

# REPORT

## **Holyhead Port Expansion**

Environmental Scoping Report

Client: Stena Line Ports Ltd.

Reference: I&BPB6108R001F0.1

Revision: 0.1/Final

Date: 28 April 2017



Project related



HASKONINGDHV UK LTD.

Honeycomb  
Edmund Street  
Liverpool  
L3 9NG  
Industry & Buildings  
VAT registration number: 792428892  
  
+44 151 2362944 **T**  
+44 151 2272561 **F**  
info.newcastle@uk.rhdhv.com **E**  
royalhaskoningdhv.com **W**

Document title: Holyhead Port Expansion

Document short title:

Reference: I&BPB6108R001F0.1

Revision: 0.1/Final

Date: 28 April 2017

Project name: Holyhead Port Expansion

Project number: PB6108

Author(s): Claire Gilchrist; Jess Moran; Reinier Zoutenbier; Gemma Starmore; Courtney Clemence; Charlotte Clements; Sarah Mounce; Mark Smith; Charlotte Goodman

Drafted by: Jess Moran; Claire Gilchrist

Checked by: Jamie Gardiner

Date / initials: 28/04/17 JVG

Approved by: Jamie Gardiner

Date / initials: 28/04/17 JVG

Classification

Project related



## Disclaimer

*No part of these specifications/printed matter may be reproduced and/or published by print, photocopy, microfilm or by any other means, without the prior written permission of HaskoningDHV UK Ltd.; nor may they be used, without such permission, for any purposes other than that for which they were produced. HaskoningDHV UK Ltd. accepts no responsibility or liability for these specifications/printed matter to any party other than the persons by whom it was commissioned and as concluded under that Appointment. The integrated QHSE management system of HaskoningDHV UK Ltd. has been certified in accordance with ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.*

## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	Need for the Scheme	1
1.3	Purpose of this document	5
1.4	The study area	6
1.5	Report structure	6
<b>2</b>	<b>Description of the Proposed Scheme</b>	<b>8</b>
2.1	Description of the construction phase	8
2.2	Description of the operational phase	11
2.3	Measures to manage environmental risks	11
2.4	Decommissioning	11
2.5	Alternatives	12
<b>3</b>	<b>Legislative and Consenting Requirements</b>	<b>13</b>
3.1	Introduction	13
3.2	Key consents	13
3.3	Applicable legislation	13
3.4	Marine Planning Policy	18
<b>4</b>	<b>Consultation</b>	<b>19</b>
<b>5</b>	<b>Nature Conservation Designations</b>	<b>20</b>
5.1	Introduction	20
5.2	European and international Sites	20
5.3	National Designations	22
5.4	RSPB Reserves	23
<b>6</b>	<b>Coastal Processes</b>	<b>24</b>
6.1	Introduction	24
6.2	Baseline conditions	24
6.3	Potential environmental effects	26
6.4	Proposed approach to EIA	27
<b>7</b>	<b>Hydrology, Hydrogeology, Geology and Soils</b>	<b>29</b>
7.1	Introduction	29
7.2	Baseline conditions	29

7.3	Potential environmental issues associated with construction	31
7.4	Potential environmental issues associated with operation	31
7.5	Proposed approach to EIA	31
<b>8</b>	<b>Marine Water and Sediment Quality</b>	<b>32</b>
8.1	Introduction	32
8.2	Baseline conditions	32
8.3	Potential environmental issues associated with construction	34
8.4	Potential environmental issues associated with operation	34
8.5	Proposed approach to EIA	36
<b>9</b>	<b>Marine Ecology</b>	<b>37</b>
9.1	Introduction	37
9.2	Baseline conditions	37
9.3	Potential environmental issues associated with construction	38
9.4	Potential environmental issues associated with operation	38
9.5	Proposed approach to EIA	38
<b>10</b>	<b>Fish and Shellfish Resource</b>	<b>39</b>
10.1	Introduction	39
10.2	Baseline conditions	39
10.3	Potential environmental issues associated with construction	43
10.4	Potential environmental issues associated with operation	43
10.5	Proposed approach to EIA	43
<b>11</b>	<b>Marine Mammals</b>	<b>44</b>
11.1	Introduction	44
11.2	Baseline conditions	44
11.3	Potential environmental issues associated with construction	46
11.4	Potential environmental issues associated with operation	46
11.5	Proposed approach to EIA	46
<b>12</b>	<b>Commercial Fisheries</b>	<b>48</b>
12.1	Introduction	48
12.2	Baseline conditions	48
12.3	Potential environmental issues associated with construction	50
12.4	Potential environmental issues associated with operation	51
12.5	Proposed approach to EIA	51

<b>13</b>	<b>Ornithology</b>	<b>52</b>
13.1	Introduction	52
13.2	Baseline conditions	52
13.3	Potential environmental issues associated with construction	55
13.4	Potential environmental issues associated with operation	55
13.5	Proposed approach to EIA	55
<b>14</b>	<b>Terrestrial and Intertidal Ecology</b>	<b>56</b>
14.1	Introduction	56
14.2	Baseline conditions	56
14.3	Potential environmental issues associated with construction	57
14.4	Potential environmental issues associated with operation	57
14.5	Proposed approach to EIA	57
<b>15</b>	<b>Commercial and Recreational Navigation</b>	<b>58</b>
15.1	Introduction	58
15.2	Baseline conditions	58
15.3	Potential environmental issues associated with construction	59
15.4	Potential environmental issues associated with operation	59
15.5	Proposed approach to EIA	60
<b>16</b>	<b>Traffic and Transport</b>	<b>61</b>
16.1	Introduction	61
16.2	Baseline conditions	61
16.3	Potential environmental issues associated with construction	61
16.4	Potential environmental issues associated with operation	61
16.5	Proposed approach to EIA	61
<b>17</b>	<b>Noise and Vibration</b>	<b>63</b>
17.1	Introduction	63
17.2	Baseline conditions	63
17.3	Potential environmental issues associated with construction	63
17.4	Potential environmental issues associated with operation	64
17.5	Proposed approach to EIA	64
<b>18</b>	<b>Air Quality</b>	<b>66</b>
18.1	Introduction	66
18.2	Baseline conditions	66

18.3	Potential environmental issues associated with construction	67
18.4	Potential environmental issues associated with operation	68
18.5	Proposed approach to EIA	68
<b>19</b>	<b>Archaeology and Cultural Heritage</b>	<b>70</b>
19.1	Introduction	70
19.2	Baseline conditions	70
19.3	Potential environmental issues associated with construction	73
19.4	Potential environmental issues associated with operation	73
19.5	Proposed approach to EIA	73
<b>20</b>	<b>Landscape/Seascape and Visual Setting</b>	<b>75</b>
20.1	Introduction	75
20.2	Baseline conditions	75
20.3	Potential environmental issues associated with construction	76
20.4	Potential environmental issues associated with operation	77
20.5	Proposed approach to EIA	77
<b>21</b>	<b>Coastal Defence and Flood Risk</b>	<b>78</b>
21.1	Introduction	78
21.2	Baseline Conditions	78
21.3	Potential environmental issues associated with construction	80
21.4	Potential environmental issues associated with operation	80
21.5	Proposed approach to EIA	81
<b>22</b>	<b>Tourism and Recreation</b>	<b>82</b>
22.1	Introduction	82
22.2	Baseline Conditions	82
22.3	Potential environmental issues associated with construction	83
22.4	Potential environmental issues associated with operation	83
22.5	Proposed approach to EIA	83
<b>23</b>	<b>Existing Infrastructure and Other Users</b>	<b>85</b>
23.1	Introduction	85
23.2	Baseline Conditions	85
23.3	Other Users	85
23.4	Potential environmental issues associated with construction	86
23.5	Potential environmental issues associated with operation	86
23.6	Proposed approach to EIA	86

<b>24</b>	<b>Socio-economics</b>	<b>87</b>
24.1	Introduction	87
24.2	Baseline conditions	87
24.3	Potential environmental issues associated with construction	87
24.4	Potential environmental issues associated with operation	88
24.5	Proposed approach to EIA	88
<b>25</b>	<b>Waste</b>	<b>89</b>
25.1	Introduction	89
25.2	Baseline conditions	89
25.3	Potential environmental issues associated with construction	89
25.4	Potential environmental issues associated with operation	89
25.5	Proposed approach to EIA	90
<b>26</b>	<b>Cumulative Impact Assessment</b>	<b>91</b>
26.1	Introduction	91
26.2	Initial list of potential plans and projects	91
<b>27</b>	<b>Water Framework Directive</b>	<b>94</b>
27.1	Introduction	94
27.2	Water Framework Directive	94
27.3	Method of Assessment	95
<b>28</b>	<b>Information for Habitats Regulations Assessment</b>	<b>98</b>
<b>29</b>	<b>Proposed Approach to the EIA</b>	<b>101</b>
29.1	EIA Methodology	101
29.2	Consideration of Alternatives	104
29.3	Consultation Process	104
29.4	Preparation of the Environmental Statement	105
<b>30</b>	<b>References</b>	<b>106</b>



## Table of Tables

Table 1-1	Annual port throughput in Wales in 2009	1
Table 5-1	Importance of the Anglesey Terns pSPA and reason for designation	22
Table 6-1	Tidal Information at Holyhead	25
Table 8-1	Metal, TBT and organic matter results at Holyhead Port	36
Table 12-1	Key species landed from ICES rectangle 35E5 between 2010 - 2014 by all vessel sizes	48
Table 12-2	Top four species of fish landed at Holyhead Port in 2012	49
Table 13-1	Breeding birds species list	53
Table 15-1	Holyhead Port cargo vessel arrivals between 2009 and 2015	58
Table 17-1	Summary of lowest background noise levels at NCR sites in closest proximity to the proposed scheme	63
Table 18-1	Examples where the Air Quality Objectives should apply	66
Table 20-1	SCAs identified as part of Anglesey Seascape Assessment	75
Table 27-1	Environmental objectives in WFD for surface and ground waters	95
Table 29-1	Stages of the EIA process	101
Table 29-2	Topics scoped out of the EIA	102
Table 29-3	The sensitivity of receptor	103
Table 29-4	The magnitude of effect	103
Table 29-5	Impact matrix used for the assessment of impacts	104

