Glass – Rubble – General waste • Adequate security measures will be put in place. • DPC will continue to implement its Environmental Policy and update its Environmental Management System for the development consistent with best practice. |

| Potential Impact | Summary of Proposed Mitigation |
|-------------------------|--|
| | <p><u>Duty of care in relation to correct waste authorisations</u></p> <ul style="list-style-type: none"> Contractors working on site during the works will be responsible for the collection, control and disposal of all wastes generated by the works. DPC and its appointed MWC will ensure that waste it is handled only by a body authorised under the Waste Management Act to manage it. This duty implies, at the very least, checking to see that the required authorisation is in place, has not expired and is appropriate for the waste types that are to be handled. DPC and its appointed MWC will ensure that all waste materials leaving the site will be transported via a licensed carrier and disposed or recovered through licenced operators and in accordance with national waste legislation. Monitoring and updating of records will be implemented. |
| Monitoring Requirements | <ul style="list-style-type: none"> All waste types and amounts generated will be recorded and reviewed at regular intervals to allow for continuous analysis and review of procedures that will be made to reduce waste to landfill, increase the percentage of recycling and reduce waste overall as much as possible. Waste storage will take place in a secure area on-site and the Contractor will monitor the amount of waste stored to ensure that permitted limits of any Exemption are not exceeded. Measures and procedures to monitor waste flows on site and update records will be clearly set out. An Environmental Co-ordinator/Waste Manager will be appointed who will set up and maintain a record keeping system, perform audits and establish targets for waste management on site. The Environmental Co-ordinator/Waste Manager will also implement best practice methods for segregation and storage of recyclable materials, and for reuse of appropriate materials on-site in accordance with the MP2 Project's CWMP. The Environmental Co-ordinator/Waste Manager will be responsible for organising and delivering a waste training programme to staff on site. This will provide basic awareness for all staff of the CWMP and the requirement to segregate waste at source. Training may be incorporated with other training needs (e.g. general site induction, safety training etc.). This basic course will describe the materials to be segregated, the storage methods and the location of waste storage areas. A subsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained. A system will be put in place to record the waste arising on site during demolition and construction phases, and all waste material that leaves the site. The Environmental Co-ordinator/Waste Manager will record the following: |

| Potential Impact | Summary of Proposed Mitigation |
|------------------|--|
| | <ul style="list-style-type: none"> – Waste taken off-site for reuse – Waste taken off-site for recovery – Waste taken off-site for recycling – Waste taken off-site for disposal <ul style="list-style-type: none"> • For each movement of waste off-site a signed waste collection docket will be obtained by the Environmental Co-ordinator/Waste Manager from the Contractor. This will be carried out for each material type. This system will also be linked with the delivery records. A signed waste acceptance docket will be issued for each movement of waste on-site. Periodic audits will ensure completeness of records and compliance with the established system. • Each material type will be examined in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how waste can be minimized. • The Environmental Co-ordinator/Waste Manager will be responsible for conducting a waste audit at the site during the construction phase of the development. A review of all records for waste generated and transported off-site, will be undertaken mid-way through the construction phase. • Upon completion of the construction phase a final report will be prepared summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development. <p><u>Waste arising from wash down facility</u></p> <ul style="list-style-type: none"> • Solid waste in the form of sediments will arise from the wheel wash unit settlement tank. The unit will be inspected regularly (for example, to check automated features are working and settlement content) and emptied in accordance with manufacturer's instructions. The solid residues will be analysed and the disposal route appropriately selected based on the results of this analysis. A gully emptier tanker will be used to remove settlement tank waste which will be disposed of at an approved waste disposal site. <p><u>Fuels and hydraulic oils/lubricants</u></p> <ul style="list-style-type: none"> • Contractors will ensure all plant is inspected and serviced in accordance with its schedule. A banded disposal area will be provided. Contractors will provide staff training on the waste management strategy. Disposal/recovery under licence. |

2.2 Conditions on Planning as Specified by An Bord Pleanála

This Section will be populated with any and all additional requirements under conditions imposed by An Bord Pleanála (ABP) should the Board decide to grant development consent for the MP2 Project.

2.3 Conditions on Foreshore as Specified by DHPLG

Foreshore Lease/License/Ministerial Consent conditions set by the Foreshore Unit of Department of Housing, Planning and Local Government (DHPLG) will be inserted here should DHPLG decide to grant foreshore consent for the MP2 Project.

2.4 Conditions on Dumping at Sea as Specified by the EPA

Dumping at Sea Permit conditions set by the EPA will be inserted here should the EPA decide to grant Dumping at Sea consent for the MP2 Project.

3 MANAGEMENT OF ENVIRONMENTAL IMPACT

3.1 Roles and Responsibilities

DPC intends to appoint a Contractor(s) to undertake each phase of the works. Mitigation measures set out in the CEMP will form part of the Contract Documents for the construction stage to ensure that the Contractor undertakes the works required to implement the mitigation measures.

DPC has an established liaison group for the ABR Project which includes representatives of DPC, the Contractor, Dublin City Council (DCC) and The Department of Housing, Planning and Local Government (DHPLG) Foreshore Unit. The group meets at quarterly intervals each year with an agenda and minutes taken of the meetings. It is proposed that this liaison group will also provide environmental oversight of the construction phase of the MP2 Project.

DPC will appoint a suitably qualified person to the role of Environmental Facilities Manager (Environmental Clerk of Works) to monitor the MP2 Project construction works. The Environmental Facilities Manager will provide monthly reports to the members of the liaison group. The Environmental Facilities Manager will work closely with the Contractor's site supervisors to monitor activities and ensure that all relevant environmental legislation is complied with and that the requirements of the CEMP are implemented. The Environmental Facilities Manager will have the authority to review method statements, oversee works and instruct action, as appropriate, including the authority to require the temporary cessation of works, where necessary.

3.2 Hours of Working

Where construction activity takes place for the development in the vicinity of residential properties, the activities will operate between the hours of 08:00 and 18:00 on Monday to Fridays, between 08:00 and 13:00 on Saturdays and there will be no activity on Sundays or Bank Holidays in accordance with the requirements of the EIAR.

Where additional or alternative working hours are required, a request for derogations to work outside the permitted working hours will be submitted to Dublin City Council at least five working days in advance. The request will be supported by a detailed case including an Engineering report explaining the requirement to work outside the permitted working hours and listing proposed dates with commencement and finishing times.

All affected residents and stakeholders shall be notified on receipt of any approved derogations including the rationale for the extended working hours.

Capital Dredging works are remote from residential properties and are proposed to be undertaken on a 24 hour / 7 days per week basis.

3.3 Environmental Management System

3.3.1 Background

In order to safeguard local amenities and protect the environment, the MP2 Project will be operated and managed in accordance with a comprehensive Environmental Management System (EMS). An annual audit report for the EMS will be made publicly available.

An EMS is already in operation for the ABR Project and it will be extended to incorporate the MP2 Project. This section sets out the systems already in place.

3.3.2 Existing EMS Certification

DPC has a comprehensive Environmental Management System (EMS) in place which is certified to international standard ISO 14001. A copy of the current certification is provided in Figure 3-3-I. An EMS Manager oversees the implementation of the system.

The EMS is comprised of the following elements:

- DPC Environmental Policy: a statement of intent to improve and sustain environmental performance Figure 3-3-2;
- Planning: identification of legal requirements, objectives and targets and establishment of management programme;
- Implementation and operation: training of appropriate personnel, record keeping and establishment of emergency planning;
- Checking and Corrective action: auditing EMS, implementing corrective actions;
- Management review: assessment of EMS (i.e. objectives and targets) relevant to operations and defined policy.

The MP2 Project will be incorporated into the scope of the EMS.

In addition, DPC is a member of the Ecoports network and is a certified user of the 'Ports Environmental Review System' (PERS) since 2008.



Figure 3-3-1 Dublin Port Company Current ISO 14001 Certification



ENVIRONMENTAL POLICY

The principal activities of Dublin Port Company (DPC) are to facilitate the efficient flow of goods and passengers through the port. The company provides the infrastructure, facilities, services and hard standing areas to meet with the needs of their customers and to allow the transfer of goods and passengers between sea and land.

"It is our policy to manage our obligations to the environment in a responsible manner and to take a sustainable approach to developing the port's business"

As part of this policy we aim to:

1. Comply with all relevant environmental legislation and Best Environmental Management Practices in line with the certification to ISO14001:2015 and PERS Certification.
2. Having regard to DPC's commitment to the concept of Corporate, Social Responsibility, work shall continue in developing and building partnerships with Dublin City Council, Regulator's, Non Governmental Organisations and local resident groups.
3. Promote best practise on environmental issues in the planning, design and implementation of projects in consultation with our tenants, customers and wider stakeholders.
4. DPC recognises the sensitivity of its location in close proximity to designated conservation sites and the corresponding significant aspects and impacts of Port operations. DPC will ensure a continued positive focus on nature conservation.
5. Follow best environmental practice in regard to our own activities, ensuring that pollution prevention is a major consideration in all-operational activities.
6. Having regard to protecting DPC's assets, work shall continue with both DPC staff and Port tenants in improving management of the potential environmental consequences of Port activities.
7. Seek to minimise significant environmental impacts of our activities especially in the areas of waste generation, pollution control and energy usage through the progressive development of environmental management procedures as determined by our business needs.
8. Establishing objectives and measurable targets against which improvements in environmental performance will be monitored.
9. Raise staff awareness of the environmental issues and the environmental effects of DPC's activities through communication and training.
10. Review annually our environmental policy and consider the need for any amendments in the light of changing circumstances.
11. Make the environmental policy statement available to our stakeholders and the public and consult with local communities on relevant matters.
12. Build on the environmental standards we have achieved through a process of continuous improvement in environmental performance.
13. Publish an annual Sustainability Report.
14. Ensure the availability of necessary resources to implement this policy.

Signature: 
Eamonn O'Reilly
Chief Executive Officer

Date: 2/5/2019

REF-DPC-ENV-002 Revision 13

Figure 3-2-2 Dublin Port Company Environmental Policy

3.3.3 EMS Purpose

The ISO 14001 internationally certified Environmental Management System operated by DPC provides a comprehensive framework within which DPC carries out its operations and activities to the highest environmental standards and in a sustainable manner. It is a systematic framework to manage the immediate and long term environmental impacts of DPC's products, services and processes. Its ongoing implementation ensures that DPC's environmental footprint is minimised, the risk of pollution incidents is diminished, and ensures compliance with relevant environmental legislation.

DPC's Environmental Management Manual (EMM) describes in detail how the EMS identifies and manages significant environmental issues associated with DPC's activities, and will include the MP2 Project, and consequently how it applies environmental awareness and responsible decision making in all its procedures. The EMM and associated documented procedures are intended to facilitate effective and efficient management of the environmental aspects and any potential impacts of the Dublin Port operations. DPC is committed to implementing this EMS in relation to all its activities so as to prevent any significant adverse environmental effects.

3.3.4 Environmental Facilities Manager

DPC will appoint an Environmental Facilities Manager (Environmental Clerk of Works) to monitor and to assess the environmental implications of all construction works associated with the MP2 Project. The Environmental Facilities Manager will work closely with the Contractors' site supervisors to monitor activities and ensure that all relevant environmental legislation and EMS protocols are complied with, and that the requirements of the CEMP are implemented. The Environmental Facilities Manager will review method statements, oversee works and instruct action, as appropriate, and has the authority to require the temporary cessation of works, where necessary.

3.3.5 MP2 Project - EMS Implementation

The DPC EMS Manager will provide EMS induction to the Environmental Facilities Manager once appointed. Relevant documentation will be provided including:

- EMS Manual MAN-DPC-ENV-001
- Environmental Aspects Register AR-DPC-ENV-001
- Internal EMS Audits SOP-DPC-ENV-004
- PC Legal Index/Register REF-DPC-ENV-001
- Initial Environmental Assessment SOP-DPC ENV-003
- Monitoring & Measurement of Environmental Aspects SOP-DPC-ENV-006
- Environmental Aspects Monitoring Log REF-DPC-ENV-012
- Emergency Management Plan REF: MAN-DPC-OPS-002 DPC
- Preparation, Revision & Control of SOPs SOP-DPC-QUAL-001
- Document Control System SOP-DPC-ENV-015
- Roles and Responsibilities REF-DPC-ENV-010
- Corrective Actions/ Preventive Actions SOP-DPC-ENV-008

- Internal Communication SOP-DPC-ENV-007
- External Communication SOP-DPC-ENV-011

Relevant documents will be reviewed by the Environment Facilities Manager in the context of the MP2 Project. This review will identify further new environmental considerations to be considered arising from the MP2 Project. The objective is to identify additional aspects and controls for inclusion in the Environmental Aspects register, and revise the environmental audit checklist to ensure comprehensive coverage of the MP2 Project scope of work. The environmental legal register will be reviewed and additional legislative instruments germane to the MP2 Project identified.

As part of the ongoing implementation of the EMS in relation to the MP2 Project, the Environmental Facilities Manager will participate in DPC's Capital Projects Internal Audit and will fully implement the EMS and engage in all EMS procedures and protocols as required.

3.3.6 EMS Scope

The Environmental Management Manual sets out the scope of the EMS and specifically includes management, maintenance and development of port infrastructure: including roads, ramps, drainage system, selected utilities under the roads alignment (mains water supply), buildings, piles, hydrographical surveys and dredging.

Key relevant provisions of the existing DPC ISO 14001 Environmental Management System include:

- the requirement for all Contractors to be assessed/audited at procurement stage and throughout the project in accordance with SOP-DPC-ENV-018 Environmental Performance in Procurement;
- awareness raising in MP2 Project specific environmental issues to be provided to Contractors during the project;
- ongoing auditing and monitoring as programmed in the EMS and CEMP;
- identification and documentation of environmental non-conformances and corrective actions/preventative actions using the EMS QPulse document control system;
- data storage and reporting as required by the EMS and CEMP.

3.3.7 EMS Implementation and Operation

The EMS is managed by the Environment, Health and Safety Specialist and relevant management personnel. The Environmental Management Manual sets out the overall structure for implementation and defines the roles and responsibilities of personnel in relation to the EMS.

The MP2 Project will be supported by its own dedicated Environmental Management Team. Additional expertise will be available as required when phased project elements come on-stream over the lifetime of the project.

The Environmental Facilities Manager will be the designated point of contact with the EMS Management Team. An Environmental Compliance Process Flow Diagram will be prepared by DPC's Programme Management Office for the MP2 Project. It will outline the stages in the process of environmental planning, assessment and reporting for MP2 Project construction activities.

The process begins at the procurement tendering stage, and covers the process of environmental management plan development and approval, the audit and inspection schedule roles, and reporting mechanisms. All Contractors will be made aware of DPC’s environmental policy, the EMS and DPC environmental point of contacts. This information will be made available within tender documentation as per SOP-DPC-ENV-018 – Environmental Performance in Procurement. The Environmental Facilities Manager will provide reports to the competent authorities, and to identified stakeholders at the agreed frequency.

The Environment, Health and Safety Specialist will conduct an internal environmental audit of the MP2 Project every six months. Additional audits of MP2 Project construction activities will be completed by the Environmental Facilities Manager every three months initially. However, if a large number of non-conformances are identified, this frequency will be increased in consultation with the EHS Specialist.

3.3.8 EMS Documentation

EMS specific documentation is maintained by the EMS Manager. This documentation is subject to periodical review and amendments to reflect new operations or activities carried out by DPC, changes in legal requirements and development of the system. Such a review process will be undertaken at the beginning of the MP2 Project and will be ongoing throughout the life of the project.

The preparation, revision and control of documents related to the EMS is outlined in SOP-DPC-ENV-015. DPC uses a document control system called Q- Pulse and an associated procedure SOP- DPC-ENV-009 combined with hard copy control to meet the ISO standard requirements for document control.

A list of documentation comprising the DPC EMS is provided in Table 3-3-1. It is a key requirement of the Dublin Port Masterplan 2040, reviewed 2018, that all future DPC activities (including the MP2 Project) are undertaken in accordance with the requirements of the company’s accredited EMS as set out in the documents in Table 3-3-1.

3.3.9 EDEN

DPC are registered on Environmental Data Exchange Network (EDEN) portal. All correspondence and reporting in relation to the requirements of the Dumping at Sea Permit will be made to the EPA via the EDEN System. DPC are aware that all information submitted via the Eden system can be viewed by members of the public on request at any EPA office. Some information such as environmental reporting is made available on the EPA licensing web page. The EPA will be informed if any information submitted is deemed to be confidential.

Table 3-3-1 Documents comprising the DPC EMS System

| Document Reference | Description of Contents |
|--------------------|--|
| AR-DPC-ENV-001 | DPC Aspects Register |
| MAN-DPC-ENV-001 | DPC Environmental Management System Manual |
| OBJ-DPC-ENV-001 | DPC Objectives and Targets |
| REF-DPC-ENV-001 | DPC Legal Index |
| REF-DPC-ENV-002 | DPC Environmental Policy |

| Document Reference | Description of Contents |
|---------------------------|--|
| REF-DPC-ENV-004 | DPC Environmental Management Review |
| REF-DPC-ENV-008 | Distribution List for Environmental Policy |
| REF-DPC-ENV-010 | Environmental Roles and Responsibilities |
| REF-DPC-ENV-011 | EMS Documentation Map |
| REF-DPC-ENV-006-F1 | Environmental Aspects Monitoring Log |
| REF-DPC-ENV-014 | DPC Environmental Awareness Training |
| SOP-DPC-ENV-001 | Environmental Inspection Procedure |
| SOP-DPC-ENV-002 | Identify and Update Environmental Legal Index |
| SOP-DPC-ENV-003 | Initial Environmental Assessment |
| SOP-DPC-ENV-004 | Internal EMS Audits |
| SOP-DPC-ENV-005 | Environmental Awareness and Training Procedure |
| SOP-DPC-ENV-006 | Monitoring & Measurement of Environmental Aspects |
| SOP-DPC-ENV-007 | Internal Communication |
| SOP-DPC-ENV-008 | Corrective Actions/ Preventive Actions |
| SOP-DPC-ENV-009 | Q Pulse Document Control System |
| SOP-DPC-ENV-010 | Control of Records |
| SOP-DPC-ENV-011 | External Communication |
| SOP-DPC-ENV-013 | Control of Measuring and Monitoring Devices |
| SOP-DPC-ENV-014 | Marine Oil Spill Response |
| SOP-DPC-ENV-014-A1 | Pollution Equipment Table |
| SOP-DPC-ENV-014-A2 | Location of Pollution response equipment |
| SOP-DPC-ENV-015 | Doc Control |
| SOP-DPC-ENV-016 | Environmental Management Review |
| SOP-DPC-ENV-017 | Setting, Communicating & Monitoring DPC Obj & Tar |
| SOP-DPC-ENV-018 | Environmental Performance in Procurement |
| SOP-DPC-ENV-018-A1 | Standard EMS Requirements in tendering for DPC |
| SOP-DPC-ENV-019 | Audit of Compliance |
| SOP-DPC-ENV-020 | Environmental Site Audits |
| SOP-DPC-ENV-021 | Environmental Clause for Dublin Port Tenants lease and agreement |
| SOP-DPC-ENV-022 | Galley Waste Management |
| SOP-DPC-ENV-030 | Waste Handling Procedures, LEAD ACID BATTERIES |
| SOP-DPC-ENV-031 | Waste Handling Procedures, CARDBOARD |
| SOP-DPC-ENV-034 | Waste Handling Procedures: Drain Cleaning Waste |
| SOP-DPC-ENV-035 | Waste Handling Procedures: Fluorescent Light Bulbs |

3.4 Approach to Community Engagement

This section sets out DPC's approach to community engagement with respect to the MP2 Project.

3.4.1 Existing Arrangements to Engage with Neighbouring Communities

A Community Liaison Committee (CLC) has been engaging with the neighbouring communities since 1997, operating under the umbrella of the Dublin Docklands Development Authority (DDDA). The CLC is currently chaired by Charlie Murphy, DPC. Minutes of CLC meetings are taken by officials of Dublin City Council. The CLC provides an opportunity to inform the neighbouring communities of the MP2 Project, to communicate work programmes and to engage with community representatives to resolve any potential concerns or issues arising.

A separate River Users Group is also in place to co-ordinate activities and to resolve any potential issues arising between DPC and other users of the River Liffey, comprising rowing clubs, Poolbeg marina and fishermen.

Both of the above forums are well established, are working to the satisfaction of the local communities and provide strong lines of communication between DPC and the neighbouring communities to the MP2 Project.

3.4.2 Future Arrangements to Engage with Neighbouring Communities

In response to the formation of the North & South Lotts and Poolbeg Strategic Development Zones (SDZs), a Dublin Docklands Oversight & Consultative Forum is currently being established and expressions of interest are being sought from organisations to participate on the Forum within the following categories:

- Organisations engaged in the promotion or carrying out of community development and/or engaged in the promotion of the social, economic or general interest of communities in the Dublin Docklands Area;
- Organisations representative of persons engaged in the promotion or carrying out of economic activity (including employment) in the Dublin Docklands Area; and
- Organisations representative of persons involved in the promotion or carrying out of educational activities in the Dublin Docklands Area.

This Forum will have two representatives from DPC. It is likely that a sub-committee will be formed to continue the work of the existing CLC.

3.4.3 MP2 Project Liaison Group

DPC has an established liaison group for the ABR Project which will be extended to also cover the MP2 Project. It comprises the following representatives:

- DPC;
- Dublin City Council;
- Foreshore Unit, DHPLG;

- Main Contractor;
- Environmental Facilities Manager; and
- DPC Environment, Health & Safety Manager.

The objective of the liaison group is to provide a forum to discuss the progress of the construction works, programme and any issues arising.

The group meets quarterly with an agenda and minutes taken of the meetings.

Port users are kept informed of the outcome of the meetings through established lines of communication within the Port.

3.4.4 Dublin Port Website

The existing Dublin Port Website will be used to keep local communities informed of construction progress and programme, highlighting the extent of the works scheduled over a three month rolling period.

3.5 Environmental Management Plans

A suite of draft Construction Environmental Management Plans (CEMP) have been prepared for the construction phase of the MP2 Project and are presented below. These draft CEMPs will be finalised as required prior to the commencement of development and will incorporate the mitigation measures outlined in the documentation submitted with the application for permission, and will include any additional requirements pursuant to conditions attached to statutory consents. In addition, regular audits of the CEMP will be undertaken during the construction phase of the works by the Environmental Facilities Manager.

3.5.1 Draft Construction Traffic Management Plan (dCTMP)

This draft Construction Traffic Management Plan (dCTMP) outlines minimum requirements for safe management of pedestrian traffic and vehicular movements to, from and within the MP2 Project site during construction. The traffic management plan will ensure uninterrupted access to essential DPC facilities, and will also ensure compliance with obligations set out in the following legislation:

- Guidelines For Working On Roads Guide To The Safety, Health And Welfare At Work (Construction) (Amendment) (No. 2) Regulations 2008 (S.I. No. 423 Of 2008)
- S.I. No. 366 of 2008 of the Road Traffic (Construction And Use Of Vehicles) (Amendment) Regulations 2008
- Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2008 (S.I. No. 130 of 2008).

When finalising this dCTMP a design specific risk assessment will be carried out by a Chartered Engineer with extensive experience in the design of traffic management system and works within a port environment.

Existing environment

Dublin Port operates on a 24 hour, 7 days per week basis, 365 days per year. The MP2 Project site is an area of the port that is extremely busy in particular between the hours of 05:00 & 23:00. The main access to the site is along Tolka Quay Road and Alexandra Road which incorporate public transport, cargo rail, car traffic and a high percentage of HGV traffic at peak times. The rail link on Alexandra Road operates approximately 10 times per day. Alexandra Road is also a main route on the DPC emergency evacuation plan

Dublin Port operates at security level 1 as per International Ship and Port Facility Security (ISPS) Code and national statutory requirements. The MP2 Project site is adjacent to a number of Seveso sites.

The dCTMP should be read in conjunction with the other Construction Management Plans. Implementation of this plan will require engagement with relevant stakeholders and operators in the Port during the MP2 Project construction phases. Project construction stages will be assessed to identify possible constraints and allow mitigation to be identified.

Resources

Sufficient resources will be allocated to deliver the traffic management plan. These will include a Traffic Manager Design Engineer, Traffic Manager Coordinator, Gate Man to control site access and egress, and Traffic Management Operatives as required.

Plant required will include self-contained wheel wash facility, lifting gate access barriers, road-sweeper, and signage as necessary.

Standards

The Construction Traffic Management Plan will ensure compliance with the following reference documents:

- Dublin City Council's HGV Management Strategy;

- HSA Code of Practice for Health and safety in Dock Work
- HSA Hazard in Port and Dock Operations Information Sheet
- Guidance for the Control and Management of Traffic at Road Works, 2010
- Chapter 8 of the Traffic Signs Manual issued by the Department of Transport in December 2008

CTMP Key Requirements

A project specific construction phase traffic management plan will be compiled by the Traffic Manager Design Engineer in accordance with the standards set out above and all additional requirements under conditions imposed by An Bord Pleanála (ABP) should the Board decide to grant development consent for the MP2 Project.

A Traffic Management Coordinator will oversee and maintain all traffic management on the site. Traffic access and layout will be detailed in technical drawings that take into consideration the coordination of works activities with the ongoing port operations including sailing schedules. The layout will be based on a detailed risk assessment prepared by the Traffic Manager Design Engineer in accordance with Chapter 8 of the Traffic Signs Manual. The traffic management plan drawings will show the key site access points and storage areas, visitor and operative access routes and parking areas, welfare, workshops and storage areas.

The traffic management and access layout plan will be kept under constant review. The Traffic Management Coordinator and site management will collate feedback from all stakeholders in the port and externally from Dublin City Council, Traffic Infrastructure Ireland and Dublin Port Tunnel as part of the review process. A Construction Traffic Management Strategy for the Dublin Port Tunnel will be provided for the duration of the works which will include details in relation to the timing and routing of construction traffic to and from the construction sites and associated directional signage;

The Traffic Management Coordinator will liaise closely with Port Operations and relevant stakeholders to ensure that the CTMP remains current and reflects the evolving needs of the project and the Port. The CTMP will be included in regular toolbox talks to ensure personnel are kept up to date with any changes.

All drivers will receive a site induction on the traffic management plan. All drivers will receive a toolbox talk on the use of the Dublin Port Tunnel and the requirement to cover loads. All drivers will receive a toolbox talk on cleaning of trucks as they leave the site.

The CTMP will consider scheduling management of construction traffic regarding availability of access routes and peak traffic volumes. This will include measures for the staggering of various shift start and finish times to take account of the main ship arrival and departure times, movement of all construction plant, particularly large plant and wide loads requiring specialised transport. Large deliveries will be subject to a task specific risk assessment and method statement. Lift plans will be prepared for key lifting operations as per Safety, Health and Welfare at Work (General Application) Regulations 2007. Coordination of all such activities will take place with stakeholders through the Traffic Management Coordinator and site management.

All efforts will be made to limit the number of vehicle movements associated with the MP2 Project to and from the port. Where economically viable and more environmentally sustainable than transport by land, materials

for the project will be delivered by sea to minimise truck movements on and off site and to ensure the port activities are not hindered.

As part of the project enabling works, secure fencing will be erected to clearly separate the construction works and general port activities, allowing that port access to the site will be required. This fencing will be reviewed at commencement and supplemented where necessary. The site boundary will be adequately maintained through safety audits. Specific details of fencing will be provided in the final CTMP.

In order to prevent nuisance and possible safety issues a self-contained wheel wash facility will be provided at the site exit. All loads to and from the site will be appropriately covered. Trailers will also be inspected prior to use to ensure trailer boards create a good quality seal. Trailers will not be overloaded. Site access roads will be kept clean and road sweeps will ensure dirt or debris arising from the site are promptly removed as necessary.

The car park and access ways to site welfare and works areas will be clearly delineated, sign posted and lit. All cars and passengers will be required to sign in and out at gate security. Gate security will also monitor the use of the parking areas.

Strategic contingencies will be prepared to deal with any unscheduled closures of the Dublin Port Tunnel or congestion or disruption of local road networks. Strategic options will be reviewed on a case by case basis taking into consideration the likely duration of any closures and the current construction programme.

The CTMP will prevent the introduction or dispersal of invasive alien species in accordance with the MP2 Project Construction Invasive Alien Species Management Plan. All imports to the site will be from an approved supplier's database and sourced from quality controlled environments that are consistently screened for the presence of invasives. All plant arriving to the site will be washed off site prior to entering the site. The site security attendant will check all plant at the gate and turn away unwashed plant. All plant exiting the site will be wheel washed and debris free.

Should invasive species be identified within the site the mitigation listed in the invasive species management plan will be enacted. This will include such measures as physical separation of the area, treatment by chemical treatment or excavation as appropriate.

The CTMP will take cognisance of other construction activities that may be active within the Port Estate in relation to the rolling out of the Dublin Port Masterplan 2040, revised 2018.