## Table of Figures

Figure 1-1	Location of Holyhead Port	2
Figure 1-2	Proposed reclamation areas	3
Figure 1-3	Road goods vehicles passing through Welsh Ro-Ro/Ferry Ports and International sea passenger movements in 2009	4
Figure 1-4	Development of port traffic at Holyhead Port from 1993 – 2015	4
Figure 2-1	Approach channel dredge area	10
Figure 3-1	Waste hierarchy	17
Figure 5-1	Designated sites for nature conservation	21
Figure 8-1	WFD Waterbodies, Bathing and Shellfish Waters	33
Figure 8-2	Location of surface sediment samples collected in 1993	35
Figure 10-1	Map of sandeel, plaice, whiting and sole spawning areas around Anglesey	40
Figure 10-2	Map of cod and mackerel spawning areas around Anglesey	41
Figure 10-3	Map of thornback/spotted ray, whiting and tope shark nursery areas around Anglesey	42

Figure 12-1	Location of existing and planned shellfishery sites	50
Figure 13-1	Salt Island breeding bird survey area	52
Figure 15-1	Proportion of vessel movements at Holyhead Port by type of vessel over the past 30 days (November-December 2016)	59
Figure 19-1	Cultural Heritage Assets	71
Figure 20-1	Seascape Character Areas	76
Figure 21-1	Extract from NRW flood risk map illustrating Flood Zone 2 and Flood Zone 3	78
Figure 21-2	Predicted flood risk to Anglesey and Holyhead based on present data and on predicted 1m SLR	79
Figure 21-3	Predicted flood to Anglesey and Holyhead based on a predicted 2m SLR	79
Figure 21-4	Extract from NRW flood risk map illustrating areas of high and low risk from flooding from rivers and the sea	80
Figure 26-1	Location of projects to be considered as part of the CIA	93

## ABBREVIATIONS

AA	Appropriate Assessment	MCAA	Marine and Coastal Access Act
AONB	Area of Outstanding Natural Beauty	MCZ	Marine Conservation Zone
AQMA	Air Quality Management Area	MHWM	Mean High Water Mark
bCD	below chart datum	MHWS	Mean High Water Spring
CEMP	Construction Environmental Management Plan	MMO	Marine Management Organisation
CIA	Cumulative Impact Assessment	MPS	Marine Policy Statement
CROW	Countryside and Rights Of Way Act	NRW	National Resources Wales
CRTN	Calculation of Road Traffic Noise	OS	Ordnance Survey
CSD	Cutter Suction Dredger	pSAC	possible Special Area of Conservation
DMRB	Design Manual for Roads and Bridges	pSPA	proposed Special Protection Area
DO	Dissolved Oxygen	RIGS	Regionally Important Geological Site
EA	Environment Agency	rMCZ	recommended Marine Conservation Zone
EC	European Commission	SAC	Special Area of Conservation
EIA	Environmental Impact Assessment	SCA	Seascape Character Area
EQS	Environmental Quality Standard	SCI	Site of Community Importance
ES	Environmental Statement	SLR	Sea Level Rise
EU	European Union	SMP	Shoreline Management Plan
FCA	Flood Consequence Assessment	SOCS	Scientific Council on Seals
FSA	Food Standards Agency	SPA	Special Protection Area
GCR	Geological Conservation Review	SSSI	Site of Special Scientific Interest
HGV	Heavy Good Vehicles	TSHD	Trailer Suction Hoper Dredger
HRA	Habitats Regulations Assessment	TBT	tributyltin
HRO	Harbour Revision Order	UK	United Kingdom
IACC	Isle of Anglesey County Council	VMS	Vessel Monitoring System
ICES	International Council for the Exploration of the Seas	WADZ	West Anglesey Demonstration Zone
JNCC	Joint Nature Conservation Committee	WeBS	Wetland Bird Survey
LAQM	Local Air Quality Management	WFD	Water Framework Directive
LSE	Likely Significant Effect	WID	Water Injection Dredging

## 1 Introduction

### 1.1 Background

Holyhead Port is located on Holy Island (Ynys Gybi) on the western side of the Isle of Anglesey (see **Figure 1-1**). The Port is a private port owned by Stena Line Ports Ltd. (henceforth referred to as Stena Line) and forms the principal link for surface transport from north Wales and central and northern England to Ireland.

Holyhead Port is the second busiest Ro-Ro ferry port in the UK, responsible for direct employment of 25% of the local workforce. There is an even larger number of indirect employment created elsewhere on Anglesey. The Port is currently operating near full capacity. Surrounded by Holyhead Town, there is no space available in which the Port can expand to meet current and future demand of its operations.

The Port also supports a flourishing cruise industry, with cruise ship passengers increasing by 40% in 2015 when compared to 2014, contributing more than £2.4m to the Welsh economy over the year and helping to spread the word around the globe about the attractions of Wales. The ships currently dock at the former Anglesey Aluminium jetty (now called the Orthios jetty); however, sometime in the near future this jetty may be required for ships supporting the biomass project. As such, a new deep water cruise berth is required.

Stena Line is therefore proposing to expand the Port through the reclamation of three areas to provide new berths and associated landside areas for port-related use (see **Figure 1-2**). The form of these areas is indicative only and will be refined during the optioneering process.

### 1.2 Need for the Scheme

Ports in Wales represent every possible port type and activity. The industry handled 54 million tonnes of cargo in 2009 – 10% of total UK throughput, and equivalent to 18 tonnes of cargo per person. The equivalent figure for England is 8 tonnes. Bearing in mind the UK's position as the largest ports industry in the European Union, this is a significant total and makes it larger than, for example, the ports industry for the whole of the Republic of Ireland. In 2009, Holyhead Port provided the 3<sup>rd</sup> highest throughput in Wales, behind Milford Haven and Port Talbot, representing 5.3% of Wales' entire annual throughput (see **Table 1-1**). Holyhead Port is responsible for direct employment of 25% of the local workforce, with an even larger number of indirect employment benefits created elsewhere on Anglesey.

Table 1-1 Annual port throughput in Wales in 2009 (source: Welsh Ports Group, 2010)

Port	Throughput (1,000s T)
Holyhead	2,852
Wales	53,723



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AeroGRID, IGN, SIA, Airphoto, GeoEye, IGN, Aerotech, GEBCO, CNES, Swire, and the GIS User Community  
 © Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.



Legend:

● Holyhead Port

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title:  
 Location Plan of Holyhead Port

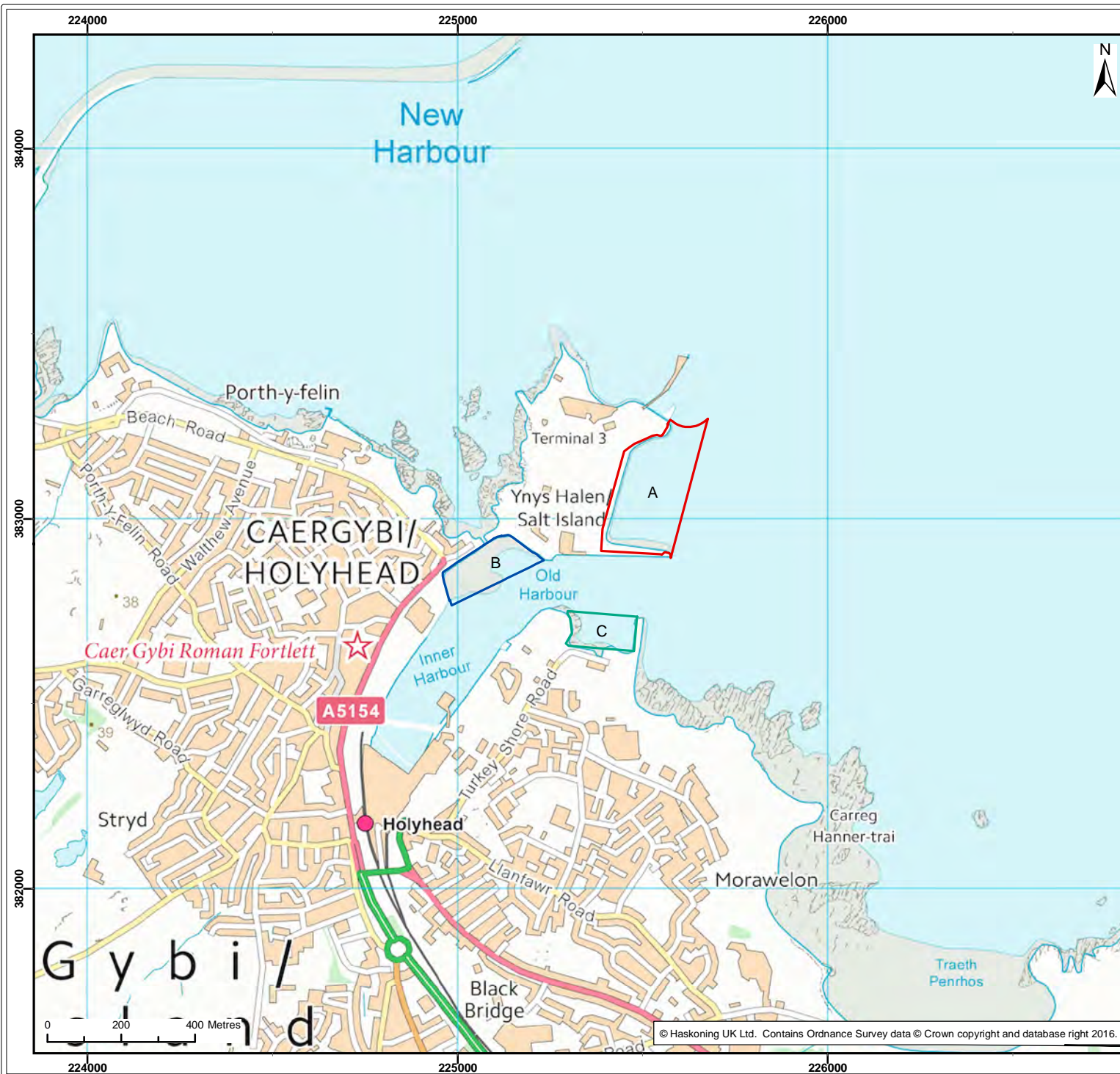
Figure: 1.1      Drawing No: PB6108-000-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	21/12/16	AB	JM	A4	1:25,000

Co-ordinate system: British National Grid



**ROYAL HASKONINGDHV**  
 INDUSTRY, ENERGY & MINING  
 2 ABBEY GARDENS  
 GREAT COLLEGE STREET  
 WESTMINSTER  
 LONDON  
 SW1P 3NL  
 +44 (0)20 7222 2115  
 www.royalhaskoning.co.uk



Legend:

**Reclamation Areas**

- Area A
- Area B
- Area C

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title:

Proposed Reclamation Areas

Figure: 1.2      Drawing No: PB6108-000-008

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	23/03/17	AB	JM	A4	1:15,000

Co-ordinate system: British National Grid



**Royal HaskoningDHV**  
Enhancing Society Together

**ROYAL HASKONINGDHV**  
INDUSTRY, ENERGY & MINING  
2 ABBEY GARDENS  
GREAT COLLEGE STREET  
WESTMINSTER  
LONDON  
SW1P 3NL  
+44 (0)20 7222 2115  
www.royalhaskoning.co.uk

The significant Ro-Ro and passenger traffic handled by Holyhead Port supports a strategically vital trade route between Ireland, the UK and the Continent. Holyhead Port is the second busiest Ro-Ro ferry port in the UK, with only Dover handling more cars and road goods vehicles each year, providing 71% of Wales’ road good vehicles and almost two million passenger movements in 2009 (see **Figure 1-3**).

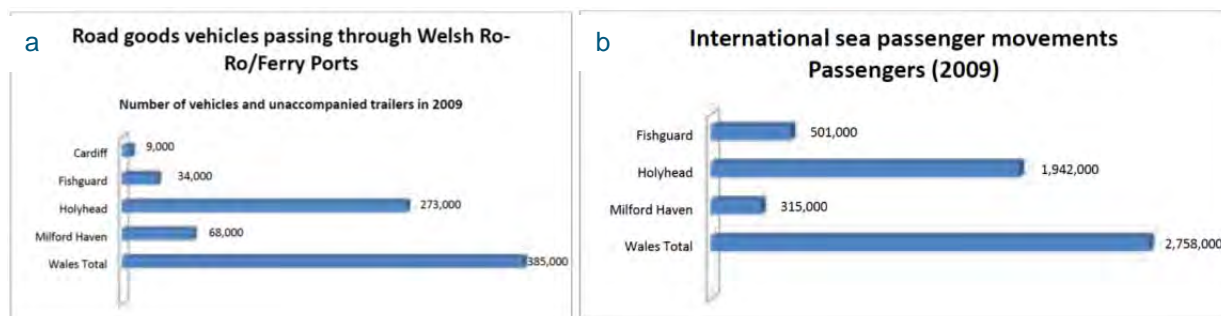


Figure 1-3 Road goods vehicles passing through Welsh Ro-Ro/Ferry Ports (a) and International sea passenger movements (b) in 2009 (source: Welsh Ports Group, 2010)

The Port is currently operating near full capacity. Whilst the volume of passengers, car units and coaches has remained relatively stable over recent years, the volume freight has continued to grow, reaching its highest level ever in 2016 (see **Figure 1-4**). Surrounded by Holyhead Town, there is no space available in which the Port can expand to meet the current and future demand of its operations.

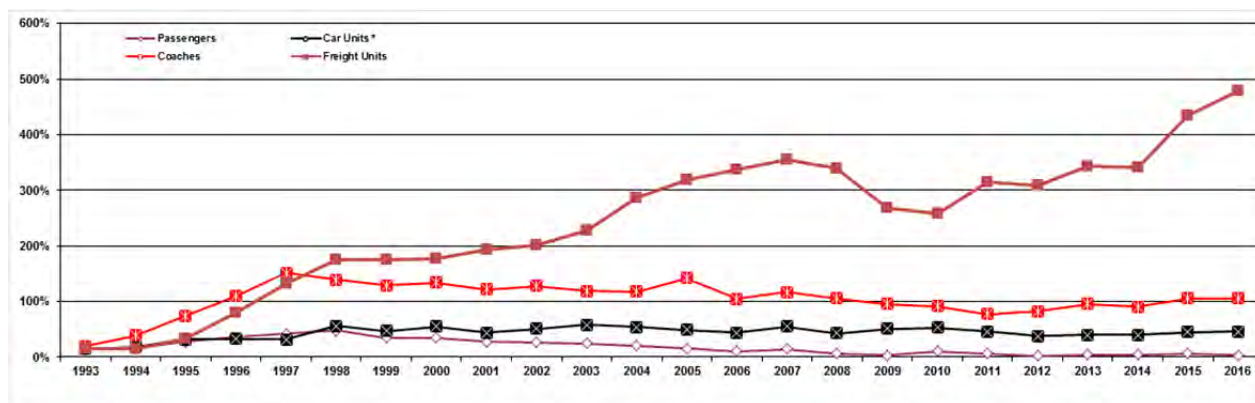


Figure 1-4 Development of port traffic at Holyhead Port from 1993 – 2015

The Port also supports a flourishing cruise industry, with cruise ship passengers increasing by 40% in 2015 when compared to 2014. Forty four cruise ships are booked in for 2017. The industry contributes more than £2.4m to the Welsh economy over the year, helping to spread the word around the globe about the attractions of Wales. The ships currently dock at the former Anglesey Aluminium jetty (now called the Orthios jetty); however, sometime in the near future this jetty may be required for ships supporting the biomass project. As such, a new deep water cruise berth is required.

With the increasing growth of the Port, there is a need to provide increased security to ensure all assets remain protected. In addition, and in particular as a result of the UK leaving the European Union, there may be a need to enhance security and provide new border controls due Brexit. Currently, there is no space available upon which to locate these facilities.

There is an emerging tidal energy market forming around the Anglesey coastline using tidal turbines. Of direct relevance to Holyhead Port is Minesto's proposal to install a Deep Green tidal power plant array at Holyhead Deep, a seabed area to the west of the Port. Furthermore, the construction of Wylfa Newydd Nuclear Power Station will require the importation of large abnormal loads and construction equipment. The Port is therefore in a unique position to support the construction of these nationally important developments by providing the required land area and load on/load off facilities.

### 1.3 Purpose of this document

It is Stena Line's intention to apply to the Marine Management Organisation (MMO)<sup>1</sup> for a Harbour Revision Order (HRO) under Section 14 of the Harbours Act 1964 (as amended) to authorise construction of the proposed scheme. As the proposed HRO would authorise a 'project', Stena Line must also submit 'notice of their intention to make the application' to the MMO under the requirements of Paragraph 3, Schedule 3 of the Harbours Act 1964<sup>2</sup>. This will also allow the MMO to 'screen' the notice for the purposes of Environmental Impact Assessment (EIA) (i.e. provide an EIA Screening Opinion).

A Marine Licence granted under the requirements of Part 4 of the Marine and Coastal Access Act 2009 (as amended)<sup>3</sup> (MCAA 2009) will also be required to construct the marine facilities. Stena Line therefore also requests an EIA Screening Opinion from Natural Resources Wales (NRW) under the requirements of the Marine Works (EIA) Regulations 2007 (as amended)<sup>4</sup> (MWRs). It is understood that NRW is able to implement Regulation 10(1)(b) of the MWRs which allows NRW to defer to its own EIA Consent Decision made under the HA 1964. Confirmation is also requested as to whether this Regulation 10(1)(b) of the MWRs will be implemented.

As it is expected that an EIA will be required, this Environmental Scoping Report has been prepared to allow the MMO and NRW to issue its EIA Screening/Scoping Opinions in parallel. This report identifies those areas where there is potential for significant environmental impacts from the construction and operation of the proposed scheme, and makes recommendations for further studies considered necessary in support of the EIA process.

The specific objectives of this report are to:

- Define and describe the study area (i.e. physical, biological, human and built environment), the proposed scheme and alternatives considered.
- Identify potential significant environmental impacts.
- Define the approach to the environmental assessment, particularly relating to the assessment of impacts of potential significance.
- Define other projects and plans that may need to be considered as part of an assessment of cumulative impacts.

<sup>1</sup> It is understood that the proposed Wales Bill is currently being considered by Parliament. This Bill will amend the Government of Wales Act 2006, to transfer executive functions relating to Welsh harbours, amendments of the Harbours Act 1964, application of general provisions and development consent. It is anticipated that these powers will be devolved in 2018

<sup>2</sup> as substituted by Schedule 3 of the Harbour Works (Environmental Impact Assessment) Regulations 1999

<sup>3</sup> as amended by The Marine and Coastal Access Act 2009 (Amendment) Regulations 2011

<sup>4</sup> as amended by The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2009, the Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2011 and the Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2015



- Identify where data gaps exist and what further data collection is considered necessary to inform the impact assessment (i.e. field surveys or modelling).

## 1.4 The study area

The study area for the environmental assessment in respect of the proposed scheme is the area over which the direct and indirect effects of the proposed scheme may be detected during the construction and operational phases. In this case, the maximum extent of potential impact (on the marine environment) has been determined to be the areas over which the potential effects of the proposed marine elements on tidal current and sediment transport may occur. Such effects have the potential to affect other parameters, such as marine ecology, waterbird populations and water quality. For the purposes of this scoping exercise, this was assumed to be 5km, which will be confirmed by the proposed modelling studies (see **Section 6.4.1**).

With regard to potential for impacts on the terrestrial environment, the study area for the proposed scheme comprises a 1km buffer to consider potential impacts from, for example, noise and air emissions, and also the wider vicinity in relation to potential impacts upon traffic and the wider transport network, and visual setting. This will be determined on completion of preliminary studies in relation to both construction and operational transportation elements.

## 1.5 Report structure

This Environmental Scoping Report is subdivided into 30 sections. This section provides an introduction to the proposed scheme and the EIA scoping process. The subsequent sections of this report are structured as follows:

- **Section 2** provides a description of the proposed scheme, including the alternatives that have been considered;
- **Section 3** provides a description of the relevant legislative framework and outlines the licences and consenting requirements for the proposed scheme;
- **Section 4** summaries the consultation that has been undertaken;
- **Section 5** describes the nature conservation designations in the study area;
- **Sections 6 to 25** provide the main detail of the scoping assessment and identify the nature and level of investigations proposed for each relevant environmental parameter during the EIA process. For each parameter the following information is provided:
  - Description of the baseline conditions, based on existing data sources;
  - Consideration of the potential impacts of the proposed scheme; and,
  - Details of the investigations that will need to be undertaken through the EIA process in order to fully determine the significance of any impacts and identify proposed mitigation measures, where appropriate.
- **Section 26** sets out our current understanding of other plans and projects in the study area which may impact on relevant environmental parameters when considered in combination with the proposed scheme;
- **Section 27** considers the requirements of the Water Framework Directive;
- **Section 28** considers the requirements of the Habitats Directive;



- **Section 29** summarises the proposed scope of the EIA, including the next steps of the EIA process; and,
- **Section 30** lists the references used in preparing this document.