3.5.2 Draft Invasive Alien Species Management Plan

Introduction

This Invasive Alien Species Management Plan (IASMP) sets out measures that will be implemented during the construction phase of the MP2 Project to control the introduction or dispersal of invasive alien species (IAS), including early detection so that effective management may be applied.

IAS are taken to mean all species and the vectors implicated in their dispersal, as set out in the Third Schedule (Non-native species subject to restrictions under Regulations 49 and 50) to S.I. No. 477/2011 - The European Communities (Birds and Natural Habitats) Regulations 2011.

DPC is very aware of the fundamental importance of biodiversity in maintaining robust and sustainable ecosystems. In recent years the widespread occurrence and continual dispersal of invasive alien species poses a growing threat to native flora and fauna and the ecosystems that support them. Species of concern are listed in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (Non-native species subject to restrictions under Regulations 49 and 50) which prohibits their introduction and dispersal.

The importance of the threat posed by Invasive Alien Species (IAS) is reflected in a suite of international, European and national policy and legislation. These include:-

- Convention on Biological Diversity
- EU Biodiversity Strategy to 2020
- Regulation of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species
- Actions for Biodiversity 2011-2016, Ireland's 2nd National Biodiversity Plan
- European Communities (Birds and Natural Habitats) Regulations 2011, as amended

IAS can negatively impact on native species, can transform habitats and threaten whole ecosystems causing serious problems to the environment and the economy. They can be extremely difficult and costly to control and eradicate. In some instances the latter may be impossible and adverse effects are irreversible. Early detection of IAS and preventing new introductions are effective management strategies.

Negative impacts of IAS on biodiversity can occur through a range of mechanisms such as competition, herbivory, predation, alteration of habitats and food webs, introduction of parasites and pathogens and through the dilution of native gene pools. On the island of Ireland the most prominent negative impact appears to be direct competition with native biota, whilst alteration to habitats and the influence of parasites and pathogens are also important. A range of specific habitat types, and a variety of native species are currently under threat, including freshwater rivers and lakes; coastal floodplains, saltmarsh and sand dunes; tidal mudflats and sandflats.

The total number of alien animal and plant species on the island of Ireland has been estimated at over 1,200. Not all of these are 'invasive' or have an impact i.e. given to vigorous dispersal and displacement of natives. A group of 163 of the worst IAS threatening biodiversity in Europe has been compiled and the island of Ireland has over 40 of this group.

Key Irish legislation with provision for control of invasive species is the Wildlife Acts and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), both of which prohibit the spreading of invasive species. Specifically, Regulation 49.(2) of S.I No. 477/2011 makes it an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow in any place specified plants listed in the Third Schedule save in accordance with a licence. Regulation 49(3) allows proof that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence as a defence.

The schedule also refers to vector materials that may occasion the dispersal of IAS. For the MP2 Project particular relevance is attached to 'soil or spoil taken from places infested with Japanese knotweed (*Fallopia japonica*), giant knotweed (*Fallopia sachalinensis*) or their hybrid Bohemian knotweed (*Fallopia xbohemica*)'.

The species and vectors for their dispersal as set out in the Third Schedule to S.I. No. 477/2011 are listed in Table 3-5-1 and Table 3-5-2 along with an assessment of the risk posed for introduction or dispersal through the MP2 Project.

Three distinct types of measures are envisaged, which follow an internationally agreed hierarchical approach to combating IAS (European Union Regulation (EU) NO 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species). These include:

- **Prevention:** a number of robust measures aimed at preventing the intentional or unintentional introduction of IAS of Union concern into the MP2 Project Site.
- **Early detection and rapid eradication:** a surveillance system will be put in place to detect the presence of IAS of concern as early as possible to allow rapid eradication measures to be implemented where possible to prevent them from establishing.
- **Management:** some IAS may already be established. In this case concerted management action will be taken to prevent them from spreading any further and to minimize the harm they may cause.

The measures identified in this Invasive Alien Species Management Plan will be implemented for the duration of the proposed construction works.

An initial Invasive Alien Species (IAS) Risk Assessment of the MP2 Project Site has been completed to inform the Invasive Alien Species Management Plan. This will also link into the Construction Waste Management Plan and Construction Traffic Management Plan to prevent the introduction or spread of IAS.

IAS Management in Dublin Port

This management strategy is informed by best practice guidance, advice on mitigation methods, and aids to identification provided in a range of sources including:

- National Roads Authority (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads Revision 1, December 2010
- Invasive Species Ireland Project (2009). Field Guide to Invasive Species in Ireland. 2nd Edition.
- Invasive Species Ireland website: <http://invasivespeciesireland.com>
- GB Non-Native Species Secretariat website: www.nonnativespecies.org

Initial IAS Risk Assessment

The implementation of biosecurity measures in relation to IAS must be based on a risk based approach. To inform this approach an initial IAS risk assessment has been undertaken to identify those IAS that are likely to be relevant and present risks of introduction or dispersal during the MP2 Project. This initial risk assessment will facilitate implementation of appropriate mitigation measures, including preparation of guides to aid species identification for use by contractors.

Not all non-native or alien species are invasive. Some species may only be invasive in certain contexts. This risk assessment considers all species, and the vectors implicated in their dispersal, as set out in the Third Schedule (Non-native species subject to restrictions under Regulations 49 and 50) to The Birds and Natural Habitats Regulations (S.I. No. 477/2011). The assessment also considers individual IAS as set out in the Draft Invasive Species Action Plan for Dublin City 2016 - 2020 prepared by Dublin City Council, and the invasive non-native species listed in *Ireland's invasive and non-native species – trends in introductions* (O'Flynn, C., Kelly, J. and Lysaght, L. (2014) National Biodiversity Data Centre Series No. 2. Ireland).

The risk assessment includes:-

- an appraisal of the key IAS that are most likely to pose a threat based on
 - habitat availability at the construction site
 - known occurrence of IAS in the likely region of influence
 - available pathways for dispersal to and within the construction site
 - extent of risk presented by an individual IAS (considering potential economic, operational, and environmental impacts, and presence of resident vulnerable or threatened native species)
- a visual survey of the construction site for the presence IAS
- mapping and photographic record of any IAS detected
- compilation of visual identification aids for shortlisted key IAS

Method

The National Biodiversity Data Centre (NBDC) IAS dataset has been used to support a preliminary assessment of invasive species issues when considering the MP2 Project. All invasive species records at the MP2 site and in proximity to the site were extracted to compile a list of IAS in an area of 48 km² centred on the MP2 site.

Surveys of the MP2 site were carried out in May 2018 and April 2019. All areas of the site were visited and searches were undertaken for invasive species. The suitability of habitats throughout the MP2 site for invasive species was also assessed using expert judgement in combination with results of habitat surveys previously undertaken at the site in 2018 as part of the MP2 EIA.

The risk assessment is based on the presence or absence of species at the MP2 site, the distribution of the species in the surrounding region, and the availability of suitable habitats at the MP2 site. Consideration is also given to available pathways for dispersal and the impact/invasiveness of the species in question.

Site Characteristics

The MP2 site lies at the eastern extreme of the Dublin Port Estate on the northern side of the Liffey channel. It is comprised largely of artificial surfaces (BL3¹), sea walls, piers and jetties (CC1) some areas of which support patches of ruderal plant communities recolonising bare ground (ED3).

A narrow coastal fringe along the eastern and northern margins of the site has some small planted areas of ornamental/non-native shrubs (WS3) and mixed broadleaved/conifer woodland (WD2).

Narrow strips of amenity grassland (GA2) occur along the road network and are regularly mown. All of these plant communities are comprised of both native and introduced non-native species.

No freshwater habitats exist within the curtilage of the site.

IAS Occurrence On-Site

No regulated invasive plant species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, were identified on site during the surveys in May 2018 or April 2019.

The following non-regulated 'medium impact species' listed in O'Flynn, C. et al (2014) were recorded on site:

- butterfly bush *Buddleja davidii*
- narrow leaved ragwort *Senecio inaequidens*
- sycamore *Acer pseudoplatanus*
- traveller's-joy *Clematis vitalba*

A search of NBDC records for the MP2 site and all adjacent 2x2km grid squares (a total area of 48km²) shows the presence of 28 non-native invasive species. Thirteen of these are regulated invasive species listed in the Third Schedule to S.I. No. 477/2011, of which three are mammals and ten are plants. Of the three mammals, regulation only applies to the Brown Rat in the case of off-shore islands and is therefore not relevant to this site.

Risk Assessment

The risk assessment undertaken here relates to the MP2 site only. An assessment of the overall risk of future introduction or dispersal associated with all species in the Third Schedule is provided in Table 3-5-1 and Table 3-5-2. Overall risk is based on a combination of species presence on the MP2 site, occurrence locally i.e. recorded in the surrounding 48km², and habitat availability at the construction site. Consideration is also given to available pathways for dispersal and the impact/invasiveness of the species in question. Where an IAS risk assessment has been published, the overall potential impact is considered and may result in downgrading risk as computed (e.g. Three-cornered Leek and Spanish Bluebell). Also where MP2 project activities do not provide likely pathways for introduction or dispersal the risk has been reduced (mammals

¹ Habitat categories are as in Fossitt, 2000, A Guide to the Habitats of Ireland. The Heritage Council.

including the mink and grey squirrel). Finally, where species are not considered highly invasive in this geographical region (e.g. Giant Rhubarb species), the risk has also been reduced.

Due to their presence in the surrounding region, the availability of dispersal pathways, and suitable habitat at the construction site, three species of flowering plants are considered to pose a high risk of introduction and future dispersal. These include Japanese Knotweed, Giant Hogweed, and Himalayan/Indian Balsam. Note that while these species are identified as the most likely to disperse to the construction site, they do not all have the same impact potential or pose the same degree of management difficulties.

A further four plant species are ranked as medium risk. These include the Cord Grasses, Sea-buckthorn, Spanish Bluebell and Three-cornered Leek. Both of the latter 2 species are garden escapes (horticultural pathways) with relatively less impact.

Two mammals have been assigned medium risk, the American Mink and the Grey Squirrel. These species have been recorded in the surrounding area and are considered 'high impact' invasive species. However, they are highly mobile species and it is considered unlikely that operations of the MP2 project will provide any additional significant pathways for introduction or dispersal.

Soil contaminated with knotweed material (in particular stem fragments, or rhizomes) is also identified as a high risk vector for these invasive species.

Table 3-5-1 Risk Assessment for Third Schedule IAS in relation to MP2 site

| Common name | Scientific name | IAS Present on MP2 Site | IAS Occurs Locally (48km ²) | Suitable habitat present | Overall Risk |
|--|---|-------------------------|---|--------------------------|--------------|
| <i>Note: Overall risk is presented as high (red), medium (amber) or low (green).</i> | | | | | |
| American skunk-cabbage | <i>Lysichiton americanus</i> | x | x | - | Low |
| A red alga | <i>Grateloupia doryphora</i> | x | x | - | Low |
| Brazilian giant-rhubarb | <i>Gunnera manicata</i> | x | x | - | Low |
| Broad-leaved rush | <i>Juncus planifolius</i> | x | x | x | Low |
| Canadian Waterweed | <i>Elodea canadensis</i> | x | y | x | Low |
| Cape pondweed | <i>Aponogeton distachyos</i> | x | x | - | Low |
| Cord-grasses | <i>Spartina</i> (all species and hybrids) | x | y | x/y | Medium |
| Curly waterweed | <i>Lagarosiphon major</i> | x | x | - | Low |
| Dwarf eel-grass | <i>Zostera japonica</i> | x | x | - | Low |
| Fanwort | <i>Cabomba caroliniana</i> | x | x | - | Low |
| Floating pennywort | <i>Hydrocotyle ranunculoides</i> | x | x | - | Low |
| Fringed water-lily | <i>Nymphoides peltata</i> | x | x | - | Low |
| Giant hogweed | <i>Heraclium mantegazzianum</i> | x | y | y | High |
| Giant knotweed | <i>Fallopia sachalinensis</i> | x | x | - | Low |
| Giant-rhubarb | <i>Gunnera tinctoria</i> | x | x | - | Low |
| Giant salvinia | <i>Salvinia molesta</i> | x | x | - | Low |
| Himalayan/Indian balsam | <i>Impatiens glandulifera</i> | x | y | y | High |
| Himalayan knotweed | <i>Persicaria wallichii</i> | x | x | - | Low |
| Hottentot-fig | <i>Carpobrotus edulis</i> | x | x | - | Low |

| Common name | Scientific name | IAS Present on MP2 Site | IAS Occurs Locally (48km ²) | Suitable habitat present | Overall Risk |
|--|---|-------------------------|---|--------------------------|--------------|
| <i>Note: Overall risk is presented as high (red), medium (amber) or low (green).</i> | | | | | |
| Japanese knotweed | <i>Fallopia japonica</i> | x | y | y | High |
| Large-flowered waterweed | <i>Egeria densa</i> | x | x | - | Low |
| Mile-a-minute weed | <i>Persicaria perfoliata</i> | x | x | - | Low |
| New Zealand pigmyweed | <i>Crassula helmsii</i> | x | x | - | Low |
| Nuttall's Waterweed | <i>Elodea nutalli</i> | x | y | x | Low |
| Parrots feather | <i>Myriophyllum aquaticum</i> | x | x | - | Low |
| Rhododendron | <i>Rhododendron ponticum</i> | x | x | - | Low |
| Salmonberry | <i>Rubus spectabilis</i> | x | x | - | Low |
| Sea-buckthorn | <i>Hippophae rhamnoides</i> | x | y | x/y | Medium |
| Spanish bluebell | <i>Hyacinthoides hispanica</i> | x | y | y | Medium |
| Three-cornered leek | <i>Allium triquetrum</i> | x | y | y | Medium |
| Wakame | <i>Undaria pinnatifida</i> | x | x | - | Low |
| Water chestnut | <i>Trapa natans</i> | x | x | - | Low |
| Water fern | <i>Azolla filiculoides</i> | x | y | x | Low |
| Water lettuce | <i>Pistia stratiotes</i> | x | x | - | Low |
| Water-primrose | <i>Ludwigia</i> (all species) | x | x | - | Low |
| Wireweed | <i>Sargassum muticum</i> | x | x | - | Low |
| A colonial sea squirt | <i>Didemnum spp.</i> | x | x | - | Low |
| A colonial sea squirt | <i>Perophora japonica</i> | x | x | - | Low |
| All freshwater crayfish species except the white-clawed crayfish | <i>All freshwater crayfish species except Austropotamobius pallipes</i> | x | x | - | Low |
| American bullfrog | <i>Rana catesbeiana</i> | x | x | - | Low |
| American mink | <i>Neovison vison</i> | x | y | y | Medium |
| American oyster drill | <i>Urosalpinx cinerea</i> | x | x | - | Low |
| Asian oyster drill | <i>Ceratostoma inornatum</i> | x | x | - | Low |
| Asian rapa whelk | <i>Rapana venosa</i> | x | x | - | Low |
| Asian river clam | <i>Corbicula fluminea</i> | x | x | - | Low |
| Bay barnacle | <i>Balanus improvisus</i> | x | x | - | Low |
| Black rat | <i>Rattus rattus</i> * | N/A | | | |
| Brown hare | <i>Lepus europaeus</i> | x | x | - | Low |
| Brown rat | <i>Rattus norvegicus</i> * | N/A | | | |
| Canada goose | <i>Branta canadensis</i> | x | x | - | Low |
| Carp | <i>Cyprinus carpio</i> | x | x | - | Low |
| Chinese mitten crab | <i>Eriocheir sinensis</i> | x | x | - | Low |
| Chinese water deer | <i>Hydropotes inermis</i> | x | x | - | Low |
| Chub | <i>Leuciscus cephalus</i> | x | x | - | Low |
| Common toad | <i>Bufo bufo</i> | x | x | - | Low |
| Coypu | <i>Myocastor coypus</i> | x | x | - | Low |
| Dace | <i>Leuciscus leuciscus</i> | x | x | - | Low |
| Freshwater shrimp | <i>Dikerogammarus villosus</i> | x | x | - | Low |
| Fox | <i>Vulpes vulpes</i> * | N/A | | | |
| Grey squirrel | <i>Sciurus carolinensis</i> | x | y | y | Medium |

| Common name | Scientific name | IAS Present on MP2 Site | IAS Occurs Locally (48km ²) | Suitable habitat present | Overall Risk |
|--|------------------------------------|-------------------------|---|--------------------------|--------------|
| <i>Note: Overall risk is presented as high (red), medium (amber) or low (green).</i> | | | | | |
| Greylag goose | <i>Anser anser</i> | x | x | - | Low |
| Harlequin Ladybird | <i>Harmonia axyridis</i> | x | x | - | Low |
| Hedgehog | <i>Erinaceus europaeus*</i> | N/A | | | |
| Irish stoat | <i>Mustela erminea hibernicus*</i> | N/A | | | |
| Japanese skeleton shrimp | <i>Caprella mutica</i> | x | x | - | Low |
| Muntjac deer | <i>Muntiacus reevesi</i> | x | x | - | Low |
| Muskrat | <i>Ondatra zibethicus</i> | x | x | - | Low |
| Quagga Mussel | <i>Dreissena rostriformis</i> | x | x | - | Low |
| Roach | <i>Rutilus rutilus</i> | x | y | - | Low |
| Roe deer | <i>Capreolus capreolus</i> | x | x | - | Low |
| Ruddy duck | <i>Oxyura jamaicensis</i> | x | x | - | Low |
| Siberian chipmunk | <i>Tamias sibiricus</i> | x | x | - | Low |
| Slipper limpet | <i>Crepidula fornicata</i> | x | x | - | Low |
| Stalked sea squirt | <i>Styela clava</i> | x | x | - | Low |
| Tawny owl | <i>Strix aluco</i> | x | x | - | Low |
| Wild boar | <i>Sus scrofa</i> | x | x | - | Low |
| Zebra mussel | <i>Dreissena polymorpha</i> | x | x | - | Low |
| Fallow deer | <i>Dama dama</i> | x | x | - | Low |
| Sika deer | <i>Cervus nippon</i> | x | x | - | Low |

Table 3-5-2 Vectors for IAS dispersion considered at MP2 Site

| Vector material | Species referred to | IAS Present on MP2 Site | IAS Occurs Locally (48km ²) | Suitable habitat present | Overall Risk |
|--|---|-------------------------|---|--------------------------|--------------|
| <i>Note: Overall risk is presented as high (red), medium (amber) or low (green).</i> | | | | | |
| Blue mussel (<i>Mytilus edulis</i>) seed for aquaculture taken from places (including places outside the State) where there are established populations of the slipper limpet (<i>Crepidula fornicata</i>) or from places within 50 km. of such places | Mussel (<i>Mytilus edulis</i>) Slipper limpet (<i>Crepidula fornicata</i>) | N/A | | | |
| Soil or spoil taken from places infested with Japanese knotweed (<i>Fallopia japonica</i>), giant knotweed (<i>Fallopia sachalinensis</i>) or their hybrid Bohemian | Japanese knotweed (<i>Fallopia japonica</i>) Giant knotweed (<i>Fallopia sachalinensis</i>) Bohemian knotweed (<i>Fallopia x bohemica</i>) | x | y | y | High |

| | | | | | |
|---|--|--|--|--|--|
| knotweed (<i>Fallopia xbohemica</i>) | | | | | |
|---|--|--|--|--|--|

Mitigation Measures

Biosecurity measures are a series of precautionary steps designed to reduce the risk of dispersal / introduction of IAS. The management approach taken will prioritise prevention of IAS introduction to, or dispersal from Dublin Port. Mitigation measures will be implemented if required to contain, eradicate or control as appropriate any IAS found to be present in the areas of project operations.

Prevention

Prevention measures will range from raising awareness of IAS and the potential for their dispersal, to ensuring best practice in relation to the movement of materials into, within or out of the operations area. Measures which will be implemented include:

- Ensuring that rock armour, gravels, sand or soils to be imported to the site are sourced from authorised/licensed quarry operators
- Specifying that such material should be free of invasive plant species and their propagules
- Implementing a waste management plan for the proper storage and controlled movement of waste materials
- Implementing a materials handling plan for the proper storage and controlled movement of materials
- Implementing a construction traffic management plan for control of vehicle and plant access and movements, including wheel wash and plant inspection at site entrance
- Ensuring that all vehicles and construction plant arriving on site are reasonably clean and free of significant deposits of mud and plant debris (particularly tyres, wheel arches, excavator buckets and tracks) that might be a vector for spread of IAS
- Cordoning off any IAS locations on site identified and mapped in the initial IAS assessment
- Washing down machinery that has operated in IAS infested areas in designated locations before moving within the site or leaving the site
- Inclusion of IAS awareness in toolbox talks using visual aids to identification for the most likely species to be encountered based on the initial IAS risk assessment
- Notification of any suspected new occurrences of IAS to the Environmental Facilities Manager

Early detection and rapid eradication

A surveillance system will be put in place to detect the presence of IAS of concern as early as possible to allow rapid eradication measures to be implemented where possible to prevent them from establishing. The Environmental Facilities Manager will undertake regular inspections of the site to detect any new IAS occurrences or colonies. Measures which will be implemented will include:

-
- Ongoing monitoring of the MP2 Project site for IAS and updating the Initial IAS Assessment as necessary
 - mapping of distribution of existing and new IAS colonies and occurrences throughout the MP2 Project site
 - confirmation of identification of any IAS and collation of relevant best practice management and eradication methods
 - cordoning off of IAS infested area to limit movement of people / machinery in the area and relevant buffer zones, and appropriate signage
 - Implementation of recommended control/eradication measures by qualified and experienced personnel
 - monitoring of treated area to determine effectiveness of measures or need for further actions
 - Handling and disposal of treated material appropriately to prevent further spread.

Management - Containment / Treatment

If any established IAS is identified on the construction site, the management plan will aim to contain its spread in the first instance and subsequently eradicate it if possible from the site. This will include implementation of the following measures:

- Cordoning off any invasive species infestations to limit movement of people / machinery in infested area and relevant buffer zones, and appropriate signage
- Confirmation of the identification of the species concerned, and collation of relevant best practice management and eradication information
- Selection of the most appropriate best practice methods for control / treatment
- Prioritisation of treatment areas
- Undertaking physical or chemical control measures as appropriate in line with best practice guidance and in compliance with health and safety requirements
- Ensuring control measures are undertaken by suitably qualified personnel
- Handling and disposal of treated material appropriately to prevent further spread.

The Environmental Facilities Manager will be responsible for ensuring that appropriate mitigation is in place as part of the Construction Environmental Management Plan during the implementation of the MP2 Project.

3.5.3 Draft Construction Waste Management Plan

Introduction

This draft Construction Waste Management Plan (CWMP) provides an assessment of the potential impacts arising from the generation of waste materials during demolition and construction of the MP2 Project and measures for ensuring that all construction and demolition wastes associated with the MP2 Project are managed and controlled to prevent the risk of environmental pollution or ecological damage.

The draft CWMP will be finalised in the event that development consent is obtained, in order to incorporate additional requirements pursuant to conditions attached to statutory consents, and methods and plant in use by the appointed Contractor.

Objectives of the CWMP

In line with the objectives of the Waste Framework directive (WFD) (2008/98/EC) of 19 November 2008, this document prescribes a proactive approach to the management of construction and demolition waste during the MP2 Project and promotes sustainable development, environmental protection and optimum use of resources. The CWMP is based on the fundamental waste management prioritisation principles i.e. prevent, reduce, reuse, recycle. The following definitions are given in the WFD:

- Prevention – means measures taken before a substance, material or product has become waste, that reduce:
 - (a) The quantity of waste, including through the re-use of products or the extension of the life span of products;
 - (b) The adverse impacts of the generated waste on the environment and human health; or
 - (c) The content of harmful substances in materials and products.
- Preparing for re-use – means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.
- Recycling - means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.
- Other recovery e.g. energy recovery - means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II (to the WFD) sets out a non-exhaustive list of recovery operations.
- Disposal - means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations.

This waste management hierarchy will be applied wherever possible as part of this waste management process.

The objectives of this CWMP are as follows:

- Compliance with requirements for waste management during all works.

- Minimisation of the risk of environmental pollution or ecological damage during the works.
- Application of best environmental practices in relation to waste management on site.

Definition of Waste

Waste is defined as ‘any substance or object the holder discards, intends to discard or is required to discard’ under the Waste Framework Directive (European Directive 2006/12/EC as amended by Directive 2008/98/EC). Materials become wastes when deemed surplus to the needs of a development project and are about to be discarded. Once a substance has become waste it will remain waste until it has been fully recovered and no longer poses a potential risk to the environment or human health. From that moment onwards, the material ceases to be waste.

This applies to waste used as aggregate or construction material in civil engineering applications and to excess top soils and sub-soils which need to be moved off-site.

Waste recovery can be achieved when such waste is incorporated into a road, building or other infrastructure works, or in the case of inert waste, after processing if such a process is conducted following the criteria specified in the relevant quality protocols². All wastes must be handled by permitted collectors and brought to authorised facilities.

All wastes are either inert, non-hazardous or hazardous. Laboratory testing of representative samples is required to characterise waste materials. The waste acceptance criteria test is established and reliable, the results providing certainty of treatment. The ultimate classification of material dictates the destination facility where waste materials can be sent.

Anticipated Waste Arisings

The proposed works will generate construction and demolition (C&D) waste through removal of existing buildings and roads to create an additional three hectares of terminal area and construction of additional berthing facilities. Detailed estimates of all predicted waste generation will be produced before commencement of the construction phase. These estimates will indicate the type and the predicted quantities of wastes classified by EWC Code. The waste generation document will be a live document and updated throughout the project.

Demolition Works

C&D waste will arise from the following demolition works to be undertaken as part of the MP2 project:

- Terminal 2 Building
- Terminal 2 Check in
- Terminal 5 Building
- Terminal 5 Check In
- Terminal 5 Sheds (3 no.)

² Quality Protocols have been developed by Waste and Resources Action Programme (WRAP) and the Environment Agency (EA) to encourage the recovery of waste materials while at the same time increasing confidence in quality of products made from waste.

- Terminal 5 Substations (2no.)
- Terminal 1 Car Check-In
- Port Operations Centre building is to be demolished along with ancillary structures
- The Pier Head, located at the terminus of Breakwater Road, which currently supports the Port Operations Centre, is to be demolished. This includes part of the 19th Century Eastern Breakwater which demarcated the end of Dublin Port in the Victorian era. The masonry units making up the facing of the Pier Head will be carefully removed and salvaged for relocation elsewhere on site for heritage gain projects and amenity value
- Southern end of the Eastern Oil Jetty
- Internal roads and fences.

Construction Works

Waste may arise from the following construction works to be undertaken as part of the MP2 Project:

- Infilling of the basin at Oil Berth 4 with engineered fill material and suitable CDW arising from the proposed demolition works within the footprint of the MP2 Project development area. The void between the existing Oil Berth 3 and the proposed new sheet pile wall will also be filled with engineered fill material. The quantity of fill material required is estimated to be approximately 145,000 m³.
- Backfilling of bridging structure in Berth 50A with engineered fill material and/or construction and demolition waste.
- General waste generated from the various construction works.

MWC Roles & Responsibilities

A Main Works Contractor (MWC) Environmental Co-ordinator/Waste Manager will be appointed to ensure commitment, operational efficiency and accountability during the construction and demolition phase with regard to waste management, including the procedures that will be followed for ensuring implementation of the CWMP through the onsite management structure but also across all members of the construction team.

Records Keeping

The Environmental Co-ordinator/Waste Manager will obtain and maintain hard copies of:

- all waste collection permits, waste facility permits, waste licences, industrial emission licences and certificates of registration for all facilities to be used throughout the project.
- all waste classification tests carried out on materials, where applicable
- sign-off all Waste Transfer Forms for empty/full skips
- maintain a Waste Tracking Register for all hazardous and non-hazardous waste movements off-site
- All waste types and amounts generated will be recorded and reviewed at regular intervals, to allow for continuous analysis and review of procedures that will be made to reduce waste to landfill, increase the percentage of recycling and reduce waste overall as much as possible.

Records will be kept for all waste material that leaves the site, whether for reuse on another site, recovery, recycling or disposal. A system will be put in place to record the construction waste arising on site. The MWC Environmental Co-ordinator/Waste Manager or delegate will record the following:

- Waste taken off-site for reuse
- Waste taken off-site for recovery
- Waste taken off-site for recycling
- Waste taken off-site for disposal

For each movement of waste off-site a signed waste collection docket will be obtained by the MWC Environmental Co-ordinator/Waste Manager from the Contractor. This will be carried out for each material type. This system will also be linked with the delivery records. A signed waste acceptance docket will be issued for each movement of waste on-site.