## 2 Description of the Proposed Scheme

### 2.1 Description of the construction phase

The proposed scheme comprises the reclamation of three intertidal/subtidal areas and the dredging of an approach channel, as presented in **Figure 1-2** and **Figure 2-1**, respectively.

#### 2.1.1 Reclamation Areas

The source material for the reclamations has not yet been confirmed; however, will include the dredged arising from the approach channel, as much as possible, and land based sources, if required. For each area, the quay wall would be constructed prior to any fill material being added, thereby isolating the areas from the marine environment and preventing the release of any material into the sea. Piling would be undertaken using vibro-piling and drilling. No impact piling will be undertaken.

#### Area A – New multi-purpose and cruise berth

This area would comprise:

1. The reclamation of the area extending from the northeast and southeast corners of Salt Island, forming approximately 68,230m<sup>2</sup> of new port land and requiring approximately 697,000m<sup>3</sup> of fill material; and,
2. The construction of a 340m quay wall.

A steel tubular combi-wall would form the quay face with a reinforced concrete capping beam carrying the bollards, fender panels and safety ladders. The combi-wall would require an anchor wall several metres back from the main wall connected with large diameter tie bars linking the two walls together. Fill from the dredging of the approach channel would be pumped behind the wall forming the land mass. This would be compacted and then surcharged to remove excess water.

#### Area B – New multi-purpose berth and security and customs facility

This area would comprise:

1. The reclamation of the area between Marine Yard and Salt Island, forming approximately 25,540m<sup>2</sup> of new port land and requiring approximately 156,000m<sup>3</sup> of fill material;
2. The construction of a 280m quay wall;
3. Extension of the culvert running under Salt Island Bridge; and,
4. Re-align the road to the north of Area B, which is currently used as a service lane.

A steel tubular combi-wall would form the quay face with a reinforced concrete capping beam carrying the bollards, fender panels and safety ladders. The combi-wall would require an anchor wall several metres back from the main wall connected with large diameter tie bars linking the two walls together. Fill from the dredging of the approach channel would be pumped behind the wall forming the land mass. This would be compacted and then surcharged to remove excess water.

### Area C – New multi-purpose berth and fisherman’s wharf

This area would comprise:

1. The reclamation of the area between the existing car park and south pier, forming 16,830m<sup>2</sup> of new port land and requiring approximately 143,000m<sup>3</sup> of fill material;
2. The construction of a 190m quay wall; and,
3. The demolition of the existing landing stage.

Reinforced concrete caissons precast in a nearby location would be floated into position and then placed on a prepared seabed. A reinforced concrete capping beam carrying the bollards, fender panels and safety ladders cast along the top face of all the caissons. Fill from the dredging of the approach channel would be pumped behind the wall forming the land mass. This would be compacted and then surcharged to remove excess water. Any dredging required to prepare the seabed would be placed in the reclamation area, where possible.

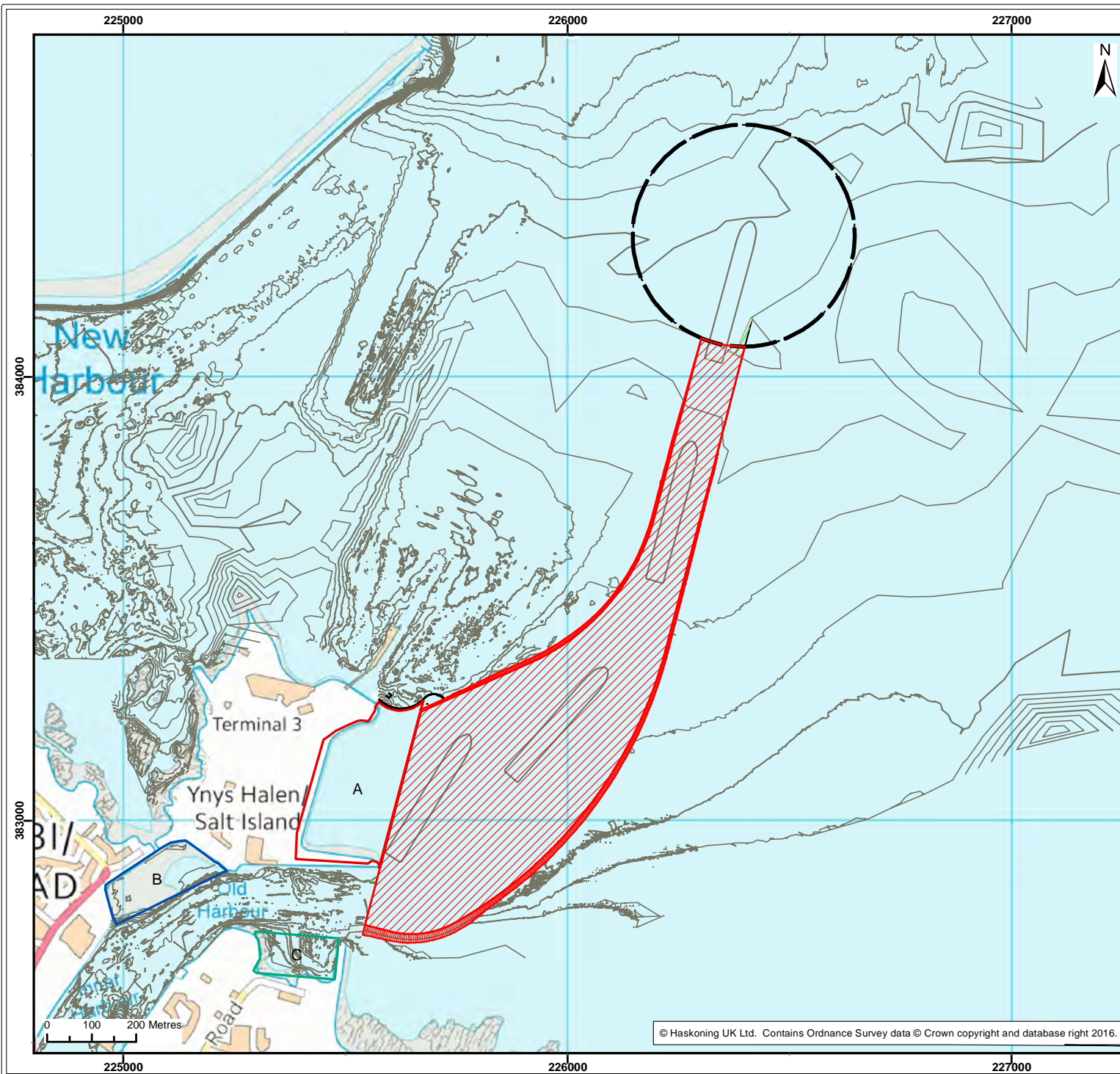
#### 2.1.2 Approach channel dredge

An approach channel to the Port will be dredged (see **Figure 2-1**) to allow navigable access to the Port by the larger vessels. The channel will be dredged to a depth of -9m below Chart Datum (bCD) resulting in a total dredge sediment volume of approximately 1,044,670m<sup>3</sup>



It is anticipated that the outer third of the approach channel, comprising approximately 348,223m<sup>3</sup> of finer material, would be dredged using either a trailer suction hopper dredger (TSHD), requiring disposal of the dredged material, or using a hydraulic method, such as Water Injection Dredging (WID), which requires no disposal as the material is re-suspended and transported away naturally by the action of gravity and currents.

The inner two thirds, comprising approximately 696,466m<sup>3</sup> of coarser material, would be dredged using a cutter suction dredger (CSD). Where possible, all dredged arisings will be recovered and used as fill for the reclaimed areas described in **Section 2.1.1**.




Should a TSHD be used, or for any other material not suitable to be used in the reclamation, the material would need to be used/disposed of elsewhere. The closest licenced offshore disposal site is Holyhead Deep (IS040).



Legend:

-  Dredge Channel
-  Turning Circle

Reclamation Areas

-  Area A
-  Area B
-  Area C

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title: Approach Channel

Figure: 2.1	Drawing No: PB6108-000-011				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	23/03/17	AB	JM	A4	1:12,500
01	21/12/16	AB	JM	A4	1:12,500

Co-ordinate system: British National Grid



ROYAL HASKONINGDHV  
INDUSTRY, ENERGY & MINING  
2 ABBEY GARDENS  
GREAT COLLEGE STREET  
WESTMINSTER  
LONDON  
SW1P 3NL  
+44 (0)20 7222 2115  
www.royalhaskoning.co.uk

© Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.

## 2.2 Description of the operational phase

During the operational phase, the three reclaimed areas would be used as described below.

### 2.2.1 Area A – New multi-purpose and cruise berth

This area would provide a new deep water multi-purpose berth for larger vessels as well as for cruise vessels that currently use the Orthios Jetty. In addition, the proposed reclamation would provide additional Ro-Ro standage. It is proposed that this area could be used to support the construction of Wylfa Newydd Nuclear Power Station. The area would be serviced by two ship to shore cranes and warehouses.

### 2.2.2 Area B – New multi-purpose berth and security and customs facility

As well as providing an additional multi-purpose berth at the Port, this area would be used to facilitate the access and egress of vehicles entering and leaving Salt Island. The current arrangement causes the congestion of vehicles entering and leaving Salt Island and this proposal would help alleviate this. In addition, the UK leaving the European Union may result in the requirement for additional custom and excise facilities. Should this arise then these facilities would be located within this area. The port service lane that currently runs to the north of Area B would be re-aligned to provide vehicle access to Area B.

### 2.2.3 Area C – New multi-purpose berth and fisherman's wharf

Area C will provide a multi-purpose berth for smaller vessels, it is also proposed that this area could be used to support the emerging tidal energy market, through the provision of landside storage and heavy load on/load off facilities, serviced by mobile cranes.

Area C is currently used as a commercial fishing port, the fisherman's wharf will be enhanced to enable this industry to continue at Holyhead Port.

## 2.3 Measures to manage environmental risks

As with any construction project such as the proposed scheme, there is the potential for spillages or leakages of oils, fuels or construction materials which would directly or indirectly impact upon the marine environment. The potential also exists for the spillage or leakage of fuels or oils used during the operational phase. The risk of this occurring will however be managed through the implementation of best practice measures during construction through the production of a Construction Environmental Management Plan (CEMP) and using the Port's existing pollution prevention plans during operation.

## 2.4 Decommissioning

Once built, there are no plans to decommission the infrastructure, with it always being used for port use. Further consideration of the decommissioning phase is therefore not required.

## 2.5 Alternatives

### 2.5.1 Do nothing

Without the proposed scheme, the Port will be unable to grow and meet the future demands of its operations. This could lead to the Port falling behind its competitors and ultimately result in a decline in its business. Furthermore, if a new cruise berth is not provided, when the biomass project comes on line, this could result in a total loss of the cruise trade. Therefore, the 'do-nothing' alternative is not a viable option in this case.

### 2.5.2 Alternative cruise berth locations

In 2016, Stena Line undertook a feasibility study to determine the most appropriate location of the new cruise berth (Royal HaskoningDHV, 2016). Locations considered included adjacent to the Outer Breakwater and two to the west of Salt Island. Due to the historic significance of the breakwater and the requirement for dredging to the west of Salt Island, it was concluded that a new deep water berth to the east of Salt Island was the preferred solution.

### 2.5.3 Additional reclamation area

An additional reclamation area was considered by Stena Line in the old harbour area, extending from the southwest and northwest corners of Salt Island. This area was proposed to provide ship to shore facilities to facilitate the import and export of bulk cargo. During the design process, it was decided that this additional facility was not required at present at Holyhead Port.

### 2.5.4 Optimisation of the proposed scheme

Aspects of the proposed scheme that will undergo engineering optimisations include:

- optimising the proposed extension of the culvert so as to minimise the effects on flushing and coastal processes;
- optimising the design of the quay walls and revetments so as to minimise size of the reclamation areas; and,
- optimising the location of the ship to shore facilities so as to minimise their effect on the area's local visual setting.

## 3 Legislative and Consenting Requirements

### 3.1 Introduction

The proposed scheme will require a range of consents and licences under different legislative acts, supported by detailed technical and environmental assessments. The principal consents and licences required are summarised in the following sections. These consents all invoke a wide range of related environmental legislation with which the proposed scheme will need to comply, the relevant legislative framework is outlined below.

### 3.2 Key consents

The key consents required for the proposed scheme are:

- A HRO in accordance with Section 14 of the Harbours Act 1964; and,
- A marine licence under Part 4 of the Marine and Coastal Access Act (MCAA) 2009 for works below the level of Mean High Water Spring (MHWS) tides (including deposits and removals) within the UK marine area<sup>5</sup>.

### 3.3 Applicable legislation

#### 3.3.1 Harbours Act 1964 (as amended)

Under the requirements of the HA 1964<sup>6</sup>, the MMO is responsible for the determination of applications for 'Harbour Orders' in England and Wales. Harbour Orders which authorise the carrying out of development works are known as 'works orders'.

Section 14 of the HA 1964 allows for the MMO to make a HRO "*in relation to a harbour which is being improved, maintained or managed by a harbour authority in the exercise and performance of statutory powers and duties...for achieving all or any of the objects specified in Schedule 2*".

Section 14 also requires an application to be made in writing to the MMO by "*the authority engaged in improving, maintaining or managing it or by a person appearing to him to have a substantial interest or body representative of persons appearing to him to have such an interest*". Stena Line plan to make an application to the MMO for an HRO under Section 14 of the Harbours Act 1964 to allow for the construction of the proposed scheme.

#### 3.3.2 Marine and Coastal Access Act 2009 (as amended)

Part 4 of the MCAA provides a framework for the marine licensing system for those 'licensable marine activities' undertaken within the UK marine area. NRW is the regulatory authority for marine licensing in Welsh inshore waters.

#### 3.3.3 The EIA Directive

For proposals that require a HRO, in accordance with the Harbours Act 1964, Directive 2011/92/EU (the EIA Directive), is implemented *inter alia* by the Harbour Works (EIA) Regulations 1999 (as amended). It is through this set of Regulations that the requirement for EIA may arise. An EIA is

<sup>5</sup> <http://www.legislation.gov.uk/ukpga/2009/23/section/42>

<sup>6</sup> as amended by the Harbours Act 1964 (Delegation of Functions) Order 2010.



required for all projects which fall under Annex I of the EIA Directive and also those projects (known as 'relevant projects') which fall under Annex II of the EIA Directive and the following criteria are met:

- The area of the works is > 1ha;
- Any part of the works will be undertaken in a sensitive area; or
- The MMO believes that the project falls within the Annex.

Though the project has not yet been formally 'screened' for the purposes of EIA, it is considered that the proposed scheme falls under Annex 1 8b of the EIA Directive as:

*"Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1 350 tonnes."*

Consequently an application for a HRO and marine licence will require an EIA and an accompanying Environmental Statement (ES) to be submitted. This Environmental Scoping Report has therefore been prepared as part of the EIA process.

Directive 2014/52/EU will replace the existing EIA Directive on 17 May 2017 through its transposition into national legislation, including the Harbours Act 1964. The Department for Transport (DfT) has proposed that where a pre-application procedure under Paragraph 3 of Schedule 3 of the Harbours Act 1964 has been commenced prior to 16 May 2017, the provisions of the existing Schedule 3 process will continue to apply<sup>7</sup>. As this Environmental Scoping Report has been submitted to the MMO prior to 16 May 2017, it is understood that this pre-application request for a Scoping Opinion will be considered under the requirements of the existing EIA Directive without the amendments proposed in the 2014 EIA Directive.

### 3.3.4 The Conservation of Species and Habitats Regulations 2010

The Conservation of Species and Habitats Regulations 2010 (the Habitats Regulations) implements European Commission (EC) Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (the Habitats Directive) in the United Kingdom (UK). In accordance with Section 61 of the Habitats Regulations, an Appropriate Assessment (AA) is required for any plan or project, not connected with the management of a European site, which is likely to have a significant effect on the site either alone or in combination with other plans and projects.

European sites comprise Special Protection Areas (SPAs), as designated under Council Directive 79/409/EEC (the Wild Birds Directive), and Special Areas of Conservation (SACs), as designated under Council Directive 92/43/EEC (the Habitats Directive). An AA is also required as a matter of government policy for potential SPAs (pSPAs), possible SACs (pSACs) and Ramsar sites for the purpose of considering development proposals affecting them (DCLG, 2012).

Should the works, either alone or in combination with other plans or projects, be deemed to have a Likely Significant Effect (LSE) on any European sites (or it cannot be determined that there would not be a significant effect), then an AA must be undertaken by the competent authorities assessing the potential implications of the proposed scheme in view of the conservation objectives of the sites, in accordance with Article 6 of the Habitats Directive and with advice from Natural England. This takes

<sup>7</sup> <https://www.gov.uk/government/consultations/amending-environmental-impact-assessment-regulations-within-transport>

the form of a Habitats Regulations Assessment (HRA) (which would firstly encompass the LSE test and then, should an LSE be determined, provide information for AA).

The proposed scheme is located within the following European designated sites (see **Figure 5-1**):

- North Anglesey Marine possible Special Area of Conservation (pSAC); and,
- North Anglesey Marine proposed Special Protection (pSPA).

The proposed scheme is located within 2.5km of the following European designated sites (see **Figure 5-1**):

- Glannau Ynys Gybi/Holy Island Coast SPA; and,
- Glannau Ynys Gybi/Holy Island Coast SAC.

### 3.3.5 Wildlife and Countryside Act 1981 (as amended)

Under the terms of Section 28(4)b of the Wildlife and Countryside Act 1981, as amended by Schedule 9 to the Countryside and Rights Of Way Act (CROW) 2000, any operations within, or adjacent to, a Site of Special Scientific Interest (SSSI) require assent from NRW. Assent under Section 28 of the Wildlife and Countryside Act 1981 (as amended by the CROW 2000) is normally included in NRW's overall advice regarding the requirement (or otherwise) for an AA under the Habitats Regulations, where SSSIs are covered by European sites.

The proposed scheme is located within 2km of the following SSSIs (see **Figure 5-1**):

- Beddmanarch–Cymyran SSSI; and,
- Holy Island Coast SSSI.

### 3.3.6 Water Framework Directive

In December 2003, the Water Framework Directive (WFD) (2000/60/EC) was transposed into national law by means of the Water Environment (Water Framework Directive) (England and Wales) Regulations, 2003 (as amended). These regulations provide for the implementation process of the WFD from designation of all surface waters (rivers, lakes, transitional (estuarine) and coastal waters and groundwater) as waterbodies through to achieving good ecological status by 2015. NRW is the responsible authority for WFD compliance in Wales.

The WFD applies to all waterbodies, including those that are man-made. The consideration of the proposed scheme under the WFD will therefore need to be applied to all WFD waterbodies that could be impacted by the proposals.

The WFD specifies the factors, referred to as quality elements, which must be used in determining the ecological status or ecological potential and the surface water chemical status of a surface waterbody. **Section 27** assesses the requirements for compliance under the WFD. The proposed scheme is located within, and in close proximity to, the following waterbodies (see **Figure 8-1**):

- Holyhead Strait Coastal Water Body (GB681010450000);
- Holyhead Bay Coastal Water Body (GB681010360000);
- Caernafon Bay North Coastal Water Body (GB621010380000); and,

- Ynys Mor Secondary Groundwater Water Body (GB41002G204400).

### 3.3.7 Bathing Water Directive

The Bathing Water Directive preserves, protects and improves the quality of the environment and protects human health. The Directive seeks to improve management practices at all bathing waters and to standardise the information available to bather across Europe.

The revised Bathing Water Directive was adopted in 2006 (2006/7/EC) and reporting against this Directive has commence. The key features of the revised Directive include more stringent water quality standards and increased provision of public information. Compliance will be measured using the classes: poor, sufficient, good and excellent. The revised Directive requires all bathing waters to be classed as 'sufficient' and changes the receptors measured to assess water quality. Two microbiological parameters, *Escherichia coli* (e-coli) and *Intestinal enterococci*, will be measured. Whilst it is not anticipated that sediments within Holyhead Port, when dredged, will release bacterial contamination into the water, NRW will require the consideration of any risk to the bathing waters by a visible plume associated with the resuspension of sediments. There are no Bathing Waters within 5km of the proposed scheme. Bathing Waters are therefore scoped out of further assessment in the ES.

### 3.3.8 Shellfish Waters Directive

The Shellfish Waters Directive (2006/113/EC) has now been subsumed by the WFD. All previously designated shellfish waters have been placed on the Protected Areas register under the WFD.