Monitoring

The appointed MWC Environmental Co-ordinator/Waste Manager will be responsible for conducting waste audits and checks during the C&D phase of the development and monitoring CWMP implementation including:

- regular waste audits to ensure full adherence to this waste management plan and agreed procedures
- confirming that each waste facility being used during the project is operating in accordance with its licence or permit conditions and is managing waste in accordance with the agreed method set out at the start of the project
- ensuring that all non-hazardous waste materials being placed in skips/other receptacles are being fully de-labelled
- Requesting skip/bin exchanges from the non-hazardous waste Contractor and acting as spotter when the collection vehicle is on site.

A review of all records for the waste generated and transported off-site, will be undertaken mid-way through the C&D phase.

Storage/Reuse of Demolition/Excavation Wastes

The storage and reuse of demolition or excavation wastes on site may be subject to a number of waste licensing requirements. If these wastes are to be stored on site, prior to potential reuse or recovery during construction, this activity will be subject to a Waste Management Licence Exemption with a limited tonnage of material permitted to be stored on site. Storage will take place in a secure area on-site and the MWC Environmental Co-ordinator/Waste Manager will monitor the amount of waste stored to ensure that the permitted limits of the Exemption are not exceeded. DPC and its appointed Contractor will consult with the EPA prior to construction to ensure that the appropriate Waste Management Licence or Exemption is in place.

Under certain circumstances and in order that uncontaminated excavated soil and stone is beneficially used on-site, DPC and its MWC may decide in accordance with the conditions of article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011 that such material is a by-product and not a waste and will notify the Environmental Protection Agency for a determination.

Corrective Actions

If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. Each material type will be examined in order to see where the largest percentage of waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Reporting

Upon completion of the C&D phase a final report will be prepared summarising the outcomes of the waste management processes adopted and the total recycling / reuse / recovery figures for the development. To that end a method to calculate the difference between expected waste quantities prior to commencement of the project and actual waste quantities after project completion will be provided.

Training

The MWC Environmental Co-ordinator/Waste Manager will be given responsibility and authority to select a waste team if required i.e. members of the site crew that will aid them in the organisation, operation and recording the waste management system implemented on-site.

The MWC Environmental Co-ordinator/Waste Manager will have overall responsibility to oversee records and provide feedback to DPC on everyday waste management on the site. Authority will be given to MWC Environmental Co-ordinator/Waste Manager to delegate responsibility to sub-Contractors where necessary and to co-ordinate with suppliers, service providers and sub-Contractors to prioritise waste prevention and salvage.

The MWC Environmental Co-ordinator/Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform, audit and how to establish targets for waste management on site. The Environmental Co-ordinator/Waste Manager will also be trained in the best method for segregation and storage of recyclable materials, have information on the materials that can be reused on-site and implement the CWMP.

Training of staff on site is the responsibility of the MWC Environmental Co-ordinator/Waste Manager and as such, a waste training programme will be organised. A basic awareness course will be held for all crew to outline the CWMP and to detail the segregation of waste at source. This may be incorporated with other training needs (e.g. general site induction, safety training etc.). This basic course will describe the materials to be segregated, the storage methods and the location of waste storage areas. A subsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained.

The Environmental Co-ordinator/Waste Manager will provide daily support to the site crews on waste segregation, storage and decontamination, and provide weekly input at toolbox talks on waste related subjects.

Environmental Mitigation Measures

Construction waste will be managed in line with the requirements of this CWMP which will be implemented by the appointed Contractor for the duration of the construction works. The CWMP identifies how waste will be

dealt with (i.e. disposal, re-use on/off site etc.). The Contractor will also choose building materials to 'design out waste' to the maximum extent possible. This will include agreements with materials suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme. The Contractor will implement 'just in time' materials delivery systems where possible to avoid materials being stockpiled, which increases the risk of the damage and disposal as waste.

Table 3-5-1-1 below summarises the potential impacts identified and the mitigation measures required, where necessary.

Table 3-5-1-1 Proposed Mitigation Measures

| Potential Impact (Waste Management) | Summary of Proposed Mitigation (Waste Management) |
|---|---|
| <p>Demolition Phase</p> <ul style="list-style-type: none"> ▪ Waste materials will be generated as a results of the demolition of the following existing buildings in various states of repair: <ul style="list-style-type: none"> - Terminal 2 Building - Terminal 2 Check in - Terminal 5 Building - Terminal 5 Check In - Terminal 5 Sheds (3 no.) - Terminal 5 Substations (2no.) - Terminal 1 Car Check-In - Port Operations Centre building is to be demolished along with ancillary structures - The Pier Head, located at the terminus of Breakwater Road, which currently supports the Port Operations Centre, is to be demolished. This includes part of the 19th Century Eastern Breakwater which demarcated the end of Dublin Port in the Victorian era. The masonry units making up the facing of the Pier Head will be carefully removed and salvaged for relocation elsewhere on site for heritage gain projects and amenity value - Southern end of the Eastern Oil Jetty - Internal roads and fences. ▪ The estimated quantities of C&D waste from demolition works are as follows: <ul style="list-style-type: none"> - Buildings (7,900m³) - Concrete & inert (4,740 m³) - Made ground (28,000m³) - Masonry (7,000m³) | <ul style="list-style-type: none"> ▪ A MWC will be appointed. Contractors working on site during the works will have a duty of care and be responsible for the collection, control and disposal of all wastes generated by the works. DPC and their appointed MWC will ensure that all waste materials leaving the site will be transported via a licensed carrier and disposed or recovered through licenced operators and in accordance with national waste legislation. The Contractor will ensure that all proposed waste management routes comply with the European waste hierarchy of prevention, preparing for reuse, recycling, and recovery with disposal being the last and final option. Monitoring and updating of records will be implemented under Duty of Care requirements. ▪ A Demolition Survey is required prior to any demolition work undertaken. The Demolition Survey will set out all high value waste materials, such as metals, that will be removed from buildings and segregated for possible onward reuse or recycling to maximise recovery. ▪ In order to divert waste from landfill, possibilities for reuse of inert demolition material as fill on site will be considered, following appropriate testing to ensure materials are suitable for their proposed end purpose. It is proposed the following areas will be infilled using engineered fill material and suitable CDW arising from demolition works within the footprint of the development: <ul style="list-style-type: none"> - Basin of Oil Berth 4 - Void between the existing Oil Berth 3 and the proposed new sheet pile wall - Bridging structure in Berth 50A ▪ C&D waste may be subject to treatment at the site prior to recovery in Oil Berth 4. Mobile plant may be installed to crush and screen suitable CDW. A permit for the recovery operation will be required. ▪ Storage of demolition or excavation wastes onsite for reuse will take place in a secure area on-site and the Contractor will monitor the amount of |

| Potential Impact (Waste Management) | Summary of Proposed Mitigation (Waste Management) |
|--|--|
| <ul style="list-style-type: none"> - Concrete (5,000m³) ▪ Poor management of demolition waste could lead to the potential for quantities of materials to be deposited in landfill sites rather than reused or recycled. | <p>waste stored to ensure that the permitted limits of any Exemption are not exceeded.</p> <ul style="list-style-type: none"> ▪ Masonry units (estimated 7,000m³) from the 19th Century Eastern Breakwater are of industrial heritage importance and will be carefully removed and salvaged for relocation elsewhere on site for future heritage gain projects. ▪ Correct segregation, storage, handling and transport of all waste will be required to ensure there are no adverse effects on human health and that litter is not generated. ▪ Demolition debris will be separated into five waste streams on-site: <ul style="list-style-type: none"> - Construction debris (i.e. ceramics, tiles, plasterboard) - Masonry materials (i.e. brick, concrete blocks) - Metals - Timber - Universal waste (i.e. fluorescent bulbs, ballast and mercury containing switches) ▪ On-site segregation of all hazardous waste materials into appropriate categories: <ul style="list-style-type: none"> - Waste oils and fuels; - Paints, glues, adhesives and other known hazardous substances ▪ The storage and reuse of demolition or excavation wastes on site may be subject to a number of waste licensing requirements. DPC and their appointed MWC will consult with the EPA prior to construction to ensure that the appropriate licences, permits and exemptions are in place prior to initiation. |
| <ul style="list-style-type: none"> ▪ Demolition waste can also contain hazardous substances such as Asbestos Containing Materials (ACMs) that are present in buildings when demolished or renovated. | <ul style="list-style-type: none"> ▪ The Demolition Survey will include intrusive surveying with sampling which will identify the exact extent and location of any ACMs in the building. Removal offsite of any ACMs from the buildings to be demolished will be required prior to demolition. ▪ The Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 as amended (S.I. No. 386 of 2006) and The Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) provides the legislative backdrop to all aspects of asbestos control in construction. Any actions related to ACMs must be in accordance with these regulations. |
| <p>Construction Phase</p> <ul style="list-style-type: none"> ▪ There is the potential for quantities of materials to be deposited in landfill sites rather than reused or recycled. ▪ Waste materials will arise from site | <ul style="list-style-type: none"> ▪ Contractors working on site during the works will have a duty of care and be responsible for the collection, control and disposal of all wastes generated by the works. DPC and their appointed MMC will ensure that all waste materials leaving |

| Potential Impact (Waste Management) | Summary of Proposed Mitigation (Waste Management) |
|---|--|
| <p>management practices during the construction phase, for example, excess materials and packaging, over-ordering materials, off-cuts, damaged materials and poor storage during the construction phase.</p> <ul style="list-style-type: none"> ▪ Waste materials generated as a result of excavations, typically consisting of materials, for example, soil, made ground and existing foundations removed as a function of design or from excavations for new construction. Depending upon the previous use of the site, this may, or may not be contaminated. ▪ Fuels and hydraulic oils/lubricants that will be used during the construction phase are classed as hazardous. There will be fuel stores on site for machinery and construction vehicles along with oils and lubricants. Should any spillages, waste or surplus liquids be disposed of incorrectly it could cause serious harm to the surrounding environment. | <p>the site will be transported via a licensed carrier and disposed or recovered through licenced operators and in accordance with national waste legislation. The Contractor will ensure that all proposed waste management routes comply with the European waste hierarchy of prevention, preparing for reuse, recycling, and recovery with disposal being the last and final option. Monitoring and updating of records will be implemented under Duty of Care requirements.</p> <ul style="list-style-type: none"> ▪ Every effort will be made in the management of the site to minimise the oversupply of construction materials. ▪ Correct segregation, storage, handling and transport of all waste will be required to ensure there are no adverse effects on human health and that litter is not generated. ▪ Construction waste materials shall be segregated on-site for recycling into the following categories: <ul style="list-style-type: none"> - Timber - Metal - Cardboard & paper - Glass - Rubble - General waste ▪ Waste gypsum can be recycled therefore a skip will be provided for the separate collection of waste plasterboard and collected as necessary. ▪ Cardboard packaging will be flattened and placed in a covered skip to prevent it getting wet prior to collection by a waste Contractor. ▪ Plastic will be segregated at source and kept as clean as possible and stored in a dedicated skip prior to collection by a waste Contractor. ▪ Project design will incorporate adequate dedicated space to cater for the segregation and storage of all various waste streams during construction. The waste storage compound will be fully enclosed within the development and will allow for waste segregation and handling activities. ▪ All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project. Adequate security measures will be put in place. ▪ A bunded disposal area will be provided for all waste fuels and hydraulic oils/lubricants. |
| <ul style="list-style-type: none"> ▪ The use of non-permitted waste Contractors or unlicensed facilities could give rise to inappropriate management of waste and | <ul style="list-style-type: none"> ▪ Contractors working on site during the works will have a duty of care and be responsible for the collection, control and disposal of all wastes |

| Potential Impact (Waste Management) | Summary of Proposed Mitigation (Waste Management) |
|---|---|
| <p>result in environmental impacts/pollution.</p> | <p>generated by the works. DPC and their appointed MWC will ensure that all waste materials leaving the site will be transported via a licensed carrier and disposed or recovered through licenced operators and in accordance with national waste legislation. Monitoring and updating of records will be implemented under Duty of Care requirements.</p> |
| <ul style="list-style-type: none"> ▪ Waste arising from wash down facility | <ul style="list-style-type: none"> ▪ Solid waste in the form of sediments will arise from the wheel wash unit settlement tank. The unit will be inspected regularly (for example, to check automated features are working and settlement content) and emptied in accordance with manufacturer's instructions. The solid residues will be analysed and the disposal route appropriately selected based on the results of this analysis. A gully emptier tanker will be used to remove settlement tank waste which will be disposed of at an approved waste disposal site. |
| <ul style="list-style-type: none"> ▪ If asbestos materials are not correctly identified, segregated and appropriately managed, there may be incorrect handling of the material which could have negative impacts on workers as well as environments both onsite and offsite. | <ul style="list-style-type: none"> ▪ The Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 as amended (S.I. No. 386 of 2006) and The Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) provides the legislative backdrop to all aspects of asbestos control in construction. Any actions related to ACMs must be in accordance with these regulations. |
| <ul style="list-style-type: none"> ▪ Waste will be arising from the construction compound. | <ul style="list-style-type: none"> ▪ Recyclable waste such as paper, cardboard packaging and canteen waste will be segregated on site in covered skips for recycling. ▪ Regular housekeeping of the temporary canteen, office and construction compound will be carried out by a permitted waste Contractor. |
| <ul style="list-style-type: none"> ▪ Sewage from the temporary site toilets will be emptied under contract for disposal at an appropriate facility. | <ul style="list-style-type: none"> ▪ Any temporary W/C utilities used on site during the construction phase will be maintained by an approved and permitted Contractor. |

Guidance

The requirements for best practice and adherence to the following relevant Irish policies, strategies, legislation, and guidelines, or recognised international guidelines where Irish guidelines are not available will be required:

National and Regional Policies and Strategies

- Changing Our Ways; A Policy Statement on Waste Management, Department of Environment, Heritage and Local Government, 1998;

- Preventing and Recycling Waste – Delivering Change, Department of Environment, Heritage and Local Government, 2002;
- Taking Stock and Moving Forward, Department of Environment, Heritage and Local Government, 2004;
- National Strategy on Biodegradable Waste, Department of Environment, Heritage and Local Government, 2006;
- A Resource Opportunity – Waste Management Policy in Ireland, Department of the Environment, Community and Local Government (DECLG), 2012;
- National Hazardous Waste Management Plan 2014 – 2020, EPA, 2014;
- The Eastern-Midlands Region Waste Management Plan 2015-2021, Twelve Local Authorities including Dublin City Council., 2015

National and European Legislation

- Waste Framework Directive (2008/98/EC).
- Waste Management Act 1996 (as amended);
- Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 (as amended);
- Waste Management (Collection Permit) Regulations (as amended) 2008 (S.I. No 87 of 2008);
- Waste Management (Packaging) Regulations 2003 (as amended) (S.I. No. 61 of 2003);
- Waste Management (Planning) Regulations 1997 (S.I. 137 of 1997);
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. 163 of 1998);
- Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011) as amended 2012 (S.I. No. 221 of 2012);
- European Communities (Waste Electrical Electronic Equipment) Regulations 2011;
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009);
- Local Government Act 1994 (and Amendments) and Regulations (S.I. No. 8 of 1994);
- Litter Pollution Act 1997 (S.I. No. 12 of 1997);
- Protection of the Environment Act 2003 (No. 27 of 2003);
- Industrial Emissions Directive (2010/75/EU);
- European Communities (Waste Directive) Regulations, 2011;

Specifically in relation to the waste management requirements at Port facilities

- EU Directive 2000/59/EC on port reception facilities for ship generated wastes and cargo residues
- S.I. No. 117 of 2003: European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) Regulations 2003
- Directive 2002/84/EC amending the Directives on maritime safety and the prevention of pollution from ships
- S.I. No. 659 of 2003: European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) (Amendment) Regulations 2003
- Commission Directive 2007/71/EC of 13 December 2007 amending Annex II of Directive 2000/59/EC of the European Parliament and the Council on port reception facilities for ship-generated waste and cargo residues

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- S.I. No. 376 of 2009: European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) (Amendment) Regulations 2009
 - Commission Directive (EU) 2015/2087 amending Annex II to Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues
 - S.I. No. 550 of 2016: European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) (Amendment) Regulations 2016
 - Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements
 - Directive 2009/123/EC amending Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements
 - S.I. No. 542 of 2010: European Communities (Ship-Source Pollution) Regulations 2010
 - MARPOL 73/78, International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
 - A guide to good practice – IMO Consolidated Guidance for port Reception Facility Providers and Users.

3.5.4 Draft Noise Management Plan

Introduction

This draft Noise Management Plan (NMP) details the environmental monitoring and noise mitigation measures that will be implemented during the works to minimise the effects of the site operations on environmental receptors. The draft NMP will be finalised in the event that development consent is obtained, in order to incorporate additional requirements pursuant to conditions attached to statutory consents, and methods and plant in use by the appointed Contractor.

This NMP will be fully in accordance with the following documents;

- MP2 Project EIAR Chapter 11.1 Terrestrial Noise & Vibration and mitigation measures therein;
- British Standard BS5228:2009+A1:2014 Noise & vibration control on construction and open sites;
- NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004);
- NRA Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (2014)

The purpose and aims of the NMP are to:

- Establish noise guidance criteria to be used;
- Detailed outline of monitoring programme to be adopted including information on instrumentation, monitoring locations, monitoring procedure/methodology;
- Detailed outline of all proposed mitigation measures to control and minimise noise from all phases and areas of construction activity;
- Outline of management procedures for ensuring that the appropriate mitigation measures are appropriately managed;
- Outline of procedures for liaising with the public and Dublin City Council.

The proposals for noise monitoring and noise mitigation measures included in this document relate to the entire duration of construction works associated with the MP2 Project.

The draft Noise Management Plan will be finalised when Contractors are appointed, and liaison with Dublin City Council has taken place with regard to approval of the updated NMP. The updated NMP will detail the specific roles and responsibilities of personnel related to the implementation of the NMP.

Mitigation Measures

Mitigation measures will include the requirements for best practice and adherence to the following relevant Irish policies, strategies, legislation, and guidelines, or recognised international guidelines where Irish guidelines are not available:

- (a) The construction noise and vibration levels arising from the proposed development shall not exceed Noise and Vibration Threshold Limits in NRA Guidelines (2004) and BS5229:2009, set out in Table 3-5-4-1.
- (b) The following mitigation measures, presented in the EIAR (Chapter 11), shall be adhered to, in compliance with British Standard BS5228:2009+A1:2014 – Noise and vibration control on construction and open sites.

- Ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order;
- Careful selection of quiet plant and machinery to undertake the required work where available;
- All major compressors will be ‘sound reduced’ models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use;
- Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines in intermittent use will be shut down in the intervening periods between work;
- Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations, in order to cause minimum noise disturbance. Where possible, in potentially sensitive areas, acoustic barriers or enclosures will be utilised around noisy plant and equipment.
- Handling of all materials will take place in a manner which minimises noise emissions;
- Audible warning systems will be switched to the minimum setting required by the Health & Safety Authority.

A complaints procedure shall be operated by DPC throughout the construction phase and the Contractor will be instructed to make all efforts to address any noise issues at the nearest noise sensitive properties.

DPC will engage in a neighbour notification exercise prior to the commencement of the construction phase. The extent of residents to be notified of construction activities will be determined by a noise modelling exercise which will determine what residents are likely to hear the construction phase activities.

Table 3-5-4-1 Noise Threshold Limits at Nearest Sensitive Receptors for Construction Activities

| | Threshold Limits [dB(A)] | | |
|---|--------------------------|------------|------------|
| | Category A | Category B | Category C |
| Night-time (23:00 - 07:00) | 45 | 50 | 55 |
| Evening and Weekends (19:00 - 23:00 Weekdays, 13:00-23:00 Saturdays, 07:00-23:00 Sundays) | 55 | 60 | 65 |
| Weekday daytime (07:00-19:00) and Saturdays (07:00-13:00) | 65 | 70 | 75 |

Noise Monitoring Programme

Noise surveys will be conducted in accordance with BS7445: Description and Measurement of Environmental Noise. All measurements will be made using Type 1 precision digital sound levels meters and associated hardware. The following parameters will be recorded as a minimum: LAeq, LAm_{ax}, LA_{min}, LA₁₀ & LA₉₀.

All data will be collected and analysed on a weekly basis and the analysed data will be fed back to DPC and the Contractors on a weekly basis with a view to reviewing the compliance of construction phase activities in the context of any relevant conditions in planning approval if granted, and the thresholds/requirements included in this CEMP. This will also include any liaison requirement with Dublin City Council in this regard.

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

Reporting

Interim synoptic reports will be produced on a regular basis, usually calendar months, and submitted to Dublin City Council and the project liaison group.

Summary data and graphical outputs for each year of the construction phase will form part of an Annual Environmental Report. The data will be prepared in an analytical output that will aim to provide a concise representation of the construction phase noise levels from the port and will aim to avoid presentation of lengthy datasets.

Equipment

The number and location of noise meters will be agreed with Dublin City Council. These will operate for the entire duration of the construction phase. A permanent secure noise monitoring station has previously been established at the marina adjacent to Pigeon House Road as part of the ABR Project. It is representative of nearest sensitive noise receptors and may prove to be an appropriate location for the MP2 Project subject to approval as above. A second monitoring station is proposed at Clontarf, representative of nearest sensitive noise receptors to the north of the MP2 Project site.

The noise meters used will conform to the description of a Type 1 precision digital sound level meters as described in the relevant noise guidance documentation. All equipment will be calibrated at regular intervals.

3.5.5 Draft Dust & Odour Management Plan

Dust Minimisation Plan

Dust emissions from the proposed works have the potential to impact on neighbouring areas in the absence of mitigation. This section outlines the mitigation measures that will be employed to reduce the dust impact on sensitive receptors. These measures are the minimum required and will form the basis of a detailed Dust Management Plan to be prepared by the Contractor when appointed.

The Dust Minimisation Plan is based upon the industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities' (BRE 2003). In order to ensure that any dust nuisance is minimised, a series of mitigation measures have been listed below, which will be implemented in the event that development consent is granted:

- Any construction compound will be located as far as practicable from sensitive receptors such as residential dwellings but also at a sufficient distance from ecological receptors such as the Tolka estuary.
- Site roads will be regularly cleaned and maintained as appropriate. Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only.
- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust potential).
- All HGVs and other site vehicles exiting the site will make use of a wheel wash facility prior to entering onto Dublin Port estate roads and public roads, to ensure mud and other wastes are not tracked onto the roads. Wheel washes will be self-contained systems that do not require discharge of the wastewater to water bodies.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind.
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Site traffic will be restricted to 20km/hr to minimise dust re-suspension

The level of mitigation (water misting, use of bowsers, etc.) will be dictated by the monitoring results and the levels of rainfall experienced in a given period. This will prevent the excessive use of water for dust suppression on site when not required to minimise secondary drainage impacts.

As part of a broader audit of the works under the CEMP, the application of the above measures will be assessed and recorded. Where required, corrective actions will be identified and presented to the Contractor to fully implement the above measures to minimise dust.

Independent Consultants will monitor dust deposition levels each month for the duration of construction. The monitoring procedure employed will be the German Standard Method VDI 2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Institute). The dust deposition rate will be measured by positioning a series of Bergerhoff Dust Deposit Gauges at strategic

locations at key receptor points which will be tested on a monthly basis. The selection of sampling point locations will be completed after consideration of the requirements of VDI 2119 with respect to the location of the samplers relative to buildings and other obstructions, height above ground and sample collection and analysis procedures. The locations will be proposed to Dublin City Council for approval and will be based on the potential risk to sensitive receptors in the area.

The results of the monitoring will be compared against the guideline of 350mg/m²/day. This is the standard German TA Luft guideline which is widely applied in Ireland to determine dust nuisance.

This guideline will be used as a trigger to determine dust nuisance. Where any monthly dust level exceeds the trigger value the Environmental Facilities Manager will carry out an investigation to determine the cause. Recent operations within the site, possible external dust sources and meteorological data will be considered to determine the potential cause of any exceedance. Where the works are identified as the cause the Contractor will be obliged to increase mitigation, modify the proposed works or provide alternative means of dust minimisation measures. All exceedances of the trigger value and subsequent investigations will be recorded and available for review.

Monthly dust monitoring using the methods above has been carried out at Poolbeg Marina Pigeon House Road, the location of the nearest sensitive receptors to the MP2 Project site, since July 2016 as part of the ABR Project. The mean dust deposition level over this 32 month period is 121mg/m²/d. This is well below the nuisance dust level of 350mg/m²/d and establishes a background level for dust deposition in this area. The nearest sensitive noise receptors to the north of the MP2 Project site are in Clontarf, and slightly more distant from the MP2 Project site.

Odour Management Plan

This Odour Management Plan (OMP) has been prepared in accordance with the following guidance documents:

- Odour Management Plans for Waste Handling Facilities (Environment Agency, 2011)
- Odour Management Guidance" (Environment Agency, 2011).
- Odour Impact Assessment Guidance for EPA Licensed Sites" (EPA Guidance Note AG5, 2010).

The OMP has been designed to:-

- Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution;
- Prevent unacceptable odour pollution at all times; and
- Reduce the risk of odour releasing incidents or accidents by anticipating them and planning accordingly.

Odour Risk

The risk of odour from the proposed work has been assessed based on the standard source-pathway-receptor model. Each area is outlined in the following section to provide an assessment of overall risk.

Source

The potential sources of odour during the construction works relate to the dredging operation where decayed organic material has the potential to release sulphurous compounds (such as hydrogen sulphide) or where solvent contamination is uncovered.

Hydrogen sulphide (H₂S) is partially water soluble so a portion of any H₂S released during dredging will dissolve in the water to form sulphuric acid at trace concentrations which will rapidly dilute and disperse in the water column. Previous dredging operations in the same area have released no hydrogen sulphide to the atmosphere.

Very low levels of organic solvents have been recorded in the dredge material in some areas of the channel equating to less than 0.02% of the total material. Volumes of any solvent vapour released during dredging are therefore likely to be extremely low and will quickly condense into the liquid phase and either dissolve in the water (e.g. water soluble solvents such as alcohols) or form a residue on the water surface if not water soluble (such as aromatics).

Pathway

In the event that any odours become airborne the odours will dilute and disperse in the air. The direction of dispersion and extent of dilution is largely dictated by the wind speed and direction. Higher winds will lead to greater dilution than lower winds, and calm days (such as temperature inversion) will restrict dilution/dispersion and increase odour risk. Wind direction in the Dublin area is predominately westerly-south westerly (circa 60% of the year) which will direct odours away from the nearest residential areas which are to the south and west. Northerly and north easterly winds in the direction of these residential areas are very infrequent (circa 10%) as are calms (2.2% of the time).

Receptor

The nearest sensitive residential receptors to the proposed dredging operation are the residential dwellings on York Road, Pigeon House Road, Ringsend Park and Pembroke Cottages. Further north there are a number of residential areas along Clontarf Road which lie over 1.5km to the north of the proposed dredging operations.

The nearest commercial receptors to the proposed development include the various operations along Alexandra Road predominantly to the northwest of the site. In addition the 3Arena Theatre and the Gibson Hotel are the closest operations to the west of the site. To the south of the site there are a number of office developments on York Road and Thorncastle Road.

Ecological receptors can be affected by deposition of air pollutants such as nitrogen oxides and sulphur dioxide. The nearest sensitive ecological sites to the proposed development are the Grand Canal pNHA (Site Code 2104), the Royal Canal pNHA (Site Code 2103) and South Dublin Bay and River Tolka Estuary SPA (Site Code 4024). Ecological receptors are less sensitive to odours than human receptors.

Monitoring and Audit

Odour audits of the MP2 Project construction operations will be undertaken by a suitably qualified expert as required in response to complaints or as directed by regulatory authorities. Any such audits will consider the

odour sources listed above coupled with the identification of any new sources and will follow the procedures presented in the EPA "Odour Impact Assessment Guidance for EPA Licensed Sites" (Guidance Note AG5, 2010).

The results of monitoring events and audits will be communicated to the construction manager so that any changes required to working practices or additional abatement measures to mitigate odour risk may be implemented.

Complaint Investigation

As part of the plan, DPC will put in place a system to efficiently manage, record and respond to odour complaints. The relevant information to be recorded includes:

- Date and time of complaint
- Name of complainant
- Location of complainant
- Duration of odour
- Where and when odour was detected
- How strong the odour was/is (Intensity on a scale of 0 to 5 where 0 is not perceptible, 1 is very weak, 2 is weak, 3 is distinct, 4 is strong and 5 is very strong)?
- What did the odour smell like - A number of random descriptors should be proposed by the facility representative or offered by the resident (saying that the odour smells bad is not sufficient).
- Details of the responses made to the complainant.
- Details of the meteorological conditions existing at the time, in particular wind speed. Meteorological data is available on: <http://www.met.ie/latest/reports.asp>

Where possible, the location of the complainant will be visited immediately to verify the nature of the odour. Where the source is confirmed to relate to the works, the construction manager will be contacted immediately to cease or modify the operation causing the odour until suitable mitigation measures are devised.

3.5.6 Draft Marine Mammals Management Plan

The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to marine mammals in the area of operations in line with National Parks and Wildlife Service (NPWS) Guidelines (2014):

- A trained and experienced Marine Mammal Observer (MMO) will be put in place during piling, dredging and demolition works within the foreshore and dumping operations. The MMO will scan the surrounding area to ensure no marine mammals are in a pre-determined exclusion zone in the 30-minute period prior to operations. The NPWS exclusion zone is 500m for dredging and demolition works and 1,000m for piling activities.
- Noise-producing activities will only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring is not possible, the sound-producing activities will be postponed until effective visual monitoring is possible. Visual scanning for marine mammals (in particular harbour porpoise) will only be effective during daylight hours and if sea conditions are WMO Sea State 4 (\approx Beaufort Force 4 conditions) or less. The Beaufort scale, which is used in Met Office marine forecasts, is an empirical measure for describing wind intensity based on observed sea conditions.
- For piling activities, where the output peak sound pressure level (in water) exceeds 170 dB re: 1 μ Pa @ 1m, a ramp-up procedure will be employed following the pre-start monitoring. Underwater acoustic energy output will commence from a lower energy start-up and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20-40 minutes.
- If there is a break in piling / dredging activity for a period greater than 30 minutes then all pre-activity monitoring measures and ramp-up (where this is possible) will recommence as for start-up.
- Once normal operations commence (including appropriate ramp-up procedures), there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate, nor if marine mammals occur within a radial distance of the sound source that is 500m for dredging and demolition works, and 1,000m for piling activities.
- Any approach by marine mammals into the immediate (<50m) works area will be reported to the National Parks and Wildlife Service.

The MMO will keep a record of the monitoring using a 'MMO form location and effort (coastal works)' available from the National Parks and Wildlife Service (NPWS) and submit to the NPWS on completion of the works.

In line with best international practice a combination of visual and acoustic mitigation techniques will be used to ensure there are no significant impacts on all Annex II species, including harbour porpoise, grey seal and harbour seal. Static Acoustic Monitoring (SAM) through the deployment of CPODs will be used. SAM monitoring sites will be established and maintained throughout the project and for two years post-construction. This technique is to complement and not replace visual techniques.

The deployment of a SAM system will complement and extend the extensive database currently being collected as part of the ABR Project environmental monitoring programme.

Static Acoustic Monitoring (SAM)

In order to validate the long term effectiveness of mitigation measures for harbour porpoises a static acoustic monitoring programme (SAM) will be established using C-PODS. The C-POD is a fully automated, static acoustic monitoring system which can detect porpoises, dolphins and other toothed whales by recognising the trains of echolocation clicks these species make in order to detect their prey, orientate themselves and interact with one another. These units are accompanied by click train recognition software which produces fully automated, accurate data on the behaviour and identification of cetacean species (see www.chelonia.co.uk).

Once deployed at sea, C-PODs operate in a passive mode and are constantly listening for tonal clicks within a frequency range of 20kHz to 160kHz. When a tonal click is detected, the C-POD records the time of occurrence, centre frequency, intensity, duration, bandwidth and frequency of the click. Internally, the C-POD is equipped with a Secure Digital (SD) flash card, and all data are stored on this card. Dedicated software, CPOD.exe, provided by the manufacturer, is used to process the data from the SD card when connected to a PC via a card-reader. This allows for the extraction of data files under pre-determined parameters as set by the user. Additionally, the C-POD also records temperature over its deployment duration. It must be noted that the C-POD does not record actual sound files, only information about the tonal clicks it detects.

Static acoustic monitoring is independent of weather conditions once deployed and thus ensures high quality data is collected but only at a small spatial scale, typically around 800m radius for dolphins and 250m for porpoise (O'Brien et al. 2013). They can be deployed on a mooring for 4-6 months before recovery and downloading of data. Data will be recovered and analysed three times a year. This data will be analysed as detection positive minutes (DPM) to generate an acoustic index of activity. This technique provides large datasets to enable changes in activity to be identified at high resolutions.

O'Brien et al. (2013) recommended a minimum of four units should be deployed in small inshore study areas to ensure that statistically robust data can be collected. The number of C-PODs required should reflect the parameters to be tested (e.g. fine scale diel or larger scales such as seasonal trends). Using an even number design for replication purposes can allow for parameters such as inshore and offshore trends to be explored in larger areas. The more units that can be deployed in an area, the more an informed evaluation of a site and successful monitoring indices will be generated.

A total of ten units have been purchased on behalf of the ABR Project to enable individual units to be swapped on the moorings and downloaded and maintained ashore between deployments. These units will also be used for the MP2 Project environmental monitoring programme. In line with best practice, a field calibration trial was carried out in the Shannon Estuary during one month from May to June 2016 in order to test the use of the C-PODs for diel/tidal traffic, and to assess any differences in sensitivity. Field calibrations are necessary when introducing new units to an existing study, and calibrations are carried out at the beginning and end of project.

Four SAM stations will be used for the environmental monitoring programme. These stations will be monitored pre-construction, during construction and for a minimum of two years post-construction. This monitoring will determine whether displacement of harbour porpoises has occurred and whether activity returns to pre-

construction levels when construction is completed. This monitoring will provide information to determine if the requirements of the Habitats Directive have been met i.e. to avoid significant disturbance from preferred habitats, and inform future similar developments. This is in line with best international practice. C-PODs will be recovered every four months and analysed for Detection Positive Minutes (DPMs) providing high quality data on seasonal, diel and tidal occurrence. Data will be compared across sites, before during and after construction following the BACI type design similar to Carstensen et al. (2006). This will provide opportunities for adaptive project management through regular feedback to environmental managers and Contractors.

Seal Survey

Monthly monitoring of seal haul out sites at the North Bull Island has been carried out as part of the ABR Project since May 2016. These surveys have established typical seal numbers and seasonal occupancy of the site. Monitoring of seal haul out sites is ongoing and will be continued during the MP2 Project and after construction for a minimum of two years in line with international best practice. The haul out site at Bull Island will be surveyed two hours either side of low water from the same vantage points following the recommended technique by London et al. (2012). Known and suspected haul out sites will be surveyed during low water to record species, maturity stage (relative size), behaviour and vigilance.

In addition to these formal monthly surveys, counts of seals at their haul out site will be carried out regularly as time allows (see Figure 3-5-6-1). In addition, if any new haul out sites are discovered or reported, regular counts will be carried out to explore the numbers and use of these sites.



Figure 3-5-6-1 Examples of different neck patterns of individuals on Bull Island

There are no known haul out sites for seals in the immediate proximity of the proposed works but a small group of resident harbour and grey seals haul out on the North Bull Island around 6km to the northeast, on Lambay Island 15km to the north and Dalkey Island 12km to the south. These sites are considered far enough away from the construction activity to have no negative effect, especially as sensitivity of seals to disturbance is less when hauled out.

The waters surrounding haul out sites are a critical habitat for feeding and/or for navigation to more offshore foraging areas. Seals often haul out on man-made structures and tolerate considerable human activity, which may lead to chronic exposure to man-made noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson et al. 1995). Besides the local seals from the Howth peninsula, it is likely that Bull Island is also visited by seals from nearby Skerries, Lambay Island, Ireland's Eye, Dalkey islands and possibly further afield. The MP2 Project poses little risk of impact or disturbance to these animals, and is unlikely to cause detectable impacts on seals at the population level.

Reporting

Comprehensive reporting will be on an annual basis. Short reports on specific aspects will be prepared for circulation as required, and to inform the implementation programme as necessary.

3.5.7 Draft Birds and Marine Ecology Management Plan

3.5.7.1 Birds

The following precautionary measures will be undertaken to minimise the risk of injury or disturbance to birds in the area of operations:

- Black Guillemots – provision of nest-boxes and other artificial next sites will be provided prior to construction.
- Breeding Terns – the capital dredging scheme will be confined to the winter months (October – March) when the terns have migrated from the site.
- Non-breeding waterbirds:
 - Construction of Berth 53 and heritage installations will temporarily cease during periods of greatest low spring tides to avoid disturbance at exposed feeding grounds within the Tolka Estuary.
 - Gates will be used at the site of the Greenway to control the movement of people during periods of greatest low spring tides, again, to avoid disturbance at feeding grounds within the Tolka Estuary.

Monitoring

DPC is committed to continuing a programme to monitor the movement of Black Guillemots, Common Tern and Arctic Tern in Dublin Port throughout the construction phase of the MP2 Project and for a period of two years after the completion of such works. The results of this monitoring programme will be submitted to Dublin City Council at 12-monthly intervals to maintain a public record.

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

Black Guillemot Monitoring Programme

Location: Black Guillemots are seabirds that nest in crevices within the quays and other structures of Dublin Port between Poolbeg and Butt Bridge on the River Liffey.

Methods: The population of Black Guillemots nesting within Dublin Port will be monitored on an annual basis. This will be carried out following the methods of Mitchell et al. (2004)³. Two surveyors will carry out the census between 26th March and 15th May and between 05:00 and 09:00 (BST), in winds no stronger than Beaufort force 4 and in calm sea conditions. The census will be conducted from a boat by two surveyors who will visit and survey all quaysides within the port on two separate dates in this period. The count unit will be the number of adult Black Guillemots visible on land or on the sea within 300m of the shore. Any Apparently

³ Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. 2004. *Seabird Populations of Britain and Ireland*. Poyser. London.

Occupied Sites (AOS) will be mapped and Black Guillemots associated with such sites will be recorded separately.

Common Tern and Arctic Tern Monitoring Programme

Location: Common Terns and Arctic Terns are seabirds that nest on permanent structures and floating pontoons within Dublin Port.

Methods: The population of Common Terns and Arctic Terns nesting within Dublin Port will be monitored on an annual basis. The monitoring will be limited to a census of Apparently Occupied Nests (AON) on each of these structures following the methods of Mitchell et al. (2004). Two surveyors will carry out walked transects through each subsite of the colony recording the number of egg clutches of each species present (one clutch of eggs is treated as one Apparently Occupied Nest). Access to each of the subsites will be by boat.

Where access to a subsite is restricted for safety or other reasons, an estimate will be made of number of terns in the air over the colony during flushing (flush count). The number of birds counted by this method is divided by 1.5 in order to convert it to AONs. The survey will be timed to coincide with the peak of incubation activity when the maximum number of nests and incubating adults are present for AON counts and when adult attendance for flush counts is most stable. The survey will be carried out by two surveyors on two separate dates in the period 10th June to 15th July, in moderate weather and sea conditions. Surveys will not be undertaken during rainfall to avoid the chilling of eggs.

Winter Wetland Bird Monitoring Programme

Location: The area to be monitored is the South Dublin Bay and River Tolka Estuary SPA. This includes all intertidal areas between Dun Laoghaire West Pier and the Bull Wall.

Methods: A series of six low tide surveys will be carried out at approximately monthly intervals between 1st October and 31st March each year. Survey dates will be selected when low tide occurs in daylight and in good weather conditions. Surveys will be carried out within two hours either side of low tide to ensure that all birds foraging in the census area are present in the intertidal area. The surveys will be undertaken by a team of five experienced observers using binoculars and telescopes with each observer positioned in a suitable vantage point on shore. In each case, bird flocks (giving species codes and estimated numbers present) will be mapped on large scale drawings for later analysis.

Reporting

An annual report on the results of the Bird Monitoring Programme will be prepared and submitted to the Planning Authority not later than 31st July each year. This will cover the results of the monitoring programme for the previous year (i.e. from April to March).

3.5.7.2 Marine Ecology

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

- No over-spilling at the surface of the dredger for all dredging activities within the inner Liffey Channel will be permitted.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.
- The dredging of sediments within the navigation channel will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- A trailer suction hopper dredger (TSHD) or Back-hoe dredger will be used for the capital dredging works. When operating in the River Liffey Channel, the TSHD pumps will be switched off when the drag head is being lifted and returned from the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment.

The following key mitigation measures apply to piling activities to minimise the impact of the proposed works on fisheries

- No piling will take place along the riverside of the Liffey channel during the three months of the year when smolts are likely to run in their highest numbers (i.e. March to May inclusive). This recognises the smaller size of smolts compared to returning adults and lamprey. It also takes account of the fact that smolts have a swim bladder which likely makes them more susceptible than lamprey to pressure trauma due to piling noise.

Benthic Surveys

It is proposed to continue the benthic surveys in the vicinity of the dump site at the entrance to Dublin Bay which are currently being undertaken as part of the ABR Project environmental monitoring programme. It is proposed to undertake a survey prior to commencement of the dredging operations and at 6 months and 12 months post completion of the dredging operations.

Benthic Grab & Video Survey

It is proposed to collect up to 30 drop down video samples at locations within and around the dumpsite. Information gathered from this survey will be used to select infaunal sediment stations, and will be used to provide a snapshot of the seabed prior to sediment disposal at the dumpsite, as well as monitor recovery at the site following disposal. An outline on potential sampling locations is presented in Figure 3-5-7-1. These are subject to change following the video survey. However, it should be noted that the number of samples will remain consistent.

In addition, it is proposed to collect subtidal infaunal sediment samples at 12 locations, 4 within the dumpsite and 8 located outside the dumpsite.

This will allow for a detailed assessment to be made on the communities present in the area whilst maximising the spatial spread in areas of potential impact to the north and south of the disposal area. Each biological grab sample will be taken in the same location as a video drop sample. This will allow for a more detailed assessment to be made on potential impacts from the dredge spoil disposal activities. In addition, blotted wet weight biomass will be measured at each site for each of the major phyla identified.

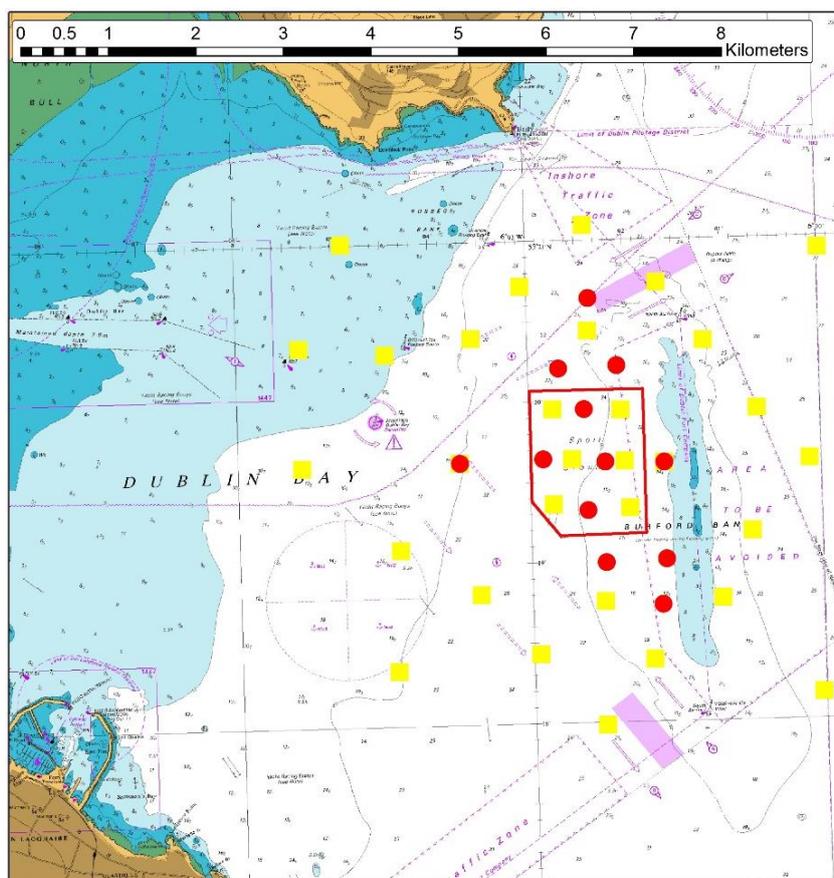


Figure 3-5-7-1 Proposed sampling locations (Biological infaunal samples – Red; Video drops – Yellow). These sites are indicative and subject to change following the video survey

Environmental data for granulometry and organic matter (Loss on Ignition) will also be measured at each site.

Results from these surveys will then be used to assess the community structure in the area using a combination of univariate indices (such as evenness and diversity indices) and multivariate analysis.

Comparisons will be made between the pre- and post-disposal results, and assessments made on community level impacts at the sites, and the spatial distribution of impacts.

Fisheries Management - Beam Trawl Survey

The beam trawl surveys are designed to confirm that the fish community in these areas from year to year remain largely the same, i.e. dominated by the same range of species, across the same general size ranges and broadly the same rank i.e. relative frequency of occurrence.

Replicate 2m beam trawls will be taken roughly in the middle of Dublin Bay one north and one south of the shipping channel with one taken within the channel. In addition one replicate trawl will be taken within the dumpsite and one immediately to the west of the dumpsite. See Figure 3-5-7-2 for the approximate locations of the proposed beam trawls.

The fishery surveys will be undertaken at the same time as the benthic surveys. Comparisons will be made between the pre- and post-disposal results, and assessments made on community level impacts at the sites, and the spatial distribution of impacts.



Figure 3-5-7-2 Approximate location of replicate beam trawl survey tracks

3.5.8 Draft Archaeology and Cultural Heritage Management Plan

3.5.8.1 Landside Works

The impacts on cultural heritage assets on land arising from the MP2 Project focus on works associated with ground disturbance activities that might expose elements of the 19th Century Eastern Breakwater, which are assumed to remain undisturbed beneath Breakwater Road South.

To facilitate the construction of Oil Berth 3, reclamation work is planned along the west side of the Breakwater to build up the quayside of the Oil Berth. This will necessitate the reclamation of the sea pocket that accommodates the Pilot Boat pontoon, and five ship's timber and one metal piece that are in temporary storage under the pontoon.

It is necessary to demolish the Breakwater's Pier Head to facilitate the construction of Berth 50A. This work will remove the existing Port Operations Building, ancillary structures and the Pier Head itself. Masonry elements will be salvaged and stored for heritage gain projects.

The works represent direct and permanent impacts on the historic Pier Head. In anticipation of the steel-work required to tie-in the new quayside, it is anticipated that elements of the nineteenth-century breakwater that currently lie buried will be exposed.

The works provide opportunities to record archaeologically and recover exemplars of Bindon Blood Stoney's work, and to understand more fully the construction process developed to create the deepwater basin.

3.5.8.2 Heritage Gain Proposals

The proposed Greenway that is to follow the perimeter of the Port estate will converge on the north side of the river at the eastern end of the Port operation, and will be a location to celebrate the industrial heritage of the Port in a way that captures sound and vision (see standalone Heritage Gain Report by MOLA). The location will be the most eastern limit of the Port in the twenty-first century, marking its growth and development since the Breakwater Lighthouse defined the eastern limit and entrance to the deep water basin in the nineteenth-century. To celebrate this resonance, Dublin Port will create a public realm visitor experience at the new eastern limit that includes the re-use of the granite blocks and related elements of the Pier Head and the Breakwater Lighthouse (demolished circa 20 years ago), reconceived as an experiential place where walkers and cyclists can learn about the cultural and natural heritage of the Port and can continue to enjoy views of Dublin Bay in all its tidal cycles and weather-induced power and beauty.

3.5.8.3 Marine Works

Capital dredging is required to deepen the seabed at:

- Berth 50A to –11.0m CD;
- Oil Berth 3 to –13m CD,
- Berth 53 to -10.0m CD
- Localised widening of the navigation channel to –10m CD.

The total volume of material to be dredged will be circa 424,844m³. A trailing suction hopper dredger and/or a backhoe dredger will carry out the dredging work. Dredged spoil will be disposed of at the licensed dump site used by DPC on the west side of the Burford Bank.

Where dredging will take place on the north slopes for Berth 53, concrete mattresses or their equivalent will be placed on the dredged slopes to provide stabilisation and scour protection to the Tolka Estuary.

The localised channel widening area crosses the approach channel. The approach channel is permitted through the ABR Project to be deepened to achieve a standard depth of –10m CD.

The extension of capital dredging into the south side of the localised channel widening area represents direct and permanent impacts on what appears to be previously un-dredged locations. As recorded on Rocque's 1757 map, this area was a wider mooring for ships in the eighteenth century before the construction of Pigeon House Harbour. It is a zone of high archaeological potential and the recovery of shipping debris and/or shipwreck must be anticipated.

3.5.8.4 Archaeological monitoring and management measures

The following archaeological monitoring and management measures will be undertaken:

Retaining an Archaeologist/s.

An archaeologist experienced in maritime archaeology will be retained by DPC for the duration of the relevant works.

Retaining a Heritage Architect.

A heritage architect experienced in industrial and maritime architectural heritage will be retained by DPC for the duration of the relevant works, to advise specifically in relation to works associated with the Breakwater Pier Head.

Archaeological Licences

Archaeological licences will be required to conduct the on-site archaeological works. Licence applications require the inclusion of detailed method statements, which outline the rationale for the works, and the means by which the works will be resolved. The following licence types will be required: Excavation, to cover monitoring and investigations works; Detection, to cover the use of metal-detectors; and Dive Survey, to cover the possibility of having to conduct underwater inspections. The Excavation licence applications will be accompanied by a letter from DPC confirming that sufficient funds and other facilities are available to the archaeologist to complete the archaeological excavation, post-excavation, and preliminary and final reports (including specialist reports).

Archaeological Monitoring

Archaeological monitoring will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by DCHG. Archaeological monitoring will be conducted during all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the MP2 Project.

The monitoring will be undertaken in a safe working environment that will facilitate archaeological observation and the retrieval of objects that may be observed and that require consideration during the course of the works.

The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland.

Construction Schedules

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

Discovery of Archaeological Material

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

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

Archaeological Team

The core of a suitable archaeological team will be placed on standby to deal with any such rescue excavation. This will be complemented in the event of a full excavation.

Archaeological Dive Team

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

Site Office/Storage Facilities

A site office and facilities will be provided by DPC on site for use by archaeologists. This will include secure wet storage facilities to facilitate the temporary storage of artefacts that may be recorded during the course of the site work.

Buoying/Fencing

Buoying/fencing of any such areas of discovery will be undertaken if discovered during excavation.

Machinery Traffic

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

Spoil

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

Post-Construction Project Report and Archive

It is a condition of archaeological licensing that a detailed project report is lodged with the DCHG within 12 months of completion of site works. The report will be to publication standard and will include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland.

The above recommendations are subject to the approval of the National Monuments Service at DCHG.

3.5.9 Draft Water Quality Management Plan

3.5.9.1 Introduction

The objective of the Water Quality Management Plan is to ensure that the mitigation measures specified in Chapter 9 of the EIAR are adhered to and that a monitoring regime is put in place to confirm the efficacy of the mitigation measures implemented so as to further safeguard the receiving water environment.

Temporary impacts on water quality have the potential to occur during the construction phase of the works. Mobilised suspended sediment and cement release through construction activities are the principal potential sources of water quality impact. The following have been considered in assessing the mitigation measures required:

- Increased suspended sediment levels due to the accidental release of sediment to the water column during:
 - Demolition of buildings & structures;
 - Berth Construction including the construction of waterside berths, quay walls, jetties, open piled structures.
 - Capital Dredging and Sediment disposal operations;
 - Landside ancillary works to serve the marine operations including the construction of ramps and deck structures to access linkspans, services and drainage installation, and installation of jetty furniture and fender systems etc.;
- Accidental release of highly alkaline contaminants from concrete and cement during the demolition of buildings and structures and the construction of hardstand areas, waterside berths, quay walls, jetties, bridging structures, etc.
- General water quality impacts associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals.

Detailed mitigation has been incorporated into the engineering design of the MP2 Project to minimise its potential impact on the water environment. Indeed, most potential impacts to water quality posed by this project during construction will be dependent on the quality of drainage and treatment of site run-off before discharge to Dublin Harbour. Therefore procedures will be put in place for the control and minimisation of surface water and suspended solids movement. Measures will also be taken to ensure existing drainage pathways are kept free from construction sediment and pollutants through the use of effective barriers to pollutant export and best practice techniques to control these pressures at source. Mitigation measures to be employed on site during the MP2 Project construction are described next.

3.5.9.2 Mitigation Measures

Construction Phase Best Practice Measures

Mitigation measures will include the requirements for best practice and adherence to the following relevant Irish guidelines and recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);

- Netregs Guidance for Pollution Prevention series (GPP), Pollution prevention guidelines (PPGs) in relation to a variety of activities developed by the Environment Agency (EA), the Scottish Environmental Agency (SEPA) and the Northern Ireland Environment Agency (NIEA);
 - GPP2: Above Ground oil storage tanks
 - PPG3: use and design of oil separators in surface water drainage
 - GPP5: Works and maintenance in or near water
 - PPG6: Working at construction and demolition sites
 - GPP8: Safe Storage and disposal of used oils
 - GPP13: Vehicle washing and cleaning
 - PPG20: Dewatering underground ducts and chambers
 - GPP21: Pollution incident response planning
 - GPP22: Dealing with spills
- Fisheries Guidelines for Local Authority Works. Department of Communications, Marine & Natural Resources, Dublin, (Anonymous, 1998);
- Guidelines on protection of fisheries habitats during construction projects (Eastern Regional Fisheries Board, 2006);
- International Convention for the Prevention of Pollution From Ships, 1973, as modified by the Protocol of 1978 (MARPOL) for domestic waste discharges to the environment;
- International Marine Organisation guidelines; and
- Control of Substances Hazardous to Health (COSHH) Handling of Hazardous Materials.

Suspended Sediment and Sedimentation Measures

Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff. Appropriate erosion and sediment controls during construction to prevent sediment pollution will be implemented.

Demolition of existing buildings and structures, berth construction and construction of landside ancillary works

These demolition and construction works have the potential to result in a localised impact on water quality.

The mitigation and control measures to address the impact from suspended sediments associated with these activities will follow sound design principles and good working practices as listed in the Netregs Pollution Prevention Guidelines. In addition to the requirements of best practice and relevant guidelines, the following mitigation measures will be employed by the principal Contractor during the construction phase.

- Where preferential surface flow paths occur, silt fencing or other suitable barriers will be used to ensure silt laden or contaminated surface runoff from the site does not discharge directly to a water body or surface water drain.
- In the event that dewatering of foundations or drainage trenches is required during construction and/or discharge of surface water from sumps, a treatment system prior to the discharge will be used; silt traps, settlement skips etc. This measure will allow additional settlement of any suspended solids within storm water arising from the construction areas.

Capital Dredging and Disposal

A Dredging Management Plan was developed for the ABR Project and is set out in Alexandra Basin Redevelopment Project Construction Environmental Management Plan (CEMP) Rev. F August 2018, submitted to Dublin City Council in compliance with conditions attached to the ABR Project planning permission (PL.29N.PA0034). The mitigation proposed for dredging operations in the MP2 Project has been informed by ABR Project monitoring and experience working in the same locations.

The Dredging Contractor will comply with the mitigation measures arising from the EIAR and in the consents for Planning, Foreshore Licence/ Lease/ Ministerial Consent and Dumping at Sea Permit. The mitigation measures are summarised in this CEMP.

The following key relevant mitigation measures will apply to each dredging campaign in the MP2 Project:

- Loading will be carried out by a backhoe dredger or trailing suction hopper dredger (TSHD).
- The dredging activity will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- No over-spilling from the vessel shall be permitted while the dredging activity is being carried out within the inner Liffey Channel.
- The TSHD pumps will be switched off while the drag head is being lifted and returned to the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment.
- The dredger's hopper will be filled to a maximum of 4,100 cubic metres (including entrained water) to control suspended solids released at the dumping site. This is equivalent to a maximum quantity per trip of 2,030 tonnes (wet weight).
- Full time monitoring of Marine Mammals within 500m of loading and dumping operations will be undertaken in accordance with the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters (NPWS 2014).
- A documented Accident Prevention Procedure is to be in place prior to commencement.
- A documented Emergency Response Procedure is to be in place prior to commencement.
- A full record of loading and dumping tracks and record of the material being dumped will be maintained for each trip.
- Dumping will be carried out through the vessel's hull.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.

No other capital or maintenance dredging will take place at Dublin Port at the same time as the MP2 Project capital dredging to ensure that there is no overlap in dredging operations that might result in cumulative impacts. A Dredging Management Plan is presented in Section 3.5.10. The Contractor will comply with all measures and mitigation contained therein to ensure that water quality is not significantly impacted.

Concrete and Cement Pollution Measures

Demolition of existing buildings and structures, berth construction and construction of landside ancillary works

The impacts in relation to cement and concrete for the MP2 Project are, for the most part (but not limited to); demolition of buildings and structures, construction of piles and foundations for the proposed berthing areas, quay walls etc, the installation of the concrete berthing area areas (to be poured in-situ) and construction of landside ancillary works.