Following the repeal of the Directive at the end of 2013, there is an ongoing requirement to manage designated shellfish waters to ensure there is no deterioration in water quality and the levels of protection are not relaxed. Therefore, existing shellfish waters must at least maintain their current Food Standards Agency (FSA) classification and the environmental objective under the WFD for the wider water body in which they are located. The water quality standards established under the previous Directive have been transposed into the WFD and remain unchanged. These parameters include suspended solids, salinity, dissolved oxygen (DO), organo-halogenated substances (e.g. PCBs, organochlorine pesticides), metals and guideline values for coliforms in shellfish flesh. The only designated Shellfish Water near to the proposed scheme is the Beddmanarch Bay Shellfish Water, located approximately 1.7km to the east of the proposed scheme (see **Figure 8-1**).

### 3.3.9 Priority Substances Directive

The Priority Substances Directive (2008/105/EC) is implemented in England and Wales by the River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction 2010. Compliance with these standards forms the basis of good surface water chemical status under the WFD.

The Environmental Quality Standards (EQSs) within this Directive supersede EQSs initially introduced by the Dangerous Substances Directive (76/464/EEC). However, where EQSs are not listed for substances, limit values set by the Dangerous Substances Directive and its daughter Directives remain in force.

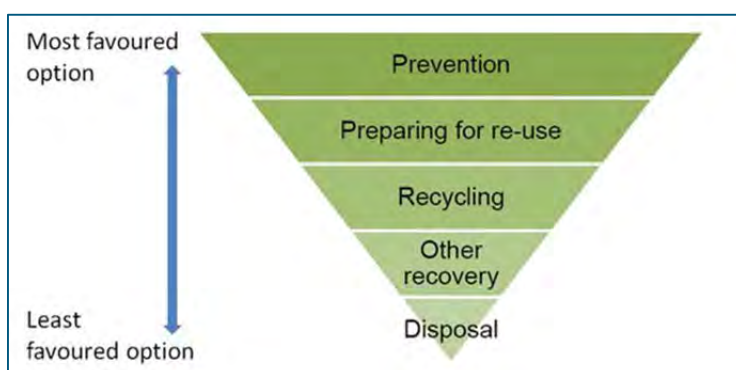
### 3.3.10 Waste Framework Directive

The Waste Framework Directive (2008/98/EC) consolidates earlier legislation regulating waste. The Directive sets out the general rules applying to all categories of waste. A key objective of which is to provide 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.

Article 3(1) of the Directive defines waste as:

“...any substance or object...which the holder discards or intends or is required to discard”.

More generally, the Directive provides a general duty to ensure that waste is dealt with in an environmentally friendly way. The key to this is the ‘waste hierarchy’, which emphasises prevention (in the first instance) and then re-use, recycling and recovery of waste (see **Figure 3-1**). EU Member States must have regard to the waste hierarchy when dealing with waste. Disposal to landfill or at sea is the least favourable option.



**Figure 3-1** Waste hierarchy

The proposed scheme has potential to generate waste, primarily as a result of the capital dredging required during the construction phase as well as any maintenance dredging that is required during the operational phase. Although waste will be generated during the construction and operation phases, this will be dealt with through standard site waste management planning and the existing port’s waste management processes. No unusual wastes would arise in terms of types of waste or quantity.

### 3.3.11 Marine Conservation Zones

The MCAA (2009) created a new type of Marine Protected Area (MPA), known as Marine Conservation Zones (MCZs) which will protect nationally important marine wildlife, habitats, geology and geomorphology.

Section 126 of the MCAA places specific duties on the NRW relating to Marine Conservation Zones (MCZ) and marine licence decision-making. The proposed scheme is not located within or adjacent to an MCZ or a recommended MCZ (rMCZ). As such a MCZ assessment will not be required to be undertaken on the proposed scheme.

### 3.4 Marine Planning Policy

The main national and regional policies applicable to the proposed scheme are outlined in the following sections.

#### 3.4.1 UK Marine Policy Statement

The MCAA and MWRs are supported by policy presented in the UK Marine Policy Statement (MPS) (HM Government, 2011), which provides the framework for preparing marine plans and taking decisions affecting the marine environment. The MPS is intended to contribute to the achievement of sustainable development in the UK marine area.

The MPS enables an appropriate and consistent approach to marine planning across UK waters, and ensures the sustainable use of marine resources and strategic management of marine activities from renewable energy to nature conservation, fishing, recreation and tourism.

The MPS stipulates that the extraction of marine dredged sand and gravel should continue to the extent that this remains consistent with the principles of sustainable development, recognising that marine aggregates are a finite resource and in line with the relevant guidance and legislation.

Ports and shipping play an important role in the activities taking place within the marine environment and both are an essential part of the UK economy. The MPS stipulates that ports and shipping are critical to the effective movement of cargo and people, both within the UK and in the context of the global economy. The MPS and national planning policy documents recognise the overall national levels of need for port development based on port forecasts in the context of market-led sector.

The MPS recognises the positive impacts of port development associated with job creation and benefits to local businesses, as well as wider benefits to national, regional or local economies.

#### 3.4.2 Marine Plans

The MCAA requires all public authorities taking authorisation or enforcement decisions that affect or might affect the UK marine area to do so in accordance with the MPS unless relevant considerations indicate otherwise (HM Government, 2011). Once adopted, marine plans will have the same effect on authorisation or enforcement decisions in the UK marine area as the MPS, including the requirements and conditions attached to authorisations and the enforcement action that would be taken to ensure compliance.

The MCAA divides the UK marine area into planning regions with an associated plan authority responsible for preparing plans for their region. In Wales, NRW are the responsible for the regulation of inshore and offshore waters in Wales. The Welsh National Marine Plan is currently being developed by Welsh Government to cover Welsh inshore and offshore waters in accordance with the MCAA, the UK MPS and Maritime Spatial Planning Directive.

Until the Welsh National Marine Plan comes into act, the legislation listed above will be adhered to. All public authorities are to take into account the MPS and relevant Marine Plans when making decisions in regard to the marine area. This ensures that marine resources are used in a sustainable way in line with the high level marine objectives.

## 4 Consultation

A scoping consultation meeting was held on 19 January 2017 to inform the scoping exercise. Attendees included:

- The MMO;
- NRW Marine Licencing Team;
- NRW Development Planning Department;
- Isle of Anglesey County Council; and,
- Welsh Government.

The objectives of the workshop were to:

1. Present the proposed scheme;
2. Confirm the consenting route;
3. Identify available environmental baseline information;
4. Identify key potential constraints and opportunities as a result of the proposed works; and,
5. Identify likely studies and investigations required to support consent applications.

## 5 Nature Conservation Designations

### 5.1 Introduction

This section considers sites designated for nature conservation. The study area considered for this section includes Holyhead Port and a 1km buffer for terrestrial sites and a 5km buffer for coastal/marine sites. The location of designated sites can be seen on **Figure 5-1**.

### 5.2 European and international Sites

#### 5.2.1 Holy Island Coast SAC

The Annex I habitats that are a primary reason for the selection of the Holy Island Coast SAC are; vegetated sea cliffs of the Atlantic and Baltic Coasts; and, European dry heaths. Holy Island has hard rock acidic cliffs and supports important examples of coastal cliff heathland vegetation. In addition to maritime heath with several rare species such as spotted rock-rose *Tuberaria guttata*, there are extensive maritime cliff-crevice and grassland communities (JNCC, 2016b). The site is approximately 2km west from the centre of Holyhead Port, to the west of the Outer Breakwater.

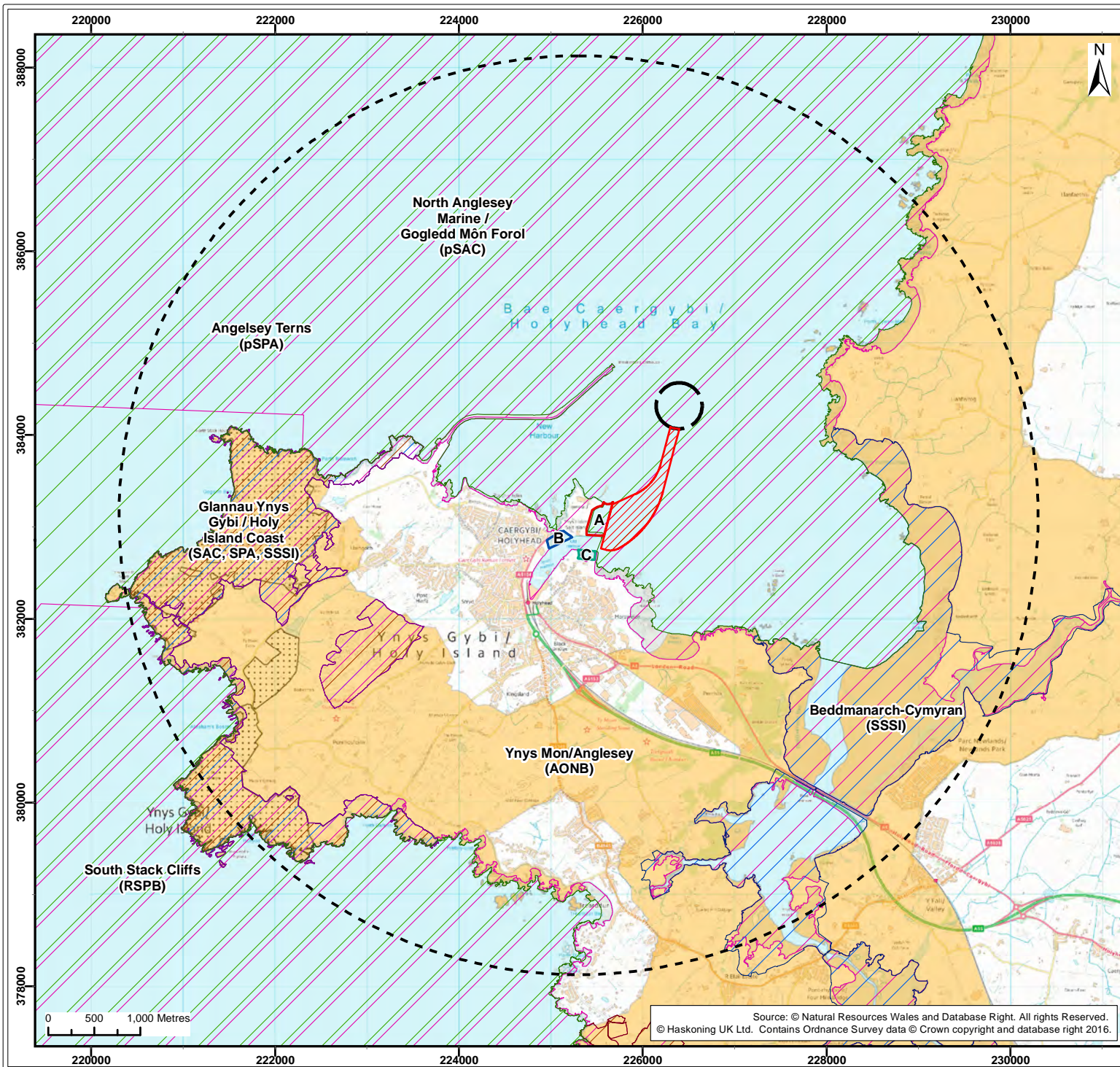
#### 5.2.2 North Anglesey Marine pSAC

The proposed scheme is located within the North Anglesey Marine pSAC. The pSAC includes areas both within Welsh Territorial waters and UK waters outside the 12 nautical mile limit and is therefore a joint responsibility of the Joint Nature Conservation Committee (JNCC) and NRW. The site is proposed for designation for the Annex II species harbour porpoise (*Phocoena phocoena*). This is a single feature site, proposed for designation solely for the purpose of aiding the management of harbour porpoise populations throughout UK waters, in accordance with European Union (EU) legislation.