The following mitigation measures will be implemented:

- Breaking of concrete (associated with structure demolition) has the potential to emit alkaline dust into the receiving environment. A barrier between the dust source and the sensitive receptor (the water body in this case) will be erected to limit the possibility of dust contacting the receptor.
- Concrete use and production will adhere to control measures outlined in Guidance for Pollution Prevention (GPP5): Works and maintenance in or near water (2017). Any on-site concrete production will have the following mitigation measures: bunded designated concrete washout area; closed circuit wheel wash etc.; and initial siting of any concrete mixing facilities such that there is no production within a minimum of 10 metres from the aquatic zone.
- The use of concrete in close proximity to water bodies requires a great deal of care. Fresh concrete and cement are very alkaline and corrosive and can cause serious pollution in water bodies. It is essential to ensure that the use of wet concrete and cement in or close to any water body is carefully controlled so as to minimise the risk of any material entering the water, particularly from shuttered structures or the washing of equipment.
- Where concrete is to be placed under water or in tidal conditions, specific fast-setting mix is required to limit segregation and washout of fine material / cement. This will normally be achieved by having either a higher than normal fines content, a higher cement content or the use of chemical admixtures.

General Construction Works

The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example leakages/spillages of fuels, oils, other chemicals and waste water) will be controlled through good site management and the adherence to codes and practices which limit the risk to within acceptable levels.

The Contractor will implement the following measures during construction:

- A detailed works specific Construction Environmental Management Plan (CEMP) will be prepared by the Contractor which will meet the minimum requirements of this project level CEMP and will include detail in respect of every aspect of the works in order to minimise potential impacts and maximise potential benefits associated with the works;
- Management and auditing procedures, including tool box talks to personnel, will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions, and include all mitigation required by the CEMP;

- Existing and proposed surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants.
- The use of oils and chemicals on-site will receive significant care and attention. The following procedures will be followed to reduce the potential risk from oils and chemicals:
 - Fuel, oil and chemical storage will be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. The control measures in GPP2: Above Ground Oil Storage Tanks and PPG 26 “Safe storage – drums and intermediate bulk containers” (Environment Agency, 2011) shall be implemented to ensure safe storage of oils and chemicals;
 - The safe operation of refuelling activities shall be in accordance with PPG 7 “Safe Storage – The safe operation of refuelling facilities” (Environment Agency, 2011);
- Contingency Planning: A project specific Pollution Incident Response Plan will be prepared by the Contractor consistent with DPC's Environmental Emergency Plan as part of the draft Construction Environmental Management Plan (CEMP) for the construction works and will be in accordance with PPG 21 Pollution Incident Response Planning. Whilst a major incident is highly unlikely to occur in circumstances where the mitigation measures as detailed in the CEMP are implemented, the finalisation of this document is considered to be best practice. The Contractor's Environmental Manager and DPC will be notified in a timely manner of all incidents where there has been a breach in agreed environmental management procedures. Suitable training will be provided by the Contractor to relevant personnel detailed within the Pollution Incident Response Plan to ensure that appropriate and timely actions is taken.

3.5.9.3 Water Quality Monitoring Programme

A Construction Environmental Monitoring Programme has been prepared to provide additional safeguards to the receiving environment and an assessment of the effectiveness of the mitigation measures implemented to address any potential environmental effects to the receiving environment during the construction phase of the works. The monitoring programme will form part of the specification of the Contract Documents for the construction stage.

The Construction Environmental Monitoring Programme includes the following elements related to the receiving waters:

- An assessment based on 3-D computational hydrodynamic modelling and water quality modelling to design the placement of a number of water quality monitoring buoys and telemetry based warning systems.
- the establishment of a baseline for suspended solids, and dissolved oxygen within the receiving waters of the Liffey Estuary Lower and Dublin Bay. The baseline has been established using existing monitoring data, particularly the high resolution data acquired through the ABR Project monitoring programme, which may be confirmed if required in advance of construction.

- The establishment of water quality trigger levels and corresponding actions (including the necessity to temporarily cease construction operations) to safeguard sensitive conservation sites and the operations of other users of the receiving waters (e.g. Power Stations).

The preparation of the Construction Environmental Monitoring Programme has involved engagement with a range of interested parties/stakeholders including Dublin City Council, EPA, National Parks & Wildlife Service, Dublin Port tenants, ESB and local community groups.

Monitoring will continue during construction to assist in the confirmation of the effectiveness of the mitigation measures identified in the EIAR. Regular visual confirmatory monitoring and environmental assurance audits will also be undertaken during the construction phase of the works.

In addition, DPC's existing EMS and monitoring protocols (described earlier in Section 3.3) will monitor the operational activities to ensure that measures to address operational impacts are effective and confirm that adequate protection is being provided to the sensitive receiving waters.

The management of the environmental monitoring programme will fall under the remit of the Environmental Facilities Manager who is independent of the Contractor. The Environmental Facilities Manager will provide reports to the relevant authorities as required and will also submit copies of those reports to the liaison group.

The Contractors' site supervisors will work closely with the Environmental Facilities Manager to monitor activities and ensure that all relevant environmental legislation is complied with and that the requirements of the CEMP and conditions of all relevant permits are implemented.

The Contractor will notify the Environmental Facilities Manager immediately on the occurrence of:

- any incident or accident that significantly affects the environment;
- any breach of licence or permit conditions;
- any malfunction or breakdown of key control equipment or monitoring equipment that is likely to lead to loss of control or environmental mitigation measures;
- any incident with the potential for environmental contamination, or posing a threat to the aquatic environment, or requiring an emergency response by the Local Authority.

This will include date and time of the incident, summary details of the occurrence, and where available, the steps taken to minimise any emissions, measures taken to restore compliance where breach of a licence condition has occurred.

Monitoring Programme Liffey and Tolka Estuaries

The monitoring system has been designed to ensure robust protection is afforded to the assets of the users of the River Liffey Channel, notably the intakes of power stations, as well as Natura 2000 sites, notably the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) (Site Code 004024) and the Rockabill to Dalkey Island Special Area of Conservation (SAC) (Site Code 003000).

It is proposed to use four monitoring stations at locations indicated in Figure 3-5-10-1. These are the same locations being used by the ABR Project.



Figure 3-5-10-1 Location of Monitoring Stations

Monitoring Station 1 (Eastlink)

This monitoring station will be sited in the River Liffey Channel upstream of the works at East Link Bridge.

Monitoring Station 2 (Poolbeg Sludge Jetty)

This monitoring station will be sited along the southern edge of the River Liffey Channel at the Poolbeg Sludge Jetty in close proximity to a power station intake.

Monitoring Station 3 (North Bank Light)

This monitoring station will be sited along the northern edge of the River Liffey Channel at the North Bank Light outside, but in close proximity to, the South Dublin Bay and River Tolka SPA.

Monitoring Station 4 (Tolka Estuary)

This monitoring station will be sited in the Tolka Estuary near the northern edge of the River Liffey Channel inside the South Dublin Bay and River Tolka SPA.

Monitoring System Specification

The specification is based on state of the art 24/7 real time monitoring. Water quality monitoring sensors, giving high resolution data with respect to the following parameters will be used at each of the three monitoring locations

- Turbidity
- Dissolved Oxygen
- Temperature
- Salinity
- pH

Water level will also be measured at one monitoring station to provide information on tidal state. Turbidity is measured as a surrogate for suspended solids. Site specific tests have previously been undertaken by the ABR Project to define the relationship between turbidity and suspended solids.

Apparatus housing and moorings used are robust and designed for the marine conditions at the monitoring locations. A calibration and maintenance programme will be put in place comprising:

- Regular calibration of sensors
- Regular maintenance of sensors (including cleaning)
- Maintain Data Quality Control
- Provision of replacements if required

A data acquisition and transfer system will be used to enable the transmission of high resolution data at approximately 15 minute intervals.

A data storage, interrogation system will be put in place comprising

- Provision of Data Server
- Web site for access to data
- Suitable Software to interrogate and display data

The following trigger levels that will prompt investigation are proposed:

- Dissolved Oxygen level falling below 6 mg/l
- Peak Suspended Solids level rising more than 100mg/l above background (Based on the Turbidity v Suspended Solids relationship previously established this is equivalent to a Turbidity increase of 40 NTU above background)

The Dissolved Oxygen trigger level has been selected to safeguard fish-life.

Duration of Monitoring Programme

The monitoring network infrastructure has been in place since 2016 and the project specific monitoring programme will be established at least one month prior to commencement of the works associated with the MP2 Project and continue for the duration of the construction works.

Incident Response / General Observations

In the event of possible environmental incidents, staff will undertake additional investigative sampling as required to seek to identify the possible source and nature of any pollutants present. They will record any general observations relevant to the event which may inform the investigation including:

- Weather conditions;
- Any unusual water attributes (e.g. unusual colour or smell of sample, foam, scum);
- Any other observations including works within or surrounding the site;
- Any other general observations.

In this regard, written and photographic records will be made as appropriate.

Reporting

Data from ongoing monitoring programmes will be collated at regular intervals (usually calendar months) and summarised in synoptic reports by the Environmental Facilities Manager. Any breaches of emission, trigger levels or compliance values will be indicated in the report along with the findings of any relevant investigation.

In addition to interim synoptic reports an annual environmental report will be prepared.

3.5.10 Draft Dredging Management Plan

Background

A Capital Dredging Scheme is an integral part of the MP2 Project and the EIAR and NIS includes an assessment of the loading and dumping activities required to ensure that a holistic approach is taken in assessing potential environment effects.

In addition to planning consent, the loading and dumping activities are also subject to two additional consents.

Foreshore Consent

DPC will submit a Foreshore Application for the MP2 Project to the Department of Housing, Planning and Local Government (DHPLG), in order to obtain permissions for undertaking works on the Foreshore (below the mean High Water Mark) including the construction of new quays and jetties and undertaking the Capital Dredging Scheme.

Dumping at Sea Consent

DPC will submit a Dumping at Sea Permit application for the MP2 Project to the EPA, should ABP grant development consent, in order to obtain permissions for loading and dumping activities associated with the Capital Dredging Scheme.

Chemical analysis has shown that the sediments to be dredged from the Port's navigation channel and basins during the MP2 Project are suitable for conventional dumping at sea (see Chapter 8 of the EIAR).

Key Mitigation Measures

The following key mitigation measures apply to the Capital Dredging Scheme

- No over-spilling at the surface of the dredger for all dredging activities within the inner Liffey Channel will be permitted.
- The dredger will work on one half of the channel at a time within the inner Liffey channel to prevent the formation of a silt curtain across the River Liffey.
- The dredging of sediments within the navigation channel will be carried out during the winter months (October – March) to negate any potential impact on salmonid migration (particularly smolts) and summer bird feeding, notably terns, in the vicinity of the dredging operations.
- A trailer suction head dredger (TSHD) or Back-hoe dredger will be used for the capital dredging works. When operating in the River Liffey Channel, the TSHD pumps will be switched off when the drag head is being lifted and returned to the bottom as the dredger turns between successive lines of dredging to minimise the risk of fish entrainment.
- A maximum of 4,100m³ of sediment and entrained water will be loaded into the dredger's hopper for each loading/dumping cycle, equivalent to approximately 2,030 tonnes (wet weight).

Dredging and Loading Activity

Trailer Suction Hopper Dredgers' are equipped with a trailing suction head. When the ship reaches the location requiring dredging, it reduces speed and lowers the suction head to the seabed. The trailing suction

head moves slowly over the bed, collecting the sediments in a similar way to a giant vacuum hoover. The water and material mix is then pumped up the arm of the suction head to the ship's hull (hopper). Once full, the dredger retracts its suction head and begins to sail slowly to the dump site.

When in position over the dump site, the ship slowly sails in the desired direction as doors in the underside of the vessel open and the sediment is released from the hopper. This allows the operators to control accurately where the sediment is deposited.

The capital dredging loading activity will take place within the inner Liffey channel which is dominated by silts.

Model simulations of the proposed loading and dumping regime using a Trailer Suction Hopper Dredger, of a size akin to current maintenance dredging practices, were used to determine the environmental impact of the dredging operations (see Chapters 9 and 12 of the EIAR).

The following input was used in the model simulations:

| | |
|--|-------------------------------------|
| Typical Capacity of Trailer Suction Hopper Dredger | 4,100m ³ hopper capacity |
| Ratio of sediment/entrained water during loading | 0.3 |
| Average Trip Frequency | 3-4 hours |
| Time to release load | 90 seconds |

The predicted distribution and concentration of Total Suspended Solids within the receiving waters is presented in Figure 3-5-12-1 and Figure 3-5-12-2. The capital dredging activity is expected to be completed within a 2-3 month period within each winter dredging season, depending on weather conditions. The loading and dumping methodology will ensure that there is no significant increase in Total Suspended Solids above recorded background levels, outside the confines of the dump site.

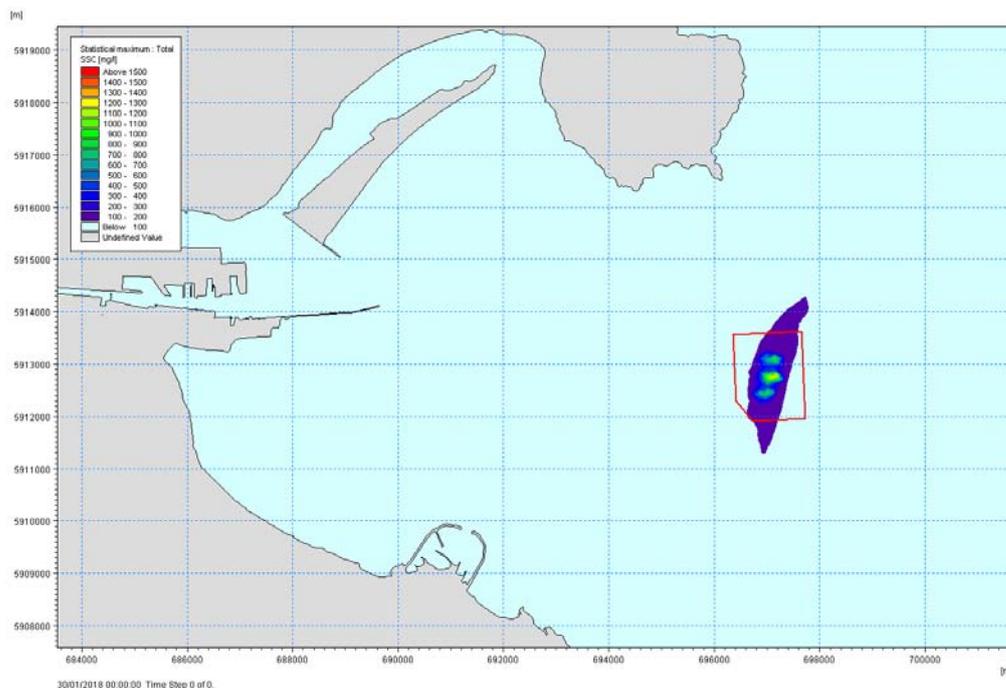


Figure 3-5-12-1 Maximum Total Suspended Solids Concentration envelope using a Trailer Suction Hopper Dredger dumping circa 2,030 tonnes (wet weight) at 3 hourly intervals on average within each winter capital dredging season

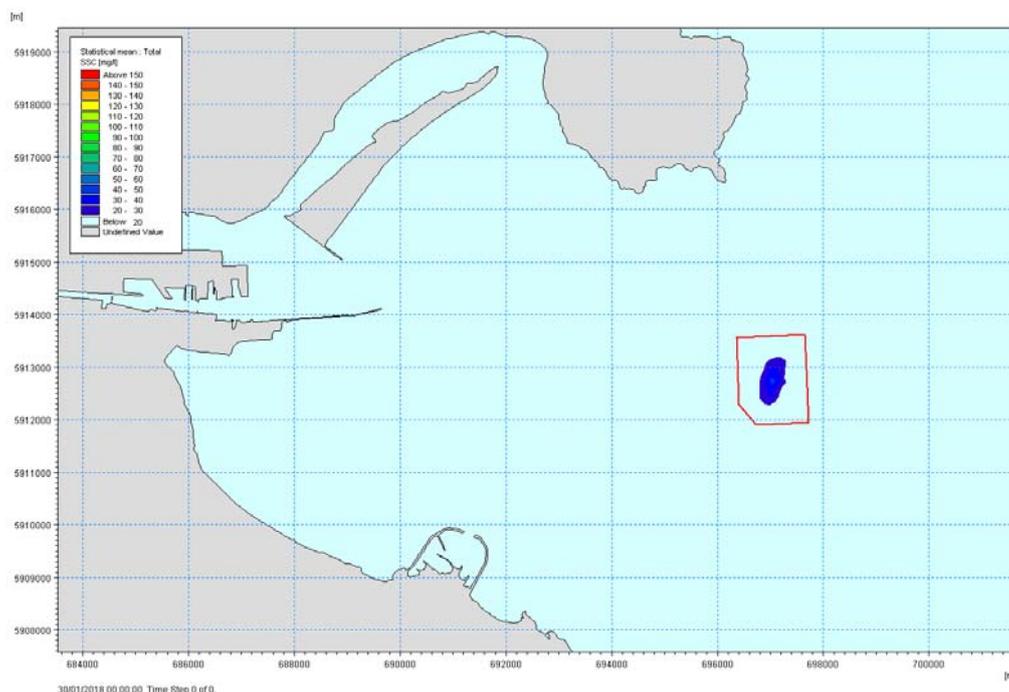


Figure 3-5-12-2 Mean Total Suspended Solids Concentration envelope using a Trailer Suction Hopper Dredger dumping circa 2,030 tonnes (wet weight) at 3 hourly intervals on average within each winter capital dredging season

Contract Management

The Capital Dredging Campaign will be carried out by suitably qualified and experienced dredging Contractors, following competitive tender. The Contractors will be provided with a copy of the CEMP at tendering stage and are required to comply with all relevant mitigation and environmental protection measures therein.

Each winter dredging season, the successful dredging Contractor will set up a base office within the Dublin Port Estate. Daily meetings will take place among the dredging Contractor, DPC, Harbour Master and the Environmental Facilities Manager. These meetings will review the capital dredging works undertaken the previous day and agree the current day's work programme, taking into consideration navigational requirements including scheduled vessel movements and environmental constraints and feedback from Marine Archaeologists and Marine Mammal Observers (MMOs) undertaking monitoring duties on board the dredger.

Inspections by the Office of Environmental Enforcement (OEE) and the Foreshore Unit, DHPLG will be facilitated at short notice.

3.5.11 Draft Pollution Incident Response Plan

This draft Pollution Incident Response Plan (PIRP) sets out best practice for dealing with potential environmental incidents on the MP2 Project site. The PIRP will help to prevent or reduce environmental damage if such an incident occurs. The PIRP should be read in conjunction with DPC's Emergency Management Plan (attached) and with the other environmental management plans presented in this CEMP which list the potential environmental impacts that may arise and the mitigation that will be implemented to prevent impact.

The draft PIRP will be finalised in the event that development consent is obtained, in order to incorporate additional requirements pursuant to conditions attached to statutory consents, and methods and plant in use by the appointed Contractor.

The DPC Emergency Management Plan (EMP) provides guidelines for responding to an emergency within the Port area. Where incidents constitute an emergency as per the EMP they will be governed by the guidelines and provisions outlined therein. In all cases where a pollution event falls within the remit of the EMP the procedures outlined in the EMP must be complied with.

The purpose of this PIRP is to provide clear guidelines on responses to pollution incidents to allow a rapid and efficient response to any incident in order to minimize environmental impact or damage. It is presumed that all relevant mitigation outlined in the individual environmental management plans in this CEMP is fully and effectively implemented.

The Main Works Contractor's designated representative (e.g. HSE Manager, Site Manager) will be responsible for coordinating the PIRP and ensuring adequate resources are available for implementation. The PIRP will ensure all appropriate and relevant resources are identified in advance and made available as quickly as possible during a pollution response event. The plan is intended for guidance purposes only and any response may be adapted depending on the specific circumstances of a particular pollution event.

Pollution Scenarios

The PIRP will detail the response required to pollution events including:

- Emissions to Water
 - Sediment release
 - Wastewater release
- Emissions to Air
 - Odours
 - Dust

For avoidance of doubt DPC's EMP provides comprehensive guidance in relation to emergency response to the following pollution events:

- oil spills to the marine or river environment (Annex A5)
- oil spills on the shore side (Annex A8)
- spills of hazardous materials (Annex 9)

The EMP uses a tiered system to describe oil and chemical spills:

- Tier 1 - Background and minor operational spills resulting in shoreline pollution which can be wholly dealt with by the relevant local authority or harbour authority and their oil spill response Contractors
- Tier 2 - Small-scale incidents where local authorities or ports may require mutual aid in order to initiate and maintain a shoreline response and also involve Irish Coast Guard (IRCG) resources
- Tier 3 - A large spill where substantial further resources may be required and support from National Government is necessary through the implementation of the IRCG National Oil Spill Contingency Plan. Additional assistance can be obtained from IRCG International response Contractor and also through the EU monitoring and Information centre

Any significant spillage or release of oils, chemicals or hazardous materials resulting from MP2 Project activities falls within the remit of the EMP and will be responded to in accordance with the EMP guidelines. Very minor and localised spills may be dealt with by the Contractor.

Key Provisions of the PIRP

The PIRP will include site and project specific pollution incident response measures including:

- Preparation of a Project Organization Chart indicating the area of responsibilities and the reporting lines of the project personnel.
- Contact details of MP2 Project Environmental Facilities Manager
- Contact details for Main Works Contractor (MWC) representatives responsible for coordinating pollution response (e.g. HSE Manager, Site Manager)
- Personnel on site and roles in PIRP implementation
- Date of PIRP issue and review dates
- PIRP distribution list and number of copies and version
- Detailed site plan
- Detailed drainage map of the site including location of all interceptors and outfalls
- Contact details for internal and external services and agencies with a role in pollution response or stakeholders whose assets may be impacted
- Details of chemicals held on site including maximum quantity, storage locations and containment conditions, Safety Information Data Sheets
- Detailed inventory of pollution prevention equipment - on and off site resources listed with calibration, service details

Pollution Response Initiation

All operatives and personnel on site will comply with all relevant mitigation measures to prevent pollution outlined in the individual environmental management plans. Any person who detects a pollution incident will notify the MWC representative responsible (HSE Manager, Site Manager).

On receipt of notification of any such incident the MWC representative will:

- Inform the Environmental Facilities Manager

-
- Establish the nature of the spill, the source, direction of travel and quantity of material involved
 - Assess the extent, nature and potential impact of the pollution event on the receiving environment and any likely impact on Port Operations
 - Halt the activities giving rise to the pollution if possible
 - Mobilise the pollution response team to take immediate appropriate steps to stop further pollution and contain polluting material where possible by deploying pollution control equipment as required
 - Consider whether additional resources are required to mitigate the event
 - In the case of significant pollution, inform stakeholders that may be impacted
 - Notify DPC's Emergency Management Team If the pollution event falls within the remit of the EMP
 - Gather as much further information as possible relating to the incident including noting wind direction and speed
 - Inform the relevant regulatory authorities (e.g. Dublin City Council Pollution Control Section 01 2222066 or 24 Hrs. contact 01 6796186; EPA; National Parks and Wildlife Services)
 - Put monitoring in place to measure the duration and extent of the event, and the concentration of known pollutants
 - Keep a diary record of all actions
 - Take comprehensive photographic records of the event
 - Ensure all expenditure in response to the spill is tracked under a single project number
 - Liaise closely with relevant DPC personnel as identified in the PIRP contacts list.

Training and Records

Training in appropriate pollution response procedures will be provided to all site personnel. This will be undertaken at induction training and through regular toolbox talks to ensure that information in relation to the current construction phase of the MP2 Project is kept up to date.

The MWC representative will be responsible for implementing the training programme. The MWC representative will also carry out regular inspections of essential pollution prevention equipment to ensure it is adequately serviced, in calibration or certification and fit for purpose.

The MWC representative will maintain a detailed record of all pollution events and responses, costs incurred and environmental impacts. The record will include a comprehensive debriefing of participants to provide an analysis of causes of the pollution event, detail lessons learned and preventive or corrective actions taken to prevent event recurrence or similar events.

4 SITE SAFETY

DPC operates and maintains quality management systems to comply with internationally recognised standards OHSAS 18001 & ISO9001. Successful maintenance of international standards enables the organisation to maintain a level of control over, and knowledge of, relevant hazards resulting from normal operations and abnormal situations with an overall objective to improving performance and preventing accidents and/or incidents in the workplace.

DPC operates to the International Ship and Port Facility Security Code (ISPS Code), which provides a comprehensive set of measures to enhance the security of ships and port facilities. Strict security procedures are already in place on site to deal with all access on a 24 hour basis. These procedures require all vehicles and personnel visiting the site to be logged and will continue in place once construction commences and has been completed.

Safety will be of prime importance during the construction works. The works will be subject to the Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations, 2013. All aspects of design construction will be reviewed with regard to health and safety and a risk assessment will be carried out.

A Project Supervisor (Design Process) will be appointed by DPC to produce a pre-tender Health and Safety Plan for the project. The Principal Contractor will be responsible for the control and co-ordination of health and safety during the works and will be appointed as the Project Supervisor (Construction Stage).

All individuals working on the Project will be required to undertake induction procedures. Such will be designed to make individuals aware of all the issues associated with the Project and will include, but not be limited to;

- The terms of the CEMP;
- Marine Safety;
- Working Hours;
- Access arrangements;
- Health, Safety and environmental policy and procedures;
- Code of Conduct within the site and surrounding environs;
- Statutory obligations of individuals on site;
- Traffic Management;
- Site parking;
- Public Access;
- Lighting requirements;
- Complaints and disciplinary procedures;
- Protection of the water environment;
- Protection of wildlife and habitats;
- Dust and air quality;
- Noise and vibration;

- Emergency procedures.

Visitors will not be allowed onto the site unless in possession of a current Safe Pass (or equivalent) demonstrating they have undertaken appropriate construction site Health & safety training and have received formal induction or are accompanied by an authorised person who has completed the induction. All visitors will be required to sign a visitor's book.

5 SUMMARY OF ENVIRONMENTAL MANAGEMENT PLANS

| Type of Environmental Management Plan | Ongoing Mitigation Required | Ongoing Mitigation Specific Requirements | Ongoing Monitoring/ Auditing Required | Timing of Ongoing Monitoring | Reporting Requirements | Reporting Procedures | Ongoing Liaison Required | Other Specific Requirements |
|---|-----------------------------|--|---|---|---|---|--------------------------|--|
| Construction Traffic Management Plan | Yes | Compliance with DCC's HGV Management Strategy | Yes | During Construction | Quarterly Reports | Report submitted to Planning Authority | Yes | Complaints Procedure |
| Invasive Alien Species Management Plan | Yes | Precautionary measures to prevent importation and spread | Yes | During Construction | Quarterly Reports | Report submitted to Planning Authority | Yes | Containment / Treatment required if any Invasive Alien Species are found on the site |
| Noise Management Plan | Yes | Compliance with NRA Guidelines and BS5229:2009 | Yes | Preconstruction and during construction | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and EPA | Yes | Specific noise limits to be met at nearest noise sensitive receptors, Complaints Procedure |
| Dust and Odour Management Plan | Yes | Compliance with EPA and BRE Guidelines | Yes | Preconstruction and during construction | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and EPA | Yes | Complaints Procedure |
| Marine Mammals Management Plan | Yes | Compliance with NPWS Guidelines | Use of MMOs, installation of SAM system | Preconstruction, during construction and for 2 years after works completion | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and NPWS | Yes | Close liaison required with NPWS |

| Type of Environmental Management Plan | Ongoing Mitigation Required | Ongoing Mitigation Specific Requirements | Ongoing Monitoring/ Auditing Required | Timing of Ongoing Monitoring | Reporting Requirements | Reporting Procedures | Ongoing Liaison Required | Other Specific Requirements |
|--|-----------------------------|---|--|---|---|---|--------------------------|--|
| Birds and Marine Ecology Management Plan | Yes | Adherence to piling and dredging mitigation measures | Specialist surveys required | Preconstruction, during construction and for 2 years after works completion | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and NPWS | Yes | Existing Black Guillemot nest boxes to be removed and replaced at specific time of year. |
| Archaeology and Cultural Heritage Management Plan | Yes | Compliance with DCHG Guidelines | Monitoring to be undertaken by heritage engineer or architect and marine archaeologist | During Construction | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and DCHG | Yes | Appropriate Licences required from DCHG |
| Water Quality Management Plan | Yes | Compliance with EPA Guidelines etc | Installation of real-time water quality monitoring system | Preconstruction and during construction | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and EPA | Yes | Complaints Procedure |
| Dredging Management Plan | Yes | Adherence to dredging mitigation measures and compliance with Dumping at Sea Permit and Foreshore Licence | Yes | During Construction | Monthly Reports, input to Annual Environmental Report | Report submitted to Planning Authority and EPA | Yes | Complaints Procedure |

| Type of Environmental Management Plan | Ongoing Mitigation Required | Ongoing Mitigation Specific Requirements | Ongoing Monitoring/Auditing Required | Timing of Ongoing Monitoring | Reporting Requirements | Reporting Procedures | Ongoing Liaison Required | Other Specific Requirements |
|---|-----------------------------|---|--|------------------------------|--|--|--------------------------|--|
| Pollution Incident Response Plan | Yes | Adherence to guidelines for rapid and efficient response to minimize environmental impact | Monitoring of pollution events required and records of pollution prevention equipment. | During construction | Detailed record of all pollution events and responses, costs involved and environmental impacts. | Report submitted to Planning Authority and EPA | Yes | Specific training, and debriefing post pollution events to establish causes of events, lessons learned and preventive or corrective action required. |

6 TABLE 19-3 SUMMARY OF ENVIRONMENTAL MONITORING PROGRAMMES

| Monitoring Programme | Monitoring Element | Frequency of Monitoring | Location | Parameters Measured | Surveyors / Support | Sampling Constraints | Action Threshold | Monitoring and Reporting | Report / Frequency |
|------------------------|--|--|---|---|---------------------|--|--|--------------------------|--|
| BIRD MONITORING | Census of Black Guillemot Population nesting in Dublin Port | Annually in period 26 March to 15 May. Two surveys to be carried out on two separate dates. | Quaysides within Dublin Port | Number Black Guillemots on land or sea within 300m of the shore Number of occupied nest sites and associated adults Number of nest boxes occupied | 2 / Boat Support | 0500 - 0900 BST. Beaufort 4 or less. Calm Sea Conditions | | Bird Specialist | Annually (year ending March) by 31st July each year. |
| | Census of Common and Arctic Terns nesting in Dublin Port | Annually in period 10 June to 15 July | Permanent Structures and Pontoons in Dublin Port | Number of apparently occupied nests (egg clutches or flush count). | 2 / Boat Support | Moderate weather and sea conditions. | | Bird Specialist | Annually (year ending March) by 31st July each year. |
| | Winter Wetland Birds | Monthly from October 1 to March 31 during each year of the project | Intertidal areas between Dún Laoghaire West Pier and Bull Wall. | Bird Flocks - species and approx. numbers. | | Low tide ± 2 hours. Daylight. Good weather conditions. | | Bird Specialist | Annually (year ending March) by 31st July each year. |
| MARINE MAMMALS | Marine Mammal Observation in exclusion zones | For piling, dredging, dumping and demolition operations within the foreshore | Within 500m of dredging / dumping operations. Within 1000m of piling operations. | Presence of marine mammals | 1 to 3 as required | Suitable vantage point. Accommodation on dredging vessels. | Presence of marine mammal in exclusion zone. | Marine Mammal Observer | NPWS MMO Location and Effort Forms |
| | Continuous Static Acoustic Monitoring | Ongoing data logging at four stations (to be confirmed) | 4 locations in Dublin Bay | Echolocation clicks of dolphins and porpoises | | | | Marine Mammal Ecologist | |

| Monitoring Programme | Monitoring Element | Frequency of Monitoring | Location | Parameters Measured | Surveyors / Support | Sampling Constraints | Action Threshold | Monitoring and Reporting | Report / Frequency |
|-----------------------------------|---|--|---|---|------------------------------|---|------------------|----------------------------------|---|
| | Seal Haul Out Sites Dublin Bay | Monthly | North Bull Island and adjacent areas. Dublin Bay within zones of influence. | Species. Maturity Stage. Behaviour. | Coordinate with NPWS surveys | Low water ± 2 hours. | | Marine Mammal Ecologist | |
| MARINE BENTHOS | Benthic Grab and Video Surveys | Before and after capital dredging programme | Dublin Bay | Benthic Communities Biomass of major Phyla Granulometry Organic Matter Content | Boat Support | Good weather, sea and visibility conditions | | Fisheries Specialist | |
| | Beam Trawl Surveys | Before and after capital dredging programme | Dublin Bay | Fish Communities - Species rank / size ranges | | | | | |
| WATER QUALITY | Water quality in lower Liffey in Dublin Port | High frequency (15min) real time at four stations | 4 locations Inner Liffey channel | Dissolved Oxygen, Turbidity, Temperature, Salinity, pH | | | | Environmental Facilities Manager | |
| ATMOSPHERIC NOISE AND DUST | Dust Deposition | Continuous over project duration | Poolbeg Marina; Clontarf | Dust deposition using Bergerhoff Dust Deposition Gauges | | | | Environmental Facilities Manager | |
| | Noise Levels | Continuous for duration of Project | Poolbeg Marina; Clontarf | L _{Aeq} | | | | Environmental Facilities Manager | Weekly to Contractor/DPC Annual AER |
| UNDERWATER NOISE | Underwater Noise Levels | Validation surveys | 4 locations Inner Liffey Channel | | Boat Support | | | Underwater Noise Specialist | Survey required at commencement of Piling |
| ARCHAEOLOGY | | An Archaeologist and Heritage Architect will be retained for the duration of works | Capital Dredging, Landside works including Pier Head | Ground Disturbance Demolition of Pier Head Dredging | | | | Archaeology Specialist | Monthly Reporting |

Appendix A

DPC Emergency Management Plan



EMERGENCY MANAGEMENT PLAN

The aim of the Dublin Port Company Emergency Management Plan is to outline the structures and arrangements that will be used in response to an emergency in order to mitigate:

- Loss of life or injury to employees, contractors, visitors and local residents
- Damage to the environment
- Damage to the facilities, plant and equipment of DPC, its commercial partners, tenant companies and neighbours

The plan also aims to ensure that DPC emergency management structures and arrangements are compatible with the requirements of the 2006 Framework for Major Emergency Management.”

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Dublin Port Company Emergency Management Plan (Public)

1. INTRODUCTION

Dublin Port covers an area in excess of 650 acres, within which many activities of a marine, commercial and industrial nature take place. This Emergency Management Plan (EMP) is designed to provide guidelines to the Dublin Port Company (DPC) for responding to an emergency within their area of jurisdiction.

The maritime jurisdiction of Dublin Port is defined under the Harbours Act 1996 (as amended). The land based limits are detailed in the Map at Annex J-1.

Operations at Dublin Port include the following:

- a. Vessel arrivals, departures and shifts.
- b. Pilotage, towage & vessel traffic services (VTS)
- c. Lo-Lo terminals operated in common user area and in designated terminals.
- d. Ro-Ro terminals facilitating both freight and passenger traffic.
- e. Facilities for handling petroleum products, LPG and molasses.
- f. Common oil pipeline linking the oil berths with the storage facilities.
- g. Dry bulk handling facilities for handling concentrate, peat, oil, grain, animal feedstuff, fertilizer, sand, coal, petroleum coke, slags, scrap metals and cement.
- h. Warehouse space
- i. Vehicle storage facilities.
- j. Cruise liner operations.
- k. Leisure craft mooring and movements at Poolbeg and Dublin City Marinas.

In addition to the activities listed, the Dublin Port road network caters for the movement of up to 15,000 vehicle movements through the port per day.

Tenant companies operate several industrial/commercial sites within the DPC estate. Several of these companies are the de-facto 'operating company' of those sites, and have ultimate responsibility for emergency planning within those facilities.

There are currently eight upper tier Seveso sites within the DPC estate, and a number of lower tier sites (See Annex C on page 22). These sites are operated by DPC tenant companies and are regulated under EU Control of Major Accident Hazards involving dangerous substances legislation (Known as COMAH regulations), and transposed into Irish law in SI No. 74/2006.

It should be noted that the DPC Emergency Plan (Public) is an unrestricted document; therefore annexes to the plan are not included in this document for general safety and security, ISPS and confidentiality reasons.

For further information please contact the Dublin Port Company: Land Operations Manager on 01 8876000.

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Dublin Port Company Emergency Management Plan (Public)

2. OBJECTIVES

The objectives of this plan are to

- a. Provide an emergency management organisation structure and arrangements which will enable DPC to respond rapidly and efficiently to any emergency in order to prevent injury to personnel, damage to property or the environment as well as minimizing or eliminating the impact to neighbouring communities.
- b. Ensure all appropriate and relevant resources are identified in advance and made available as quickly as possible during an emergency within Dublin Port.

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Dublin Port Company Emergency Management Plan (Public)

3. SCOPE AND ASSUMPTIONS

The Dublin Port EMP outlines the DPC structures and arrangements for responding to emergencies that may occur within Dublin port.

The plan is intended for guidance purposes only and may be adapted depending on the circumstances of a particular emergency. The actions to be taken in any given emergency will be decided by the Emergency Management Team (EMT).

This plan may be activated by the CEO of DPC, the Emergency Management Marine Coordinator (EMMC) OR the Emergency Management Land Coordinator (EMLC), or their alternates, depending on the circumstances and severity of the incident.

The plan is designed to cater for both marine and land based emergencies.

Marine Emergency Scenarios include:

- Major incident on-board a vessel such as fire, flooding or cargo related.
- Collision between vessels or between a vessel and a fixed object.
- Grounding of a vessel.
- Major oil spillage from a vessel or jetty.
- Major oil spill at sea or oil entering the port from a source upriver.
- A security incident, involving a ship, which has the potential to escalate into an emergency situation.

Land Emergency Scenarios include:

- Major fire within the general port area.
- Major oil spill.
- Major spill of hazardous material.
- A vehicle accident involving hazardous material.
- Chemical incidents (e.g. toxic cloud).
- Major incident in an oil, gas or hazardous material storage facility.

Marine & Land Emergency Scenarios include:

- Infectious Disease (Human or Animal) on Ship due to enter Dublin Port.
- Incident involving transportation or storage of dangerous goods
- Severe weather event

The scenario specific sub-plans for the above events have been developed as part of the overall plan. These focus on the immediate actions to be taken by internal sections, functions or departments of the port authority and are therefore restricted and not included in the public document. However it should be noted that the scenarios are for operational and emergency planning purposes as well for use in training and exercises.

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DPC adheres to an 'all hazards approach' to Emergency Management, in that the same structures, resources and personnel will be used to respond to all emergencies occurring in or affecting the port.

This plan makes the following assumptions:

- All personnel with specific roles and responsibilities are familiar with their role in the plan, and have been exercised in the implementation of the plan.
- All contact details for key stakeholders are up to date at the date of the last plan revision.
- That the resources outlined in the plan are available and maintained.

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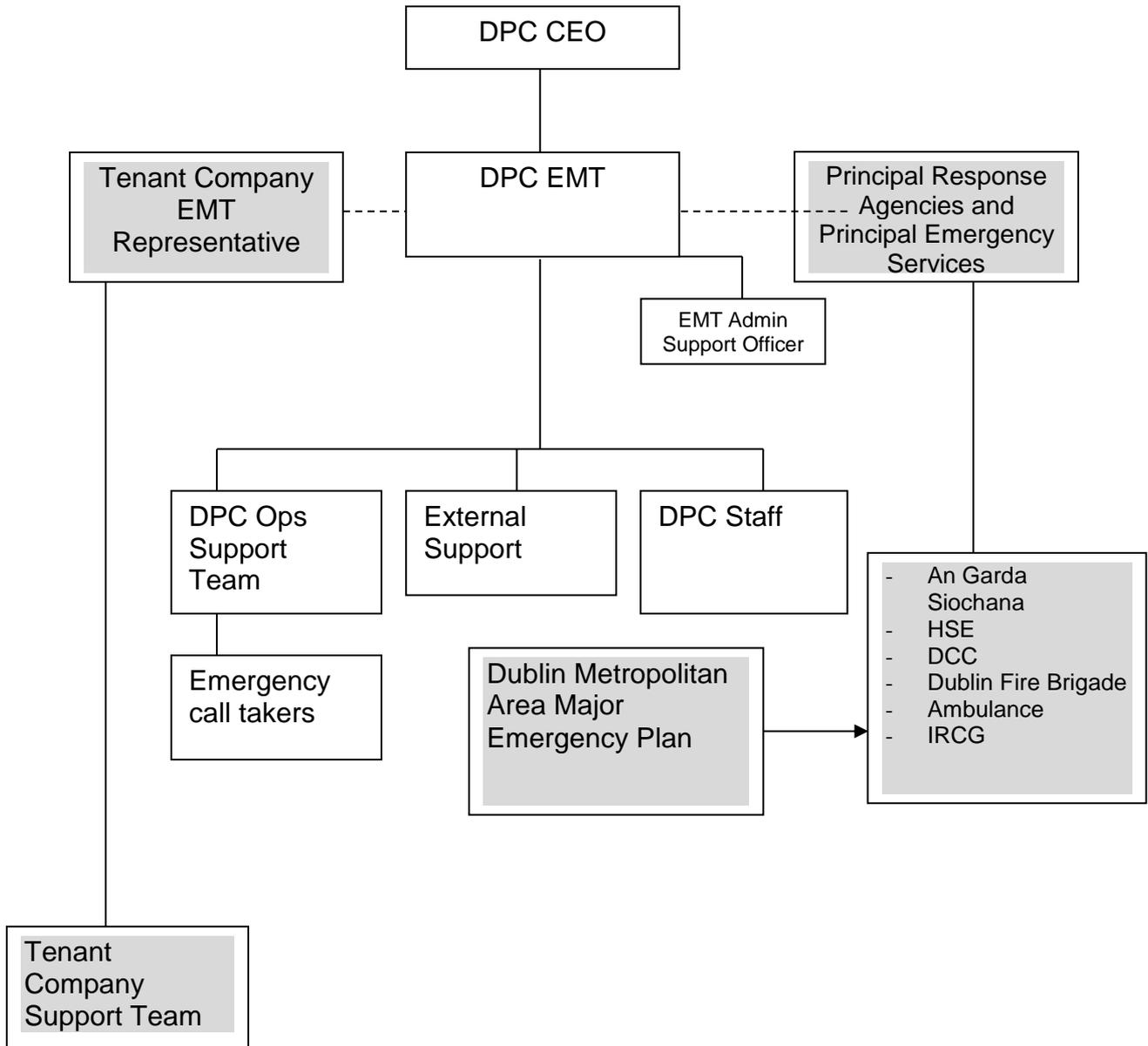
4. ABBREVIATIONS USED THROUGHOUT THIS PLAN

| | |
|-------|--|
| AAR | After Action Review (formal debrief). |
| AGS | An Garda Siochana |
| CA | Competent Authority |
| COP | Common Oil Pipeline |
| CEO | Chief Executive Officer |
| DTTAS | Department of Transport, Tourism and Sport |
| DCC | Dublin City Council |
| DFB | Dublin Fire Brigade |
| DG | Dangerous Goods |
| DoH | Department of Health |
| DPC | Dublin Port Company |
| EMA | Emergency Management Administrator |
| EMLC | Emergency Management Land Coordinator |
| EMMC | Emergency Management Marine Coordinator |
| EMP | Emergency Management Plan |
| EMT | Emergency Management Team |
| EOC | Emergency Operations Centre |
| EPA | Environmental Protection Agency |
| ESRVP | Emergency Services Rendezvous Point |
| HM | Harbour Master |
| HP/PS | Harbour Police/Port Security |
| HSA | Health & Safety Authority |
| HSE | Health Service Executive |
| IHR | International Health Regulations (2005) |
| IMDGC | International Maritime Dangerous Goods Code |
| IRCG | Irish Coast Guard |
| ISPS | International Ship and Port Facility Security (code) |
| MCIB | Marine Casualty Investigation Board |
| MSDS | Material Safety Data Sheet |
| NOG | National Operations Group (oil spill) |
| NOK | Next of Kin |
| OFA | Occupational First Aid |
| PES | Principal Emergency Services |
| PRA | Principal Response Agencies |
| PFSP | Port Facility Security Plan |
| POC | Port Operations Centre |
| SIC | Site Incident Controller |
| SSP | Ship's Security Plan |
| SWEAT | Severe Weather Event Assessment Team |
| SWEP | Severe Weather Event Plan |
| VTS | Vessel Traffic Services |

5. DPC EMERGENCY RESPONSE ORGANISATION AND ROLES

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DPC Emergency Management Team Structure

| EMT Role | Appointment holder |
|-------------------------|--------------------|
| Chief Executive Officer | CEO |

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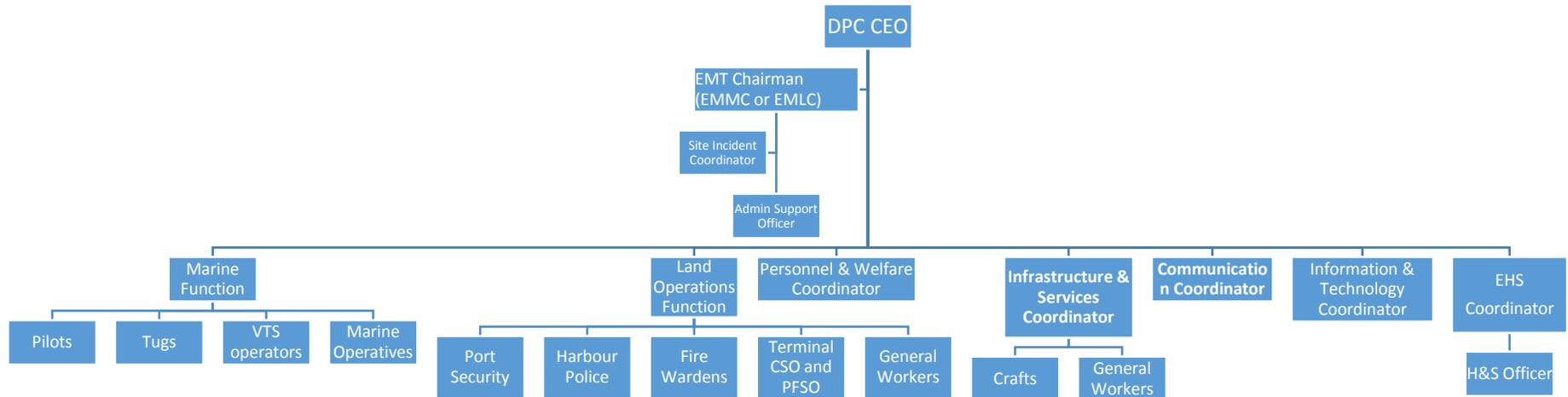
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| | |
|--|--|
| Emergency Management Marine Coordinator (EMMC) | Harbour Master |
| Alternate | Deputy Harbour Master |
| Emergency Management Land Coordinator (EMLC) | Land Operations Manager |
| Alternate | Security Manager |
| Infrastructure and Services Coordinator | Engineering Services Manager |
| Alternate | Port Engineer |
| Personnel and Welfare Coordinator | Head of Employee Relations & Human Resources and Cruise Business Manager |
| Alternate | Human Resource Officer |
| Communications Coordinator | Company Secretary |
| Alternate | Communications Manager |
| Information and Technology Coordinator | IT Manager |
| Alternate | IT Officer |
| Facilities Coordinator | Head of Property |
| Alternate | TBC |
| EHS Coordinator | EHS Manager |
| Alternate | EH&S Officer |
| EMT Administration Support Officer | Clerical/ Admin Officer |
| Emergency Management Administrator | Land Operations Manager |

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EMT Organisation Chart



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EMT - Overview and role

The EMT is made up of senior DPC managers drawn from the key functional areas of the company. The specific roles and responsibilities of team members largely reflect their day-to-day responsibilities.

The DPC CEO has overall responsibility for all operations in the port, both marine and land. Many of the day-to-day tasks are delegated to the EMMC and the EMLC, as well as to other management functions. Each EMT member has a designated alternate or deputy, capable of standing in for the primary EMT member should they be unavailable for any reason. Alternates receive the same training for EMT operations as primary team members. Others not listed on the core team may be drafted to the team if their expertise is required.

The Chair of the EMT reports to the DPC CEO, who may in certain situations decide to chair the EMT him/herself.

In general terms the overall role of the EMT is to:

- Coordinate and control the DPC response to an emergency within the port area of responsibility
- To liaise with the external emergency services and provide all reasonable support to them
- To manage DPC's interaction with external stakeholders throughout the response to an incident.

Emergency Management Administrator (EMA)

The EMP will be maintained by the Emergency Management Administrator (EMA) who will ensure the plan is kept up to date, and is responsible for arranging training and exercises for EMT members and support staff. The EMA will also ensure the Emergency Operations Centre (EOC) is fit for purpose. The EMA is not an EMT operational role as all tasks associated with the role are undertaken outside of EMT operations. The EMA will ensure the plan is reviewed internally each year and externally once every 5 years

Site Incident Coordinator (SIC)

In the event of an emergency occurring within the port area of operations, on the marine or the land side, DPC will appoint a 'Site Incident Coordinator'. This will usually be the EMMC or EMLC, their alternate or a person appointed by him. The SIC's role is to manage the DPC resources at the site, to liaise with external agencies responding to the emergency and to keep the EMT up to date with the situation at the emergency site. The SIC will be in direct contact with the Port Operations Centre (POC) by radio, and will be equipped with a mobile phone.

Emergency Call Takers

A panel of emergency call takers has been identified and trained in assisting the receptionist with responding to calls to DPC in the event of an emergency. The call

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takers take all emergency related calls and ensure the calls are logged and/or passed to the appropriate EMT or DPC person.

Vessel Traffic Services (VTS) Operator

The VTS operator is the primary point of contact in the event of any marine related incident. In the event of an incident the VTS operator will immediately contact the duty Harbour Master (HM) who will decide what action should be taken, including mobilisation of the EMT. If the duty HM deems it appropriate, the VTS operator will contact emergency services and mobilise the tugs. VTS & HP/PS will liaise closely during all emergencies.

Marine Operatives

Marine Operatives of the port will support the VTS staff and the tugs, and will act on all instructions issued by the Harbour Master during an emergency.

Harbour Police/Port Security (Contact details at Annex B)

The HP/PS has a critical role in the security of port facilities, roads and infrastructure, which include the control and coordination of emergencies including initiating the immediate response to an emergency incident. They also play a key role in alarm monitoring, receipt of calls, gathering of information, notification of emergency services, meeting the emergency services at the ESRVP, guiding them to the site of an emergency within the port, and controlling traffic within the port.

DPC Fire Wardens (Contact details at Annex B)

DPC Fire Wardens staff the oil jetty's on a 24/7/365 basis. They are responsible for the safety and security of all shipping operations on the Oil Jetty, the Common Oil Pipeline (COP), and can communicate directly with the POC and COP users via specific radio telephone channels.

DPC Fire Marshals

DPC has identified and trained a number of Fire Marshals who have a key role in accounting for personnel in their designated area during an emergency. Fire Marshals have been appointed in all DPC buildings, and they have a key role in accounting for personnel in their facility during evacuations, and in keeping the EOC informed of events in their area.

DPC Occupational First Aiders

DPC has a number of qualified Occupational First Aid (OFA) staff suitable for deployment in the event of an emergency. OFA's report to the Incident Site Coordinator once they have been accounted for by their Fire Marshal, and are prepared to administer first aid and to assist the emergency services on request.

The Emergency Operations Centre (EOC) (Contact details at Annex B)

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The primary EOC is located on the 1st floor of the POC located at the southern end of Breakwater Road. The EMT will meet here in the event of an emergency being declared. Should the emergency affect the POC then the alternate EOC will be used and is based in the IT training room located on the lower ground floor of the Port Centre on Alexandra Road. Should both locations be unavailable then the EMT Chair will decide on an appropriate location and inform other EMT members. Both the primary and alternate EOC are equipped for emergency operations.

Emergency Services

In the event of an emergency in Dublin Port, Emergency Services should go immediately to the Emergency Services Rendezvous Point (ESRVP), located at the junction of East Wall Road & Tolka Quay Road west. HP/PS will meet with and guide the emergency services to the area of emergency, if safe to do so. The primary unit of the initial lead agency will attend the scene and relay information to emergency services gathered at or near the ESRVP. In a multi-agency response the lead agency will generally appoint a senior officer as the Incident Commander or Coordinator at a safe forward point and senior operational staff from each emergency service and the DPC appointed SIC will collectively manage the emergency from this location.

EMT Member - Administration Support Officer. (Administrative/ clerical officer)

Provide all administrative support required in by the EMT, including but not limited to

- The setting up of the EOC on activation of the EMT
- Maintain an incident log throughout the emergency
- Acting as a conduit between the EMT and the administrative support personnel (call takers, secretarial support etc.)

Information Management Officer (IMO).

The IMO is responsible for maintaining the information display boards in the EOC. This role should be filled by an EMT member who has been trained in the role but can be filled by any EMT member if a trained IMO is not available. The panel of EMT IMO's should receive refresher training every two years, and should be practiced in the role when the EMT is exercised.

6. PORT WIDE ALARM ACTIVATION

The DPC fire alarm panel system is located in the HP/PS Control Room, situated on the ground floor of the POC, Breakwater Road, Dublin Port. The fire alarm system monitors approximately 21 sites, and break glass units located throughout the port estate.

The fire alarm system can be activated manually or automatically from various points around the port directly linked to the system. When activated, the HP/PS are alerted and investigate the alarm before deciding on what action is required.

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The port wide sirens are located at the ESB North Wall Power Station, the Oil Jetties and Port Centre, and are generally regularly on a scheduled basis. With the exception of alarm tests, all pumping stops immediately on sounding of the port wide siren.

For confirmed alarm activations, the affected site and HP/PS must call 999/112 and request emergency services attendance, whilst clearly stating the nature of the emergency, name and location of the site affected.

In passing information to the Emergency Services the E.T.H.A.N.E. pneumonic should be used:-

- **E**xact location of the emergency
- **T**ype of emergency – e.g. Fire; hazardous material spill; Road Traffic Accident.
- **H**azards, present and potential
- **A**ccess route to the emergency
- **N**umber and type of casualties (if known)
- **E**mergency Services – those present and those required

Once confirmed HP/PS will immediately open the emergency gates located at the western end junction of Tolka Quay Road and East Wall Road and this immediate area operates as the ESRVP.

DFB will be dispatched to the Port to deal with the incident, whilst HP/PS will implement a traffic control plan, with the support of Gardaí, as required.

The port wide alarm system is a continuous wailing alarm sound, similar to an air-raised siren. On hearing this alarm port users should:

- Be aware that an incident is on-going.
- Account for staff, visitors and contractors.
- Continue to operate as normal unless instructed otherwise or individual company SOP's indicate otherwise.
- Wait for further instructions from the HP/PS or the PES.

Port users, and members of the wider community, are asked to bear in mind that calling DPC by telephone during sounding of the port wide siren may block telephone lines at a vital time. Port users should await further information from the HP/PS, whilst members of the public should tune in to a national radio station for updates.

A new port-wide fire-main was installed in 2015 and replaced the former Salt Water mains system that covers the majority of bulk fuel storage facilities in Dublin Port. The system is fully automated and is controlled from the Port Operations Centre Control Room that is manned 24/7 by HP/PS.

Port Evacuation

During an emergency it may be necessary to evacuate the port, or parts of the port, for safety reasons.

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The HP/PS will control traffic flow throughout the port in the event of an evacuation of one or more areas.

The details of port evacuation routes are included at **Annex B** to this plan.

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7. COMMUNICATIONS

In the event of an emergency in Dublin Port the media and social media will be critical in informing the public of the incident. The perception of what has happened and whether people perceive themselves at risk will depend on what they see and hear. The importance of managing this relationship with the media cannot be overstated especially concerning information released via formal and informal (social media) channels.

Members of the public seeking information should tune in to local and national radio and television stations; social media platforms e.g. Facebook, Twitter.

Concerned members of the public can contact DPC by phone, email or social media; however DPC's first priority will be to assist Emergency Services in the protection of life, property and the environment and that patience will be required when trying to contact them during an emergency. The primary point of contact for incidents on port tenants sites should be the company itself or for general port incidents 01 8876000 or by emailing info@dublinport.ie

Telephone Enquiries

The response to callers by reception staff at DPC will be determined by the information they may have at the time, and the specific instructions of the EMT as issued through the EMT Communications Coordinator.

DPC Spokesperson

The DPC CEO in conjunction with the EMT Communications Coordinator will appoint a spokesperson to speak directly to the media and/or issue media releases.

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8. TRAINING, EXERCISE AND MAINTENANCE PLAN

General

DPC's Emergency Management competency is continuously enhanced through participation in training and exercises at different levels. DPC management regularly participate in Emergency Management exercises on tenant sites, as well as exercising as the DPC EMT in a stand-alone capacity, at least twice annually. Whilst there are a number of scenario specific sub-plans associated with the overall EMP, DPC adheres to an 'all hazard approach' to Emergency Management.

It will be the responsibility of the EMA to ensure all aspects of the Training, Exercise & Maintenance Plan are implemented. Training and exercising within the context of DPC's EMP is generally concerned with achieving the following objectives:

- Continuously developing the competence of the EMT organisation in implementing the plan.
- Continuously improving the plan by identifying potential gaps in the plans during training exercising and taking action to ensure these are addressed.
- Continuously familiarising the EMT members and supporting staff with the plan and with their roles during plan implementation.

Objective

The objective of this 'Training, Exercise and Maintenance Plan' is to provide a structured framework for training and exercising the members of the EMT in their roles as well as providing a sound basis for maintaining the integrity of the information contained within the plan.