The North Anglesey Marine site has been recognised as an area with predicted persistent high densities of harbour porpoise. The area included within the site covers important summer habitat for porpoises, which was identified as part of the top 10% persistent high density areas for the summer seasons within the UK. The site covers an area of 3,249km<sup>2</sup>, reaching north-west from the island of Anglesey into the Irish Sea.

#### 5.2.3 Holy Island Coast SPA

The Holy Island Coast SPA sites lies approximately 2km west of Salt Island and predominantly consists of sea-cliffs (rising 120m above sea level) and grasslands. The site is designated due to its support of a resident population of Chough (*Pyrrhocorax pyrrhocorax*), which are dependent on the diverse habitats of the site and the low levels of agricultural management, both during the breeding (protected by the Wildlife and Countryside Act 1981) and wintering periods (listed under Annex 1 of the EC Birds Directive 1979). Present at the site are 18 pairs (5.3% of the UK breeding population and 2.6% of the UK wintering population) (JNCC, 2001).



**Legend:**

- Dredge Channel
- Turning Circle
- Holyhead Port 5km Buffer
- Special Protection Area (SPA)
- Proposed Special Protection Area (pSPA)
- Special Area of Conservation (SAC)
- Proposed Special Area of Conservation (pSAC)
- Site of Special Scientific Interest (SSSI)
- Area of Outstanding Natural Beauty (AONB)
- RSPB Reserve

**Reclamation Areas**

- Area A
- Area B
- Area C

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title:  
International and National nature conservation designations

Figure:	5.1	Drawing No:	PB6108-000-002			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:	
02	23/03/17	AB	JM	A4	1:60,000	
01	22/12/16	AB	JM	A4	1:60,000	

Co-ordinate system: British National Grid

Source: © Natural Resources Wales and Database Right. All rights Reserved.  
© Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.

**ROYAL HASKONINGDHV**  
INDUSTRY, ENERGY & MINING  
2 ABBEY GARDENS  
GREAT COLLEGE STREET  
WESTMINSTER  
LONDON  
SW1P 3NL  
+44 (0)20 7222 2115  
www.royalhaskoning.co.uk



## 5.2.4 Anglesey Terns pSPA

Salt Island lies within the boundary of the Anglesey Terns proposed SPA (pSPA). The site is proposed to be designated due to its population importance of four species of tern (see **Table 5-1**). The Anglesey Terns pSPA incorporates and extends three existing SPAs for terns: Ynys Feurig, Cemlyn Bay and The Skerries SPAs. The purpose of combining and extending the sites is to include the surrounding marine areas used by the terns during the breeding season as well as the breeding areas themselves. The Ynys Feurig site is made up of a series of small islets that join the west coast of Anglesey at mid to low tide, while the site of Cemlyn Bay consists of a saline lagoon separated from the sea by a shingle ridge and The Skerries are formed by a group of sparsely vegetated rock formations off the North-West coast of Anglesey (NRW, 2015b).

Table 5-1 Importance of the Anglesey Terns pSPA and reason for designation (JNCC, 2016b)

Species	Importance to species	Count	% of GB Population	Level of Protection
Common tern ( <i>Sterna hirundo</i> )	breeding	189 pairs	1.5%	Annex 1 species
Arctic tern ( <i>Sterna paradisea</i> )	breeding	1,290 pairs	2.9%	Annex 1 species
Roseate tern ( <i>Sterna dougallii</i> )	breeding	3 pairs	5%	Annex 1 species
Sandwich tern ( <i>Sterna sandvicensis</i> )	breeding	460 pairs	3.3%	Annex 1 species

## 5.3 National Designations

### 5.3.1 Beddmanarch-Cymyran

Beddmanarch–Cymyran SSSI covers just over 90 Ha. It was first notified in 1961 for its coastal botanical and ornithological interest. There are large areas of sandbank, mudflat and saltmarsh, as well as two stands of dune heath. A wide range of water birds, both on passage and in winter, are attracted to the area which is especially important for overwintering ringed plover, greenshank, red breasted merganser and goldeneye (Anglesey Nature, 2016a). The closest point of the site is approximately 2.5km east of Holyhead Port.

### 5.3.2 Holy Island Coast SSSI

This site is of special interest for its geological and biological features, including heathland and maritime grassland communities, coastal cliffs and ledges, its assemblages of vascular plants and birds, invertebrates and its solid geology (Anglesey Nature, 2016b). The site lies on the north-west corner of Holy Island and includes the most westerly point on Anglesey. The closest point of the coastline is approximately 2km west of the proposed scheme, to the west of the Outer Breakwater.

### 5.3.3 The Anglesey Area of Outstanding Natural Beauty

The approximate coverage of the Anglesey Area of Outstanding Natural Beauty (AONB) is 211km<sup>2</sup>, covering one third of the island. The AONB is predominately a coastal designation and covers the majority of Holy Island. The designation reaches the cliffs close to the western edge of the beginning of the breakwater and covers the majority of the west coast of Holy Island. The main features are; low cliffs alternating with coves and pebble beaches; sheer limestone cliffs interspersed with fine

sandy beaches; and, stretches of sand dunes with beaches (Isle of Anglesey County Council, 2016). The closest point of the site is approximately 1.7km west of Holyhead Port.

## 5.4 RSPB Reserves

### 5.4.1 South Stack Cliffs RSPB Reserve

The South Stack Cliffs RSPB Reserve lies approximately 3km west of the proposed scheme, covering much of the west coastline of Holy Island. It is comprised of heathland, farmland and marine stacks and caves. These habitats are importance to breeding seabirds and choughs on the site. South Stack Cliffs has a number of birds on site that raise their young in the area, including guillemots, peregrine, razorbills and puffins, with up to 9,000 seabirds nesting on the site. Chough are also seen on the reserve, with 11 breeding pairs present (RSPB, 2013).

Fulmar (*Fulmarus glacialis*), cormorant (*Phalacrocorax carbo*), black headed gull (*Chroicocephalus ridibundus*), herring gull (*Larus argentatus*), great black backed gull (*Larus marinus*), kittiwake (*Rissa tridactyla*) and guillemot are all IUCN Amber List species, with the exception of herring gull which is on the red list. UK Bap species have breeding colonies within foraging distance of the offshore scoping area. In particular, the cliffs of the South Stack provide nesting sites for large numbers of puffin, razorbills and guillemots (as well as choughs and peregrine falcons).

## 6 Coastal Processes

### 6.1 Introduction

This section presents the present baseline for coastal processes (hydrodynamics and sediment transport) and coastal geomorphology in Holyhead Port and Holyhead Bay. The study area considered for this section has been defined as Holyhead Port and the coastal and marine areas within 5km, radiating seawards from the proposed scheme.

### 6.2 Baseline conditions

#### 6.2.1 Geomorphology of Holyhead

The western shoreline of Holy Island is anchored by hard rock headlands and outcrops interspersed with sandy bays. Areas of softer clay are found around the southern area of the west coast, to the north of Rhosneigr and Holyhead Bay, where large expanses of sandy beach are present. The area to the south of Holy Island, just north of Rhosneigr consists of low lying land with a fronting sand dune system. The easterly facing coastal area around Holyhead and Penrhos is typically low lying with soft sediment, sandy bays and clay cliffs (Royal Haskoning, 2011a). The soft bay of Penrhos is shaped by the dominant north westerly waves that enter the estuary running to the Inland Sea. The narrow backshore beaches in this area and that to the eastern side of the estuary are indicative of a more limited sediment supply to the area as a whole. The general nature of the shoreline is that of a coast carved out of glacial clays, rather than that of the large infill seen on the south western shoreline (Royal Haskoning, 2011a).

The formation of individual bays and manmade coastal structures deflect wave energy resulting in localised change in local transport systems which influence both the bay and backshore shape. Areas of softer sediment and clay cliffs around estuaries tend to erode more rapidly than rocky headland resulting in wide sandy bays bordered by rock headland and exposed rocky shorelines (Royal HaskoningDHV, 2015).

Surveys undertaken to inform the Deep Green Holyhead Deep Array Project Scoping Report (Minesto, 2016) identified Sandy Seabed habitat with small areas of bedrock reef to the east of Holyhead Port in the approach to Penrhos Beach. Grab samples taken from the same area as part of the survey campaign identified muddy sand and muddy sandy gravel sediments.

#### 6.2.2 Tidal Regime

The tidal regime at Holyhead is semi-diurnal with two high waters and two low waters a day. Currents are west to east on the flood tide and east to west on the ebb. **Table 6-1** shows the tidal information for Holyhead. All levels are shown according to Chart Datum which is 3.05m below Ordnance Datum (Newlyn). Tidal stream velocities range between 0.05 to 0.72m/s during spring tides and 0.05 to 0.36m/s during neap tides.

Table 6-1 Tidal Information at Holyhead (UK Hydrographic Office, 2017)

Tide	Levels (m CD)
HAT	6.3
MHWS	5.6
MHWN	4.4
MSL	3.3
MLWN	2.0
MLWS	0.7
LAT	0.0

### 6.2.3 Waves

The west coast of Holy Island is exposed to significant wave action from swell waves travelling up the Irish Sea from the southwest, which drives coastal processes along the coast. The shoreline northeast of Holy Island gains significant natural protection from the island itself and from the large breakwater at the Port (Royal Haskoning, 2011a). Holyhead Port itself is sheltered from significant wave action by its breakwater to the west and the Isle of Anglesey to the east. Coastal defences in the form of seawalls and groynes prevail along the inner shore of the Port area with diffraction of waves from west of north and localised waves from east of north representing current exposure conditions (Black and Veatch, 2009a).