Annual Training Requirement

Training will be conducted annually as follows:

- EMT members and their alternates will receive (induction or refresher) training in relation to the nature of emergencies and their role in the Emergency Management System.
- The EMT will exercise formally in the implementation of the EMP.
- Administrative staff and potential support group members (e.g. emergency call takers) will receive Emergency Management familiarisation training.
- Security, reception and other staff will receive training on the EMP sub-plans and their role in implementing the plans, as appropriate.

The EMA will ensure training records are maintained for all EMT training activities.

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EMT exercises will consist of two exercises per year, one land and one marine based to ensure all possible emergency situations are regularly covered.

In addition to DPC specific EMT training, management and staff of DPC regularly participate in or observe at tenant site emergency exercises, many of which are attended by the PES.

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Annex A: Contact Details

For Security Managers, Harbour Police & Port Security, Emergency Operations Centre and Fire Wardens

SECURITY MANAGERS, HARBOUR POLICE & PORT SECURITY

| Name | Phone | E-mail |
|--|------------------------------------|----------------------------------|
| Security Managers | 01 8876000 | |
| Fire Wardens | 01 8559010 | |
| Harbour Police & Port Security Control Room | 01 8876858 & 01 8876859 | controlroom@dublinport.ie |

EMERGENCY OPERATIONS CENTRE

| EOC Line | Number |
|-------------------|---------------------------------|
| 1 | 01 8876833 or 01 7040833 |
| 2 | 01 8876834 or 01 7040834 |
| Fax Number | 01 8876057 |

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Annex B – Port Map & Evacuation Plan



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Dublin Port Company Evacuation Plan

DPC has circa 155 employees located at the following locations.

- Port Centre, Corner of East Wall Road & Alexandra Road.
- Maintenance & Services Building, Bond Drive Extension
- Oil Jetty Control Room, Jetty Road
- Port Operations Centre, Breakwater Road
- Terminal 1 Building, Terminal Road South

All locations have individual emergency evacuation Standard Operating Procedures including assembly points. Due to the nature of business carried out within the port via the common oil pipeline and the bulk storage of petroleum products, LPG and molasses there is always the potential for a serious event to occur, which could require a full or partial evacuation.

Six evacuation and or alternative routes to exit/enter the port environs have been designated for all port users, including emergency services in attendance.

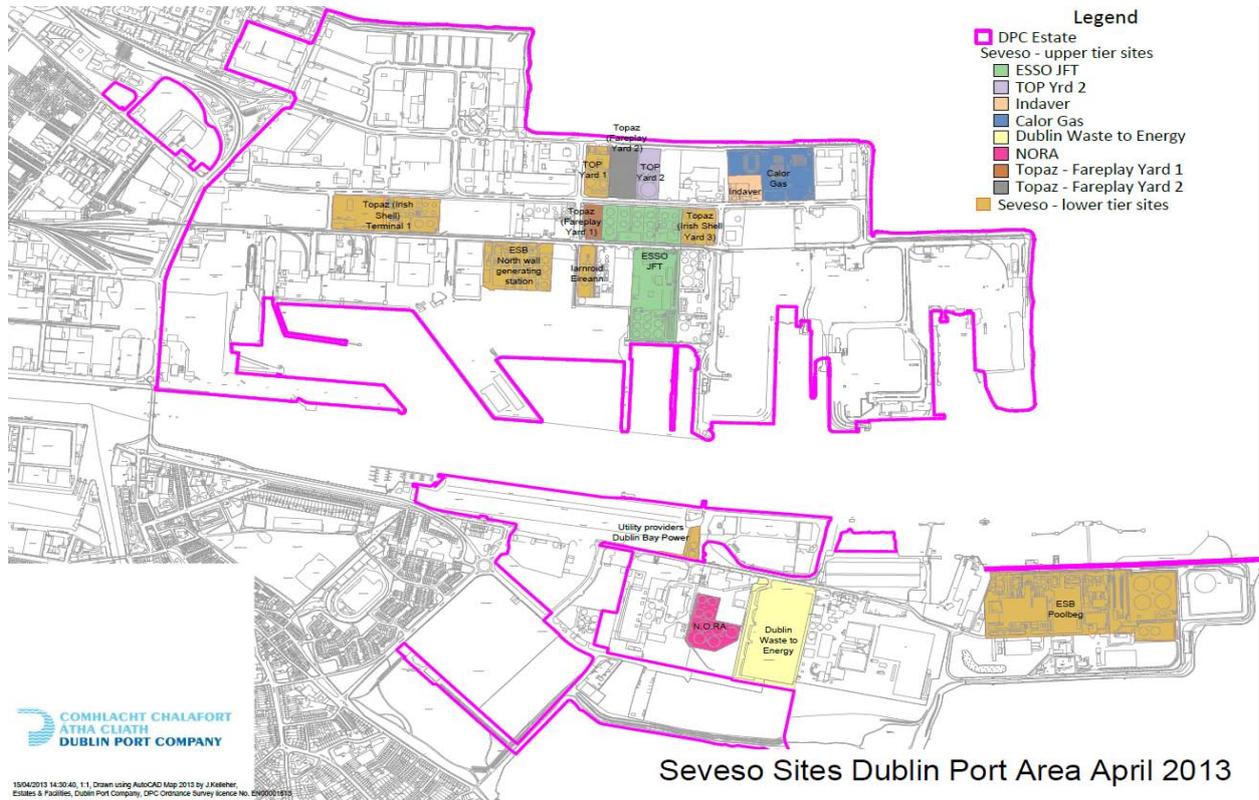
1. Promenade Road
2. Tolka Quay Road (locked gates, keys held by HP/PS)
3. Alexandra Road
4. Port Operations Centre (facilitated by HM via Marine Operatives)
5. East Oil Jetty (life boat capsule)
6. West Oil Jetty (life boat capsule)

In addition to the above, Alexandra Road (DFT terminal between Breakwater Road & Terminal Road) is a designated evacuation route. In addition to the above, DPC acknowledge there are other alternative evacuation routes available to be utilised, however the nature or extent of the event, along with the directions of emergency services would dictate the actions of all parties involved.

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Annex C – Dublin Port SEVESO sites



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Notes

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Appendix B

Dublin Port Ship's Waste Management Plan

| | | | |
|---|---|---------------|------------|
|  | Type of Document: | Date Prepared | 20/04/2017 |
| | Department Standard Operating Procedure | Supersedes | - |
| Document Reference | SOP-DPC-ENV-053 | Revision | 0 |
| Title | DUBLIN PORT SHIP'S WASTE MANAGEMENT PLAN | Issue Date | 20/04/2017 |

| DISTRIBUTION | SOFT COPY | HARDCOPY |
|---|-----------|----------|
| 1. Defined Q-Pulse Users | √ | |
| 2. Harbour Masters Office (Master Copy) | | √ |
| 3. Others | None | None |

| | Name | Designation | Date |
|-------------|-----------|-----------------------|------------|
| Originator | F Britton | Deputy Harbour Master | April 2017 |
| Reviewed by | B Brazil | EHS & Risk Manager | April 2017 |
| Approved by | M McKenna | Harbour Master | April 2017 |

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PREAMBLE

AIMS AND OBJECTIVES

The overall aim of this port waste management plan for Dublin Port Company is to protect the marine environment by reducing discharges into the sea of ship generated waste and cargo residues; to improve the availability and use of reception facilities and strengthen the enforcement regime.

Its objectives are:

- To reduce illegal discharge of waste from vessels
- To fulfil legal duties with regard to waste management
- To consult with users, agents, operators, contractors and regulators in the development and implementation of waste management strategies and measures
- To minimise the production of waste wherever possible
- To re-use or recycle waste wherever possible
- To dispose of waste so as to minimise negative environmental effects

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1. THE PORT

OVERVIEW OF PORT ACTIVITIES

1.1 Constitution

The Harbours Act 1996 reconstituted Dublin Port as a commercial harbour company operating under company law. Dublin Port Company was established on 3 March 1997 and has 12 directors. The Minister for Communications, Marine and Natural Resources nominates six directors including the Chairman; the Chief Executive is ex-officio a company director; the local authority nominates three of its members as directors; employees of the company nominate two directors.

1.2 Jurisdiction and Conservancy

Under the 1996 Act, the limits of Dublin Port comprise the waters of the River Liffey commencing from and including Matt Talbot Memorial Bridge and extending to an imaginary straight line drawn from the Baily Lighthouse on the north in the County of Dublin and extending through the North Burford Buoy, through the South Burford Buoy, and to Sorrento Point on the south including all bays, creeks, harbours and tidal docks within that area; excluding Dun Laoghaire Harbour and extending 0.3 n. miles into the bay from the pier heads.

The anchorage is exposed particularly to winds from North East through to South East.

The approach is well lighted and of easy access: vessels drawing up to 7m can enter at any state of the tide.

Verification of depths should be obtained from the Harbour Master's Department.

Dublin Port Company is the pilotage authority for the Dublin pilotage district. It also provides towage in the form of two diesel tugs of 55 tonne bollard pull, and a full contracted diving service is available. Eight private companies are licensed by Dublin Port Company to provide stevedoring services within the port.

1.3 Facilities

The lift on/ lift off (lo-lo) traffic accounts for 18% of total tonnage throughput and is handled at two dedicated terminals in the port catering for a range of services between Dublin and the United Kingdom, mainland Europe, and further afield to such locations as Egypt, Lebanon and Israel as well as worldwide trans shipment services. Dublin Ferryport Terminals and Marine Terminals Ltd operate the lo/lo terminals.

The roll on/roll off (RoRo) traffic is serviced by five ferry companies operating up to 18 sailings daily to the UK, connecting Dublin with Heysham, Holyhead, Liverpool, and Douglas (freight and tourism). The operators are Irish Ferries, I.O.M. Steam

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Packet Company, Seatruck, Merchant Ferries, P&O Irish Sea, Sea Containers Irish Sea and Stena Line.

The port has discharging facilities for oil, bitumen, chemicals, liquid petroleum gases and molasses. A 41 hectare oil zone with storage capacity for 330k tonnes of product (including 6k tonnes LPG) is linked to four oil berths by a common user oil pipeline system, incorporating 36 pipe lines. Facilities are available at the oil jetties for obtaining bunkers from the various oil companies and bunkers may also be obtained at berths by means of road tankers.

Waste oils can be removed on the Western Oil Jetty by arrangement by means of a recently installed waste pipeline.

Dry bulk facilities are provided to cater for the loading and discharging of concentrate, peat, coal, grain, animal feedstuffs, fertilisers and sand.

Break bulk accounts for <1% of total throughput, but includes an area dedicated to the storage of imported trade cars and commercial vehicles.

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2. LEGISLATIVE SUMMARY

- EU Directive 2000/59/EC on port reception facilities for ship-generated wastes and cargo residues [[Directive 2000/59/EC](#)]

The specific requirements of the new Directive are that: -

- All EU ports are to provide adequate reception facilities and to develop waste reception and handling plans (Mandatory Provision).
 - All wastes are to be delivered to reception facilities unless there is capacity on board for retention until next port of call (Mandatory Discharge).
 - All ships, except recreational craft authorised to carry 12 or fewer passengers or fishing vessels, are required to notify ports in advance of intention to use facilities and quantities of waste on board (Notification Requirement).
 - A fee system should be introduced to encourage use of facilities (Charging System).
 - There will be a system of monitoring for compliance, plus adequate sanctions for non-compliance; non-compliance data is to be forwarded to the next port of call (Compliance and Monitoring).
- European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) Regulations 2003 [[S.I. No. 117 of 2003](#)]

These Regulations bring the provisions of EU Directive 2000/59/EC into Irish Marine law. They largely follow the formulation of the European legislation. Their interpretative provisions establish the Minister of Communications, Marine and Natural Resources [now the responsibility of the Minister for Transport] as the national competent authority, and the harbour authority in respect of each harbour as the local competent authority.

- European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) (Amendment) Regulations 2009 [[S.I. 376 of 2009](#)]

The purpose of these Regulations is to reduce the discharge of sewage into the sea, especially illegal discharges, from ships using ports in the Community, by improving the availability and use of port reception facilities, thereby enhancing the protection of the marine environment.

- Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements [[Directive 2005/35/EC](#)]

[See commentary for S.I. No. 542 of 2010 below.]

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- Directive 2009/123/EC amending Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements [[Directive 2009/123/EC](#)]

[See commentary for S.I. No. 542 of 2010 below.]

- European Communities (Ship-Source Pollution) Regulations 2010 [[S.I.No. 542 of 2010](#)]

Directive 2005/35/EC on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences, as amended by Directive 2009/123/EC, was transposed into national law by the European Communities (Ship-Source Pollution) Regulations 2010 (542 of 2010). These Regulations provide that any person who intentionally, recklessly or with serious negligence makes illegal discharge of oil or hazardous and noxious substances, from a ship, or who aids, abets, or incites another person to do so, is liable to be held responsible for a criminal offence.

- Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC [[Directive 2002/59/EC](#)]

[See commentary for S.I. No. 573 of 2010 below.]

- Directive 2009/17/EC amending Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system [[Directive 2009/17/EC](#)]

[See commentary for S.I. No. 573 of 2010 below.]

- European Communities (Vessel Traffic Monitoring and Information System) Regulations 2010 [[S.I. No. 573 of 2010](#)]

Directive 2002/59/EC, amended by Directives 2009/17/EC, establishes a Community vessel traffic monitoring and information system for EU shipping and is effective in national law through the European Communities (Vessel Traffic Monitoring and Information System) Regulations (S. I. No. 573 of 2010). The Regulations provide for an extensive amount of regulation of marine vessel traffic other than pollution prevention and response, including the enhancing of safety and efficiency of maritime traffic, improving the response to incidents, accidents or potentially dangerous situations at sea, including search and rescue operations. The Regulations provide additional functions concerning the accommodation of ships in need of assistance for the Director of the Irish Coast Guard.

Each Member State has implemented the VTMISS regulations and must co-operate with any other Member State when required in dealing with threatened or actual pollution.

- Commission Directive 2011/15/EU amending Directive 2002/59/EC of the European Parliament and of the Council establishing a Community vessel traffic monitoring and information system [[Commission Directive 2011/15/EU](#)]

[See commentary for S.I. No. 71 of 2012 below.]

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- European Communities (Vessel Traffic Monitoring and Information System) (Amendment) Regulations 2012 [\[S.I. No. 71 of 2012\]](#)

These Regulations give effect to Commission Directive 2011/15/EU which amends Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system, as well as some other related matters, by amending the European Communities (Vessel Traffic Monitoring and Information System) Regulations 2010 [S.I. No. 573 of 2010].

They provide for the necessary amendments by updating the safety criteria regarding certain oil-tanker products; by substituting a new format in Schedule 3 which deals with voyage data recorder systems; by providing for an extension of the powers of intervention to include assistance, salvage or towage companies in the event of incidents or accidents at sea; by removing an obligation on any company to use *Safe Seas Ireland* or specified electronic means when placing itself at the disposal of the Irish Coast Guard in the event of an incident or accident at sea; and by amending certain minor references in Regulation 16.

- Sea Pollution Act 1991 [\[No. 27 of 1991\]](#)

This Act gives effect to the *International Convention for the Prevention of Pollution from Ships*, adopted on 2 November, 1973, and as amended by its *Protocol* adopted on 17 February, 1978, relating thereto (MARPOL).

MARPOL, to which Ireland is a party, is the International Maritime Organization's (IMO) main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.

IMO is a specialised agency of the United Nations, which has responsibility for the safety and security of shipping and the prevention of marine pollution by ships.

MARPOL has six individual Annexes, each of which contains regulations covering the various sources of ship-generated pollution, i.e., oil (Annex I), noxious liquid substances in bulk (Annex II), harmful substances carried by sea in packaged form (Annex III), sewage (Annex IV), garbage (Annex V), and air pollution from ships (Annex VI).

The 1991 Act also gives effect in the State to the Protocol relating to Intervention on the High Seas in cases of Pollution by Substances other than Oil and enables the Minister to prohibit or regulate the operational discharge of oil or oily mixtures from Irish registered ships anywhere at sea or from other ships in the territorial waters of the State.

It further enables the Minister to require Irish registered ships to be constructed, fitted or operated in such a way as to prevent, control or reduce discharges into the sea or to intervene on a vessel if considered appropriate following a casualty.

- Sea Pollution (Amendment) Act 1999 [\[No. 18 of 1999\]](#)

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This Act gives effect to the International Convention on Oil Pollution Preparedness Response and Cooperation in the Republic of Ireland. It is concerned with the prevention of pollution and the establishment by harbour authorities of oil pollution emergency plans. In addition it outlines Ministerial responsibilities for preparing contingency plans and acquiring resources to respond to an incident of pollution.

- Sea Pollution (Miscellaneous Provisions) Act, 2006 [[No. 29 of 2006](#)]

This Act amends the two previous Sea Pollution Acts by making provision for, inter alia, hazardous and noxious substances pollution emergency plans to be in place as well as for the making of regulations to give effect to a number of international instruments relating to the protection of the marine environment, agreed at the International Maritime Organization, to be brought into effect, viz:

- The Protocol to the International Convention on Oil Pollution Preparedness, response and Co-Operation 1990 (OPRC);
- The International Convention on the Control of Harmful Anti-Fouling Systems 2001 (AFS Convention);
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention);
- Annex VI as added to MARPOL 73/78 by the Protocol of 1997;
- The International Convention on Civil Liability for Bunker Oil Pollution Damage 2001 (Bunkers Convention), the text of which is attached as a schedule to the Act.

Statutory Instrument(s) giving effect to Annex I of MARPOL

- Sea Pollution (Prevention of Oil Pollution) Regulations 2007 [[S.I. No. 788 of 2007](#)]

The Regulations prohibit and control discharge into the sea of oil and oily mixtures. The Regulations require ships to follow specified procedures when washing cargo tanks. Ballasting arrangements and the discharge of ballast water are also controlled. The Regulations also provide for adequate facilities at ports and terminals for the reception of oil and oily mixtures.

Ships are required to be surveyed for the purposes of the Regulations and to carry an International Pollution Prevention Certificate. Ships are also required to carry an 'Operations and Equipment Manual', an 'Oil Record Book' and a shipboard oil pollution emergency plan approved by the Minister or recognised organisation.

The Regulations apply to all Irish ships wherever they may be and to all other ships when they are in the territorial waters of the State.

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- Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2008 [\[S.I. No. 282 of 2008\]](#)

These Regulations provide for amendments to the Sea Pollution (Prevention of Oil Pollution) Regulations 2007 ([S.I. No. 788 of 2007](#)), which give effect to Annex I of MARPOL 73/78. Essentially, they concern an amendment to the definition for 'special area' in S.I 788 of 2007.

- Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2010 [\[S.I. No. 664 of 2010\]](#)

These Regulations give effect to two amendments to Annex I of the MARPOL Convention, on the prevention of pollution by oil from ships, and come into effect on 1 January 2011. Firstly, for ship-to-ship (STS) transfer operations for cargo oil, the Regulations apply to oil tankers of 150 gross tonnage and above and require such ships to maintain an STS Operations Plan and to provide notification of planned and actual STS operations. Secondly, long-standing existing requirements are clarified to facilitate compliance by ships' crews for on board management of oil residue (sludge).

- Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2011 [\[S.I. No. 365 of 2011\]](#)

These Regulations amend the Sea Pollution (Prevention of Oil Pollution) Regulations 2007 ([S.I. No. 788 of 2007](#)) on the prevention of oil pollution from ships.

The purpose of the Regulations is to lay down special requirements with regard to both use and carriage of heavy, and therefore highly polluting, oils for Irish ships while in the Antarctic area, south of latitude 60°S, a designated special area for oil pollution prevention.

Statutory Instrument(s) giving effect to Annex II of MARPOL

- Sea Pollution (Control of Pollution by Noxious Liquid Substances in Bulk) Regulations 2008 [\[S.I. No. 217 of 2008\]](#)

These Regulations apply to all Irish ships wherever they may be and to all other ships when they are in Irish waters.

These Regulations give effect to Annex II of MARPOL 73/78, which concerns the control of pollution by noxious liquid substances in bulk.

Noxious liquid substances are divided into four categories, X, Y, Z, and *Other Substances*, according to the severity of the hazard which they present to human health and the marine environment, Category X presenting the worst hazard and Category *Other Substances* the least. Under the Regulations, discharges into the sea of these substances or mixtures of them are prohibited except when the discharges are made under specified conditions.

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These conditions vary according to the degree of hazard posed to the marine environment. Discharges are prohibited in the Antarctic area.

The Regulations require ships to follow specified procedures when washing cargo tanks in accordance with the category of the substance. They also provide for adequate facilities at ports, terminals or repair ports for the reception of residues or mixtures of noxious liquid substances.

Under the Regulations, ships are required to be surveyed, to carry an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk, and to be maintained in accordance with that Certificate. Ships are also required to carry a Cargo Record Book in which to record operations involving cargoes of noxious liquid substances.

Statutory Instrument(s) giving effect to Annex III of MARPOL

- Sea Pollution (Harmful Substances in Packaged Form) Regulations 2009 [S.I. No. 491 of 2009]

These Regulations apply to all Irish ships wherever they may be and to all other ships when they are in Irish waters.

These Regulations give effect to Annex III of MARPOL 73/78, which contains general requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications for preventing pollution by harmful substances carried by sea in packaged form.

Statutory Instrument(s) giving effect to Annex IV of MARPOL

- Sea Pollution (Prevention of Pollution by Sewage from Ships) Regulations 2006 [S.I. No. 269 of 2006]

The Regulations apply to all Irish ships, wherever they may be, and to all other ships when they are in the territorial seas and inland waters of the State.

The Regulations give effect to Annex IV of MARPOL 73/78, which prohibits and control the disposal of sewage into the sea in accordance with the type of sewage for disposal and the geographical location of the ship. They also provide for the availability of adequate facilities at ports and terminals for the reception of sewage.

- Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2008 [S.I. No. 281 of 2008]

These Regulations further amend S.I. 269 of 2006 by providing for control of sewage originating from spaces on ships containing living animals and for inspection and control of non-Irish MARPOL 73/78 Annex IV ships in Irish ports, which do not have adequate sewage regulation facilities or practice.

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- Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) (No.2) Regulations 2008 [[S.I. No. 372 of 2008](#)]

These Regulations amend the Sea Pollution (Prevention of Pollution by Sewage from Ships) Regulations 2006 by providing that existing ships engaged in international voyages must comply, by 27 September, 2008, with the provisions of Annex IV of MARPOL 73/78.

- Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2012 [[S.I. No.492 of 2012](#)]

These Regulations amend the Sea Pollution (Prevention of Pollution by Sewage from Ships) Regulations 2006 ([S.I. No. 269 of 2006](#)) on the prevention of pollution by sewage from ships. The broad purpose of these Regulations is:

- to provide for the establishment of special areas where more stringent criteria apply with regard to the discharge of sewage by passenger ships while in those areas;
- to oblige a harbour authority whose area of remit falls within a special area to provide adequate facilities for the reception of sewage from passenger ships; and
- to establish the Baltic Sea area as a special area with regard to the discharge of sewage from passenger ships.

Statutory Instrument(s) giving effect to Annex V of MARPOL

- Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 2012 [[S.I. No. 372 of 2012](#)]

These Regulations give effect to Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL Convention), adopted by the International Maritime Organisation on 2 November, 1973 and as amended by its Protocol adopted on 17 February, 1978, and as further amended by the Marine Environment Protection Committee (MEPC) of the International Maritime Organisation.

These regulations revoke the Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 1994 ([S.I. No. 45 of 1994](#)); the Sea Pollution (Prevention of Pollution by Garbage from Ships) (Amendment) Regulations 1997 ([S.I. No. 516 of 1997](#)); and the Sea Pollution (Prevention of Pollution by Garbage from Ships) (Amendment) Regulations 2006 ([S.I. No. 239 of 2006](#)).

The Regulations apply to all Irish ships wherever they may be and to all other ships when they are in the territorial seas and inland waters of the State.

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The purpose of the Regulations is to prohibit and control the disposal of garbage into the sea in accordance with the type of garbage for disposal and the geographical location of the ship.

They also provide for the availability of adequate facilities at ports and terminals for the reception of garbage.

In addition the Regulations include requirements for certain ships to have Garbage Management Plans and to carry Garbage Record Books.

Statutory Instrument(s) giving effect to Annex VI of MARPOL

- Sea Pollution (Prevention of Air Pollution from Ships) Regulations 2010 [\[S.I. No. 313 of 2010\]](#)

These Regulations give effect to the 2008 revision of Annex VI as added to the International Convention for the Prevention of Pollution from Ships (MARPOL Convention) by its Protocol adopted by the International Maritime Organization on 26 September 1997.

The Regulations, which apply to Irish ships everywhere and to other ships when they are in the inland waters and territorial seas of the State, control emissions from ships with a view to protecting human health and preventing air pollution.

The Regulations provide for improved specification of marine diesel engines in order to reduce the emission of nitrogen oxides; reduction of sulphur content of marine fuels in order to reduce sulphur oxide emissions; and a mechanism for the setting up of Emission Control Areas where shipping is particularly busy or where population may be concentrated near a maritime area, and in which higher standards of emission control are to apply. The Regulations also provide for improved regulation of ozone-depleting substances, volatile organic compounds, shipboard incineration of wastes and cargo residues, and port reception facilities.

Section 29 of the Sea Pollution Act 1991 provides for penalties for breaches of these Regulations.

- Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) Regulations 2011 [\[S.I. No. 383 of 2011\]](#)

These Regulations amend the Sea Pollution (Prevention of Air Pollution from Ships) Regulations 2010 (S.I. No. 313 of 2010) on the prevention of air pollution from ships.

The purpose of these Regulations is to provide for the insertion of the North American Emission Control Area in Regulations 12 and 13 of S.I. 313 of 2011, which deal with emissions of Nitrogen Oxides and Sulphur Oxides respectively.

- Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) (No. 2) Regulations 2011 [\[S.I. No. 596 of 2011\]](#)

These Regulations amend the Sea Pollution (Prevention of Air Pollution from Ships) Regulations 2010 (S.I. No. 313 of 2010) on the prevention of air pollution from ships.

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The purpose of these Regulations is to provide for an amendment to paragraph 2.3 of the form of Supplement to the International Air Pollution Prevention Certificate.

- Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) Regulations 2013 [[S.I. No. 35 of 2013](#)]

These Regulations amend the Sea Pollution (Prevention of Air Pollution from Ships) Regulations 2010 (S.I. No.313 of 2010) on the prevention of air pollution from ships, the broad purpose of which was to give effect to MARPOL Annex VI in Irish law.

The broad purpose of these Regulations is to provide for amendments to MARPOL Annex VI including:

— the addition of a new chapter 4 to MARPOL Annex VI to make mandatory the Energy Efficiency Design Index (EEDI) for new applicable ships, and the Ship Energy Efficiency Management Plan (SEEMP) for all applicable ships;

— the provision of a format for the International Energy Efficiency Certificate (IEE Certificate) which is provided in the new Appendix VIII to MARPOL Annex VI; and

— the designation of certain waters adjacent to the coasts of Puerto Rico (United States) and the Virgin Islands (United States) as Emission Control Areas (ECA) under MARPOL Annex VI Regulation 13 concerning nitrogen oxides (NO_x) and under MARPOL Annex VI Regulation 14 concerning sulphur oxides (SO_x) and particulate matter.

Statutory Instruments giving effect to other relevant IMO legislation

- Sea Pollution (Control of Harmful Anti-fouling Systems on Ships) Regulations 2008 [[S.I. No. 82 of 2008](#)]

These Regulations give effect to the AFS Convention, which prohibits the use of harmful [substances](#) in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems

Other relevant legislation

- Waste Management Act 1996 [[No. 10 of 1996](#)]

The Act provides for the prevention, management and control of waste, including the necessity for local authorities to produce waste management plans, the prevention, minimisation, recovery, collection, movement and disposal of hazardous waste, measures to reduce production and promote recovery of waste, and all aspects of licensing.

- Waste Management (Amendment) Act 2001 [[No. 36 of 2001](#)]

This Act was enacted on 17 July 2001 and its primary purpose is to provide a legal mechanism by which the first Regional Waste Management Plans could be made.

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Section 4 of the Act provides that the making of a waste management plan will become an executive (management) function, a change from the Waste Management Act 1996, where the power was a reserved (elected member) function.

The Act also provides for a levy on the landfill of waste, at an initial rate of not more than €19 per tonne.

- Protection of the Environment Act 2003 [\[No. 27 of 2003\]](#)

This Act made a number of amendments to the Waste Management Act 1996, but in relation to the primary purpose of the 2001 Amendment Act (re waste management plans), Section 26 provides that the review, variation or replacement of a waste management plan shall be an executive function.

These three waste management acts are the legislative basis for all waste management issues.

- Diseases of Animals Act 1966 [\[No. 6 of 1966\]](#)

This Act consolidates with amendments the previous enactments relating to diseases of animals and also provides for certain other matters relating to animals.

- Diseases of Animals (Feeding and Use of Swill) Order 1985 [\[S.I. No. 153 of 1985\]](#)

This Order provides for comprehensive control of swill as a protective measure against the introduction or spread of animal disease and to comply with certain provisions of EEC Directive 80/217 on the control of classical swine fever. It provides, in particular, for the registration of swill processing premises, for hygiene and construction standards in processing premises, the hygienic transport of swill and for the prohibition on feeding of unprocessed swill to animals and poultry.

- Diseases of Animals (Feeding and Use of Swill) (Amendment) Order 1987 [\[S.I. No. 133 of 1987\]](#)

This Order strengthened the existing Regulations controlling the movement and use of swill for feeding to livestock. It provided for a more precise definition of "swill" and made it an offence to possess swill if it was not required for legitimate purposes.

- Diseases of Animals Act, 1966 (Prohibition on the Use of Swill) Order, 2001 [\[S.I. No. 597 of 2001\]](#)

This Order prohibits the collection and feeding of swill to certain animals but permits the feeding of certain non-animals products and milk products to animals. It also revokes the Foot-and-Mouth Disease (Prohibition on the Use of Swill) Order, 2001 (S.I. No. 104 of 2001) and the Foot-and-Mouth Disease (Prohibition on the Use of Swill) (Amendment) Order, 2001 (S.I. No. 227 of 2001).

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The effect of the legislation prohibiting the feeding and use of animal swill is to make the Department of Agriculture, Fisheries & Food (DAFF) responsible for the issue of licences for the disposal of swill/food waste derived from catering waste from ships, etc. The feeding of such waste has always been prohibited. A licence is required to move such swill, and only a licensed operator may remove the swill. Licences are valid for one calendar year and copies are sent to the relevant Portal Veterinary Officer. Licences specify the name of the licensee, the harbour from where the swill is to be removed, and the conditions under which the swill must be removed and disposed of. Deep burial at Environmental Protection Agency-licensed landfill sites is the ONLY disposal route accepted by DAFF.

- Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption

This EC Regulation lays down public and animal health rules for the collection, transport, storage, handling, processing and use or disposal of Animal By-Products (ABP) to prevent these products presenting a risk to Animal or Public Health.

- European Communities (Transmissible Spongiform Encephalopathies and Animal By-Products) Regulations 2008 [S.I. No. 252 of 2008]

This S.I. enforces EC Regulation 1774/2002 in Ireland.

- Diseases of Animals Act 1966 (Prohibition On the Use of Swill) (Amendment) Order 2009 [S.I. No. 12 of 2009]

This Order amends Statutory Instrument No. 597/2001 by permitting the collection, assembly, processing and storage of swill at approved composting and biogas plants.

- Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)

Regulation (EC) No. 1069/2009 supersedes Regulation (EC) No. 1774/2002 and lays down detailed rules for the handling, use and disposal of animal by-products and derived products, processing and transformation standards.

A draft statutory instrument enabling Regulation (EC) No. 1069/2009 is expected to go before the Minister for Agriculture, Food and the Marine for signing in order to give effect to this EC Regulation in Ireland.

- Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human

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consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive

This Regulation sets out hygiene conditions and the format for documents which have to accompany consignments of animal by-products and derived products for the purposes of traceability.

European Communities (Waste Directive) Regulations 2011 [\[S.I. No. 126 of 2011\]](#)

These Regulations provide for measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use and transpose Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives, referred to in these Regulations as the waste directive. The vast bulk of the waste directive is already transposed by the [Waste Management Act 1996](#) and various regulations made thereunder and where required the Regulations amend the 1996 Waste Management Act, provide for stand-alone aspects not amenable for direct inclusion into the Act by way of specific amendments and also other consequential amendments to regulations affected by the transposition.

LEGISLATION LIST

[This list is not intended to be exhaustive – it is for reference purposes only.]

- [EU Directive 2000/59/EC on port reception facilities for ship generated wastes and cargo residues](#)
- [S.I. No. 117 of 2003: European Communities \(Port Reception Facilities for Ship-Generated Waste and Cargo Residues\) Regulations 2003](#)
- [Directive 2002/84/EC amending the Directives on maritime safety and the prevention of pollution from ships](#)
- [S.I. No. 659 of 2003: European Communities \(Port Reception Facilities for Ship-Generated Waste and Cargo Residues\) \(Amendment\) Regulations 2003](#)
- [Commission Directive 2007/71/EC of 13 December 2007 amending Annex II of Directive 2000/59/EC of the European Parliament and the Council on port reception facilities for ship-generated waste and cargo residues](#)
- [S.I. No. 376 of 2009: European Communities \(Port Reception Facilities for Ship-Generated Waste and Cargo Residues\) \(Amendment\) Regulations 2009](#)
- [Commission Directive \(EU\) 2015/2087 amending Annex II to Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues](#)
- [S.I. No. 550 of 2016: European Communities \(Port Reception Facilities for Ship-Generated Waste and Cargo Residues\) \(Amendment\) Regulations 2016](#)

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- [Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements](#)
- Directive 2009/123/EC amending Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements
- S.I. No. 542 of 2010: European Communities (Ship-Source Pollution) Regulations 2010
- Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC
- Directive 2009/17/EC amending Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system
- S.I. No. 573 of 2010: European Communities (Vessel Traffic Monitoring and Information System) Regulations 2010
- Commission Directive 2011/15/EU amending Directive 2002/59/EC of the European Parliament and of the Council establishing a Community vessel traffic monitoring and information system
- S.I. No. 71 of 2012: European Communities (Vessel Traffic Monitoring and Information System) (Amendment) Regulations 2012
- Commission Directive 2014/100/EU amending Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system
- S.I. No. 367 of 2016: European Communities (Vessel Traffic Monitoring and Information System) (Amendment) Regulations 2016
- Directive 2012/33/EU amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels
- S.I. No. 361 of 2015: European Union (Sulphur Content of Marine Fuels) Regulations 2015
- Sea Pollution Act, 1991
- Sea Pollution (Amendment) Act, 1999
- Sea Pollution (Miscellaneous Provisions) Act, 2006

[Statutory Instrument(s) giving effect to MARPOL Annex I]

- S.I. No. 788 of 2007: Sea Pollution (Prevention of Oil Pollution) Regulations 2007
- S.I. No. 282 of 2008: Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2008
- S.I. No. 664 of 2010: Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2010

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- S.I. No. 365 of 2011: Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2011
- S.I. No. 275 of 2014: Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2014
- S.I. No. 461 of 2016: Sea Pollution (Prevention of Oil Pollution) (Amendment) Regulations 2016
- S.I. No. 578 of 2016: Sea Pollution (Prevention of Oil Pollution) (Amendment) (No. 2) Regulations 2016
- S.I. No. 582 of 2016: Sea Pollution (Prevention of Oil Pollution) (Amendment) (No. 3) Regulations 2016

[Statutory Instrument(s) giving effect to MARPOL Annex II]

- S.I. No. 217 of 2008: Sea Pollution (Control of Pollution by Noxious Liquid Substances in Bulk) Regulations 2008

[Statutory Instrument(s) giving effect to MARPOL Annex III]

- S.I. No. 510 of 2013: Sea Pollution (Harmful Substances in Packaged Form) Regulations 2013
- S.I. No. 459 of 2016: Sea Pollution (Harmful Substances in Packaged Form) (Amendment) Regulations 2016

[Statutory Instrument(s) giving effect to MARPOL Annex IV]

- S.I. No. 269 of 2006: Sea Pollution (Prevention of Pollution by Sewage from Ships) Regulations 2006
- S.I. No. 281 of 2008: Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2008
- S.I. No. 372 of 2008: Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) (No.2) Regulations 2008
- S.I. No. 492 of 2012: Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2012

[Statutory Instrument(s) giving effect to MARPOL Annex V]

- S.I. No. 372 of 2012: Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 2012

[Statutory Instrument(s) giving effect to MARPOL Annex VI]

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- S.I. No. 313 of 2010: Sea Pollution (Prevention of Air Pollution from Ships) Regulations 2010
- S.I. No. 383 of 2011: Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) Regulations 2011
- S.I. No. 596 of 2011: Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) (No. 2) Regulations 2011
- S.I. No. 35 of 2013: Sea Pollution (Prevention of Air Pollution from Ships) (Amendment) Regulations 2013

[Statutory Instrument(s) giving effect to other international legislation]

- S.I. No. 82 of 2008: Sea Pollution (Control of Harmful Anti-fouling Systems on Ships) Regulations 2008

[Other legislation]

- Waste Management Act 1996 [No. 10 of 1996]
- Waste Management (Amendment) Act 2001 [No. 36 of 2001]
- Protection of the Environment Act 2003 [No. 27 of 2003]
- Diseases of Animals Act 1966
- S.I. No. 153 of 1985: Diseases of Animals (Feeding and Use of Swill) Order 1985
- S.I. No. 133 of 1987: Diseases of Animals (Feeding and Use of Swill) (Amendment) Order 1987
- S.I. No. 597 of 2001: Diseases of Animals Act, 1966 (Prohibition on the Use of Swill) Order, 2001
- S.I. No. 252 of 2008: European Communities (Transmissible Spongiform Encephalopathies and Animal By-Products) Regulations 2008
- S.I. No. 12 of 2009: Diseases of Animals Act 1966 (Prohibition On the Use of Swill) (Amendment) Order 2009
- Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)
- Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive

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97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive

- S.I. No. 126 of 2011: European Communities (Waste Directive) Regulations 2011

2 a. MAP AND DETAILS OF JURISDICTION

The jurisdiction of Dublin Port Company is indicated on the attached map by the area/s coloured in yellow.



tho 2008 Dublin
Port 12500 2...

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3. DEFINITION OF WASTES

USE THE DEFINITIONS IN MARPOL 73/78 REGULATIONS

3.1 MARPOL ANNEXES

- **Annex I – Oily Wastes (bilges, sludge, ballast, slops)**
- **Annex II – Noxious Liquid Substances Carried in Bulk (dirty ballast, slops, tank washings)**
- **Annex III – Pollution by Harmful Substances Carried by Sea in Packaged Form**
- **Annex IV – Sewage**
- **Annex V – Garbage**
 - which includes - hazardous waste, food waste, glass, metal, plastics, paper/cardboard, wood, paint tins, batteries
- **Annex VI – Prevention of Air Pollution from Ships**

The categories under consideration at Dublin Port Company are Annexes I, II and V, there being no general requirement for Annex III (such pollution would be dealt with by way of an appropriate response to an isolated incident). Facilities are available at Dublin Port for the discharge of sewage if required.

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4. SECTION I

PROCESS UNDERTAKEN BY DUBLIN PORT COMPANY TO ACHIEVE LEGISLATIVE COMPLIANCE

4.1 CONSULTATION

Purpose

To ensure that the needs of potential users and waste regulators are taken into account when planning and operating port waste reception facilities; to ensure that all mariners are aware of the location, cost and procedures for using the facilities, and also of the consultation arrangements for the future development of adequate facilities within the port.

The port has recently and continues to have on-going consultation both with the national authority and locally with the port users (ships), through their shipping agents or shore representatives.

Objective

Dublin Port Company has taken its obligations seriously and has engaged in a consultation exercise with all links in the waste management chain in order to discuss and explain the implications of the Directive and the Statutory Instrument bringing it into effect nationally. The objective has been to effect an exchange of information and to gain an understanding of the perspective of other parts of the waste management chain in order to devise a flexible and workable system.

To ensure the adequacy of the process, Dublin Port Company has consulted:

- Ships' Masters
- Ships' Agents
- Waste Contractors
- Waste Regulators
- Central Government
- Regional Government

Process

Ships' masters have been consulted as part of the exercise to analyse types and quantities of wastes landed and this information has been obtained by questionnaires issued by Dublin Port Company and through ships' agents. The process is described in the appropriate paragraph below.

Dublin Port Company held a series of consultation meetings during June 2002. A copy of the presentation given at those meetings (supplied to all those attended) and a

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copy of the Minutes of the meetings) can be viewed on application to the Harbour Master, Dublin Port Company.

5. ANALYSIS OF NEED FOR WASTE RECEPTION FACILITIES

5.1 Purpose

To assemble information to allow the port to assess what facilities should be provided.

5.2 Methodology

Reproduced below is the questionnaire used to gain information in order to analyse types and quantities of wastes landed during March 2002, issued through the ships' agents. The results are analysed *infra*.

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6. THE QUESTIONNAIRE

DUBLIN PORT COMPANY

SURVEY ON MARPOL 73/78 REGULATIONS AND THEIR EFFECTS

To help us improve waste management at this port, we would be grateful if you would answer the following questions and return the form to your agent before departure.

Date:

IMO Number:

I. SHIP CHARACTERISTICS

1 Name:

2 Berth/Wharf visited:

3 Number of days since last port:

4 Number of crew:

5 Number of passengers:

- 6 Ship Type:
- Container ship
 - Dry cargo
 - Bulker
 - Gas tanker
 - Oil tanker
 - Oil tanker with segregated ballast tank
 - RoRo vessel

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Other (please specify)

II WASTE HANDLING OPERATIONS AND FACILITIES

Annex I – Oily wastes (bilges, sludge, ballast, slops)

7 Give size of on board facilities for storage of oily wastes (cu.m):

8 If you have on board processing facilities please tick:

9 Describe quantities of waste which will be handled in this port (cu.m):

- Dirty ballast
- Slops
- Tank washings
- Bilges
- Sludges
- Other (please specify)

10 If you discharge only to shore facilities please tick:

Annex IV – Sewage

11 Give size of on board facilities for storage of sewage (cu.m):

12 If you have on board treatment facilities, please tick:

13 Describe quantities of waste which will be handled in this port:

.....

.....

.....

.....

Annex V – Garbage

14 Give size of on board facilities for storage of garbage (cu.m):

15 Describe quantities of waste which will be handled in this port (10kg

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sacks):

- Hazardous waste
- Food waste
- Glass
- Metal
- Plastics
- Paper/cardboard
- Wood
- Paint tins
- Batteries
- Other (please specify)

16 Which of the following do you segregate:

- Hazardous waste
- Food waste
- Glass
- Metal
- Plastics
- Paper/cardboard
- Wood
- Paint tins
- Batteries
- Other (please specify)

17 Do you have any cargo waste to dispose of in this port?

- Dunnage
- Sweepings
- Other (please specify)

18 Which of the following do you have on board?

- Compactor
- Incinerator
- Comminuter
- Grinder

III ADDITIONAL INFORMATION

19 Who makes arrangement for shore facilities and disposal of waste?

- Ships personnel
- Terminal operator
- Agent
- Company representative
- Port

20 How do you rate the cost of disposal in this port?

- High
- Low

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21 How do rate reception facilities in this port?

Annex I

- Excellent
- Good
- Average
- Poor

Annex V

- Excellent
- Good
- Average
- Poor

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7. ANALYSIS OF PRIMARY DATA AND RESULTS

7.1 Limitations and constraints

In a sample conducted over one month period (March 2002) 54 returns were received.

7.2 Research Methodology

The questionnaire derived from past research and amended to suit Dublin Port Company. It sought basic information about the vessel and numbers of people. Questions were asked about the segregation of waste types and any provision for on-board storage and treatment facilities. Additional information as to how facilities were rated for efficiency and cost was ascertained.

7.3 Statistical Analysis

The data received was analysed to ascertain total oily wastes and garbage discharges for 54 ships. The quantity for one ship could therefore be calculated and multiplied by monthly/annual vessel total.

7.4 Results

10 ships out of the 54 discharged oily wastes. The sample size therefore discharged 1436 cu m oily wastes. 1 ship can be estimated to discharge 26.59 cu m (average).

By the same method, the average garbage discharge per vessel was calculated as 14 kg.

7.5 Credibility

It is impossible to comment whether the garbage figure is accurate or not. European research data suggests using a waste factor of 1.5kg of garbage per person per day. However, data has been received showing tonnes of garbage collected from ships 2000-2001 (477 tonnes) and January - October 2002 (80 tonnes). It is the view of Dublin Port Company that the amount will rise with the increase in visits by cruise liners and that 500 tonnes per annum is not an unreasonable assumption. The current figures represent wastes received from cruise liners and navy vessels: no Ro-Ro or Lo-Lo vessels have discharged.

8. STUDY OF WASTE HANDLING CHAIN

In the course of the consultation exercise, Dublin Port Company had discussions with Greenclean, Ipodec, Department of Agriculture, Department of Communications, Marine and Natural Resources, Dublin City Council, and Fingal County Council.

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9. SECTION II THE PORT WASTE MANAGEMENT SYSTEM

PROCEDURES FOR THE USE OF THE PORT WASTE RECEPTION FACILITIES AT DUBLIN PORT COMPANY

9.1 Mandatory Provision

Dublin Port intends to make available the following system of port reception facilities for ship generated waste

9.2 Mandatory Discharge

All vessels **MUST** discharge ship-generated waste before leaving Dublin Port **unless** it can be demonstrated that either storage space for such waste is sufficient, **or** the vessel has applied for and has been granted an exemption, thereby meeting the 3 criteria as outlined in Section 9.3

If retaining waste on board, a legitimate reason for not using the port reception facilities must be given, (such as having sufficient storage space on board). In such circumstance, the Master must apply (using the appropriate form), for the retention of "ship generated" waste on board. This completed form to be sent to the Harbour Master, Dublin Port Company via the Ship's Agent, or directly if no ship's agent has been appointed.

Failure to do so may result in detention in port until waste has been discharged. If there is reason to believe that there is a risk of waste being discharged into the sea because adequate facilities are not available at the next port of call; or if that port of call is unknown, these will also be grounds for detention.

9.3 Definition of an Exempt Ship

Ships that meet the 3 criteria indicated below, may apply for an exemption from the port waste management system. Applications for exemptions must be made to Dublin Port Company and be approved by the Minister prior to an exemption being granted. There are three grounds for the granting of an exemption and they must **ALL** be satisfied:

SCHEDULED traffic operating along a regular route
Evidence of DELIVERY in one port along the route
Evidence of PAYMENT in one port along the route

9.4 Notification Requirement

The following information is required from **ALL** vessels prior to arrival:

- Name/call sign/IMO number

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- Flag state
- ETA/ETD
- Previous/next port of call
- Last port and date when ship generated waste was delivered
- Whether delivering all/some/none of ship generated waste into facilities
- Type and amount of waste to be delivered/stored on board plus maximum storage capacity
- The unit of measurement is cu m/kg

9.5 Notification Mechanism

The checklist is to be completed by the Master and submitted to Dublin Port Company via the ship's agent 24 hours prior to arrival. Transmission should preferably be by electronic means (e mail or fax). Dublin Port Company will retain ALL notification records for 3 years in order to comply with the audit requirements of SI 117 of 2003. Failure to submit a checklist MAY result in delay in entry. It is to be noted that this will be called a SCHEDULE 2 WASTE CHECKLIST to avoid confusion with the convention that Schedule 2 checklist refers to hazardous cargo.

9.6 Records

The Harbour Master, or his nominated Deputy to be supplied copies of all records, as supplied by the waste removal contractors via the relevant Ship's Agent. Records to be held centrally and be available for auditing, or statistical gathering purposes. Statistics relating to the volume/weight of the waste to be compiled from the data supplied by the Ship's Agent, on a 6 monthly basis.

9.7 Charging System

Dublin Port Company does not provide the waste removal services directly, and accordingly has no control over the charges involved. These charges are levied by the licensed contractors (who are approved by the local authority), and will vary dependant on the type and quantity of waste involved. Dublin Port Company are satisfied that adequate waste reception facilities are available within the port.

9.8 Fees

Any cost to Dublin Port Company in the form of a waste management administration cost to be included in the Port Charges. As this charge, forms a minor proportion of the Port Charges, it is not envisaged at this stage to specifically itemise this charge, but the port may elect to do so in the future in light of developments that may occur.

9.9 Pricing

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A list of prices, relating to the provision of waste management services, is readily available to the ship, from the waste removal contractors, through the Ship's Agent. The receipts for the service to be supplied by both the contractor and by the local authority, and such receipts to be held by the relevant Ships Agent, for a period of a minimum of 3 years.

9.10 Waste Oil

An approved waste oil removal contractor to be engaged, and the waste oil to be removed to an approved recycling facility. Records to be kept by both the contractor and the Ship's Agent and the Ship's Agent to hold such records for a minimum period of 3 years.

10. GIVING EFFECTIVE INFORMATION TO USERS

10.1 Purpose

To ensure that all vessels are aware of the services and procedures for within the port.

10.2 System

Twenty four hours (24hrs) prior to arrival the vessel will be instructed by the agent to complete the Schedule 2 (Waste) checklist.

The system will be publicised through the agents and all parts of the waste management chain will have copies of this plan and an accompanying Contact Directory (with an amendment and update procedure).

11. DUTY OF CARE/WASTE TRANSFER/WASTE DISPOSAL

11.1 System

Reception and storage are the key elements to the successful management of port waste reception facilities.

It is intended that oily wastes (MARPOL Annexes I), will be collected by an authorised contractor licensed to collect and dispose of such material. The charge raised for the service is dependent on the charge, which the contractor makes for this service.

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It is of fundamental importance that all ship-generated waste be dealt with as outlined in this waste management plan.

11.2 Waste Disposal

There will be 3 lockable skips for galley waste in the Port, two will be located in the common user area and the third will be located in the oil jetty.

Two of these will be satellite skips, of the wheelie bin type and each with a capacity of 1200 litres approx. One will be located at the western end of Alexandra Quay West i.e. Berth 29 whilst the second will be located on Jetty Road servicing the oil berths.

The third lockable skip of 14 cubic metre capacity is the hub and will be located at Ocean Pier adjacent to the No. 2 Ramp, Berth 38. All skip locations are covered by the Port security CCTV system and are reasonably close to all berths.

Dublin Port Company will maintain a current up to date permit for Landers of Swill/ Galley waste.

11.3 Process

If a ship requires to dispose of galley waste in the common user area the ships agent will contact Port Operations (8876858) giving a minimum two hours notice. Port Operations will then advise Port Security for the common user area or in the case of the oil jetty the Fire Warden.

Port Security / Fire Warden will meet ship personnel at the designated skip and ship staff will then double wrap the waste with an identifiable outer bag supplied by the Port and then place the waste bags in the skip. Note all bags must be double wrapped with the designated identity bag on the outside (the outer bags are biodegradable). Port staff are responsible for maintaining the units locked at all times.

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Port Staff will issue two dockets to the ship indicating the number of bags deposited and their identity reference (the second copy is supplied for the benefit of the ship's agent). This docket will also note both the ships and the agent's name. A copy will be retained in the Port Operations station for collection by the waste contractor on a weekly basis and the final copy will be maintained for waste management records that may be audited at any stage e.g. by the Department of Agriculture (DOA).

Operating to a documented standard operating procedure (SOP) the waste contractor will inspect the satellite bins weekly and remove the bags to the compactor. The waste contractor will maintain a log sheet 'Galley Waste Contractor Variance Report Log' as per attached as evidence of no variance between actual and recorded amounts. As required the compactor will be removed inline with the permit/licence conditions for deep burial.

The main contractor must ensure compliance with appropriate regulatory requirements. This would include the requirement to hold a mover licence from the DOA, an advance permit per skip from Dublin City Council, a commercial document to remove each skip with Category 1 waste and a burial document. A full up to date record must be maintained at all times ready for any third party independent audit. These procedures must be documented in the galley waste SOP.

11.4 Charges

It is intended that this process should be self-financing. Therefore initially there will be a minimum €50 charge for up to 5 bags, greater than this number and bags will be charged at €10 each, up to a maximum of 10 bags. Waste in excess of 10 bags will require the ship to order its own skip and control their own waste management. The Waste Contractor will bill the Ships agent directly for this service.

This system will be continuously monitored to ensure that it meets best waste management practices.

If this process is acceptable the Port waste management plan will be updated and the Harbour Master will issue a 'Notice to Mariners' advising them of this new procedure.

11.5 Pre-treatment of ships Waste

In relation to the pre-treatment of Ship's Waste by the port, there is currently no waste pre-treatment equipment in the port.

11.6 Cargo Residues

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Cargo residues, in terms of cargo waste, to be treated in the same manner as others ships waste.

12. GRIEVANCE PROCEDURE

12.1 Reporting Alleged Inadequacies

The Master of any vessel using a facility within Dublin Port is obliged to report any inadequacies or non-availability of shore reception facilities to Dublin Port Company before leaving the port.

The appropriate form will be supplied to the ship through its agent within the port.

There is to be regular and ongoing consultation between the port and the Ship's Agents in relation to waste management issues and the waste management plan.

12.2 Grievance Procedures

Under Article 12 (f) of the Waste Management Directive 2000/59/EC, any report or complaint of alleged inadequacy of waste reception facilities to be reported to the Harbour Master of Dublin Port Company, who then forwards such complaints to the Maritime Safety and Environment Division of the Department of Communications, Marine and Natural Resources.

See appendices for a copy of the Report or Complaint of Alleged Inadequacy of Waste Reception Facilities Form.

13. AUDIT AND REVIEW

13.1 Purpose

To ensure that port waste management facilities are relevant and are up to date, and that plans are implemented effectively.

13.2 Compliance and Monitoring

The Harbour Master is the designated responsible person for Dublin Port Company nominated to implement the Dublin Port Company Ship's Waste Management and to keep it up to date and relevant. He may carry out spot checks on vessels likely not to meet the requirements as set out in the regulations. Spot checks can be undertaken on vessels deemed unlikely to use facilities as outlined in this plan.

Additionally, there will be an inspection of a fixed proportion of vessels (25%) by the relevant Port State Control authority. Vessel logbooks of all waste generated during a voyage, plus disposal data, will form part of the inspection.

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APPENDICES

DEPARTMENT OF COMMUNICATIONS, MARINE & NATURAL RESOURCES MARINE NOTICE NO. 18 OF 2003

DIRECTIVE 2000/59/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 27TH NOVEMBER 2000

Form for reporting Alleged Inadequacy of Port Reception Facilities for Garbage and Oil

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CONTACT DIRECTORY

Users, contractors, regulators, Government agencies

| NAME | ADDRESS | PHONE NO. |
|--|--|---|
| Feargal O'Cuinnegain | Dept. of Agriculture, Food & the Marine Kildare Street, Dublin 2. | 01 8658248/9 01 8741250 01 6076228 |
| Eithne Gore or Siobhan Kelly. Maritime Transport Division, Dept. of Transport, Leeson Lane, Dublin2 | Dept. of Transport Tourism & Sport. Leeson Lane, Dublin 2. | Eithne Gore at (01) 6783422, or Siobhan Kelly at (01) 6783461, or shipsourcepollutionprevention@dtas.ie |
| Frank Murphy Pat Cartney Vivian Aherne | Dublin City Council, Environmental Section, Eblana House 68-70 Marrowbone Lane Dublin 1 | 01 2224374 012224235 012224276 |
| | Environmental Protection Agency, Mc Cumiskey House, Richview, Clonskeagh Road, Dublin 14. | 053-9160600 1890335599 01-2680100 Emergency Numbers Dublin Inspectorate 01-2852122 |
| Mr. P.J. Howell Director of Services for the Environment | Fingal County Council, Environmental Section, Main Street, Swords, Co. Dublin. | 01 8905000 or 01 8906261 |

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| | Enva (Waste Oil), JKF Industrial Estate, Naas Road, Dublin 10 | 01-4508111 |
| | Thorntons Recycling Centre, Killeen Road, Dublin 10 | 01- 6235133 |
| | Greyhound Waste Disposal Ltd., Head Office, Craig Ave., Clondalkin Indus. Estate, Dublin 22. | 01- 4577777 option 2 |
| Mr. Leo Stafford | Panda, Beauparc Business Park, Navan, Co. Meath. | 01-8438855 086-2772083 046 9024111 1890 626262 |
| | Greenstar Customer Services Centre, Millenium Park, Ballycoolin Road, Dublin 11 | 1890 500 800 1890 600 900 |
| Dublin City Council Emergency Phone Number | | 01 6796186 |
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Amendment record sheet

(Amendments are shown in Italics)

| Amendment Number | Date | Amended by | Pages amended |
|------------------|-----------------------------|------------------|---|
| 0001 | 15 th May 2008 | Capt. F .Britton | Number 21 |
| 0002 | 22 nd March 2010 | Capt. F .Britton | 18.19.20.21, 22 & 23 |
| 0003 | 29 th Nov 2011 | Capt. F. Britton | 23 |
| 0004 | 16 th May 2013 | Capt. F. Britton | Pages 5 -15 & 20 & 32 |
| 0005 | May 2014 | Capt. F. Britton | Sections on Red & Blue |
| 0006 | January 2017 | Capt. F. Britton | Waste Oil facility on Western Oil Jetty for Tankers page 4 Contact Sheets pages 35 & 36. Legislative Summery pages 15 -18. Index page updated |
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