Wave measurements were taken at the entrance to Holyhead Port and at Terminal 5 between November 2005 and May 2006. Over the period of the recording, wave heights up to 2.5m were recorded at the Port entrance and up to 1.25m at Terminal 5. Most of the waves arrived at the harbour entrance from the 270°-360°N sector. Wave directions at Terminal 5 varied significantly due to the local disturbances (for example passing by ships and reflections from structures) as well as due to local wind generated waves within the harbour (Royal Haskoning, 2011b). The larger offshore waves approach Holyhead from north and north-westerly directions. The 1 in 1 year offshore wave height is 4.2m and 1 in 100 year offshore wave height is 7.2m (Royal Haskoning, 2011b).

### 6.2.4 Bathymetry

Holyhead Bay ranges in depth from shallow coastal and intertidal waters hugging the coast to an average depth of 25m depth on its westerly fringes. The seabed is gently undulating, composed of schist bedrock overlain by Holocene-derived sand and gravel sediments and rock outcrops (NRW, 2015a). Seabed levels at the entrance to Holyhead Port are approximately 20m below chart datum (bCD) to the north near the Breakwater and less than 10m bCD surrounding Salt Island.

### 6.2.5 Sediment Transport

Between Holy Island and the Isle of Anglesey is the Inland Sea, controlled at its northern end by the Stanley Embankment and opening at its southern end to Cymyran Bay. The Breakwater at Holyhead Port, together with the headland on the Isle of Anglesey at Twyn Cliperau, forms the funnel shaped mouth running to the Inland Sea (Royal Haskoning, 2011a).

To the north of the Stanley Embankment, the distance between the Isle of Anglesey and Holy Island widens with the muddy sandy bay of Traeth y Gribin (Royal HaskoningDHV, 2011a). The seabed outside of the Breakwater consists of sandy gravel, while the Port itself comprises of medium-grained metamorphic rock that will split into small slabs and flakes of material (BGS, 2016). The beach surface materials on Holy Island are dominated by sand and shingle through to intertidal rock platforms, and igneous rock makes up the sub-surface geology (Black & Veatch, 2009b). A seabed investigation undertaken in the vicinity of Salt Island bridge indicated the sediment to be sandy, slightly gravelly, silt and clay. A series of boreholes taken from within the Inner Harbour in 1993 indicated that surface sediments in many parts of Holyhead Port are composed of very soft clayey silt, with smaller proportions of sand, gravel and occasional shell debris.

Physical processes along the Holy Island coastline are constrained by the presence of hard rock headlands with bays forming from the cutting into of glacial infill, these hard headlands dictate the dissipation of wave energy causing variations between sandy bays and exposed rock foreshores (Royal HaskoningDHV, 2011a). The formation of individual bays and manmade coastal structures cause localised changes in transport systems which influence both the bay and backshore shape. Sediment offshore of north Anglesey has dominant eastward transport in the littoral zone (Horizon Nuclear Power, 2016).

Holyhead Deep disposal site (ISO40) is currently used for disposal of maintenance dredge spoil from Holyhead Port, and Stena Line disposes up to 99,000 tonnes of material per year, though utilisation of the site has been low. The site is highly dispersive, with much of the dredge waste dispersing into the wider marine environment in a matter of days. There is a range of sediment types present in the area, with sandy gravel dominating the south eastern section and thickness reaches approximately 50m in some areas. Contaminant analysis in 2015 showed elevated arsenic, lead, mercury and chromium levels above background levels both within and beyond the disposal site boundaries (Minesto, 2016).

### **Bedload and suspended sediment**

Previous investigations in the Inner Harbour of Holyhead Port, where Areas B and C are located, indicate a weak circulation pattern (flows in the range of 0.1-0.1m/s). Circulation is dominated by wind conditions, to the extent that flows observed during calm weather may easily be reversed. Seabed sediment appears to be only rarely lifted into suspension in the Inner Harbour by natural processes; however, propeller-wash causes localised re-suspension. Waters within the New Harbour can become turbid during strong north-easterly winds (Mouchel & Partners, 1994).

Suspended solid measurements within the New Harbour were recorded to be less than 10mg/l. Suspended solid measurements in the surface waters of the Inner Harbour and adjacent waters indicated higher levels of 35-55mg/l on the neap tide and 25-55mg/l on the spring tide (Mouchel & Partners, 1994).

## **6.3 Potential environmental effects**

The assessment methodology adopted to understand potential changes to the physical environment caused by the deepening of the approach channel is different to that adopted in other sections of this Scoping Report. This is because the deepening of the approach channel could have effects on the hydrodynamic and sedimentary process regimes, but these effects in themselves are not considered to be impacts; where the impacts would manifest upon other receptors, such as marine ecology and

fish. Hence, the assessment in this section focuses on describing the predicted changes/effects rather than defining a potential impact.

The potential effects on coastal processes associated with the proposed scheme are set out below.

Potential effects	
Construction	Morphological change to subtidal and intertidal areas through removal of material and deposition of sediment from the capital dredging and disposal plume.
	Short term increases in suspended sediment concentrations and sedimentation through deposition of sediment from the capital dredging and disposal plume.
Operation	Change in the tidal prism within the port and surrounding area as a result of the proposed reclamation and dredging works.
	Changes in sediment transport and deposition within the port area.
	Changes in flushing rates within the port area.
	Changes in tidal currents and exposure of intertidal and foreshore areas to hydrodynamic forces which could in turn affect nearby morphological features.
	Changes in deposition (smothering) or erosion of geomorphological features.

The proposed scheme has the potential to directly and indirectly change coastal processes, including the hydrodynamic and sedimentary regimes. There is potential to affect the wave climate and tidal current speeds and direction, both of which drive sediment transport and patterns of erosion and deposition in the coastal and nearshore zones.

It should be noted that due to the presence of the Breakwater, the localised nature of the proposed works and the straightening of the coastline as a result of the proposed reclamations at Areas A, B and C, the potential effects on coastal processes as a result of the proposed scheme are considered to be limited to near field effects (i.e. within 5km) and not have the potential to result in significant far field effects.

## 6.4 Proposed approach to EIA

To further inform the existing coastal processes baseline for the study area, additional data and information will be obtained, this will include numerical modelling and the undertaking of site specific surveys.

### 6.4.1 Numerical Modelling

#### Flow modelling

To inform the EIA, a 2D model will be established and calibrated against available hydrodynamic data. Once established, the model will be used to simulate the conditions after the construction of the development and the results will then be compared with the baseline conditions. This will be undertaken for sufficient scenarios to establish a thorough understanding of the effects of the proposed scheme on the physical processes in the area. Interpretation of the results of the modelling will be used to aid the development of any mitigation or compensation required to address the predicted impacts.

### Wave modelling

The impact of the proposed scheme will be predicted using a suitable wave model, which will assess the following;

- Wave shoaling;
- Wave refraction;
- Wave growth due to wind;
- Depth-induced breaking, bottom friction and white-capping;
- Wave reflections from structures/hard shorelines;
- Far-field wave diffraction; and,
- Non-linear wave-wave interactions.

### Sediment modelling

The proposed reclamation and dredging works may alter the pattern of sediment transport and allow material to deposit in deepened areas, requiring increased maintenance dredging. In view of this, sediment plume and suspended load/bedload transport modelling will be undertaken to predict the impact of this both within the Port and the surrounding area.

#### 6.4.2 Geotechnical Survey

A marine geotechnical and geo-environmental investigation will be undertaken to characterise the physical and chemical nature of the sediments affected by the proposed scheme, with samples being collected and analysed to the proposed dredge depth. The scope of this investigation will be discussed with Cefas and NRW to ensure its suitability and adequacy.

## 7 Hydrology, Hydrogeology, Geology and Soils

### 7.1 Introduction

This section considers the current baseline for hydrology, hydrogeology, geology and soils within and around Holyhead Port. The study area considered for this section includes Holyhead Port and the surrounding area within a 1km buffer zone.

### 7.2 Baseline conditions

#### 7.2.1 Geology

The Isle of Anglesey is an important geological feature and is a key area in the UK for understanding large-scale tectonic processes that were responsible for the formation of southern Britain (Royal HaskoningDHV, 2015). The Isle of Anglesey includes over a hundred different rock types and the oldest fossils in England or Wales (UNESCO, 2016). Anglesey is a classic example of glacial landforms caused by fast flowing glaciers meeting the Irish Sea.

Bedrock on Holy Island consists of mainly Pre-Cambrian rocks, notably the Mon Complex. These rocks have been deformed under pressure and interbedded with lavas, ashes and tuffs. The coastal areas surrounding Holyhead are typically flat coastal areas that were created through glaciation that formed the Holy Island Strait between Holyhead and Anglesey mainland.

The importance of Anglesey's geology has long been appreciated and has been recognised through the designation of a number of sites due to their geological features:

#### **Anglesey Geopark (UNESCO)**

Designated for its numerous sites of geological interest and high level of geodiversity, the Anglesey Geopark encompasses the entire Isle of Anglesey. The Geopark was further designated as a UNESCO Global Geopark in 2015. The Anglesey Geopark is the UK's most geologically diverse Geopark and covers approximately 720km<sup>2</sup> and 201km of coastline (GeoMôn, 2016a).

Specific geological sites and walking trails (referred to as Geosites and Geotrails) have been selected for scientific quality, rarity, aesthetic appeal and educational value. Their interest may also be archaeological, ecological, historical or cultural (GeoMôn, 2016a). There are only two of these located on Holyhead, these include South Stack Geotrail and Rhoscolyn Headland Geosite. South Stack Geotrail exhibits folded schists and quartzites at South Stack and arches, stacks and thrust vaults at Breakwater Park to the north (GeoMôn, 2016b). The Rhoscolyn headland features folded sedimentary rocks and inland outcrops of serpentine and mantle derived rocks (GeoMôn, 2016b).

#### **Holy Island Coast SSSI**

Holy Island Coast SSSI (see **Figure 5-1**) is of special interest for its geological features, which include the folded sedimentary rocks forming the South Stack beds which are exposed in the cliffs around South Stack Lighthouse. The rock which was extracted from the Breakwater Quarry to build the breakwater is a hard, massive, white, quartzite.



### Regionally Important Geological Sites

Regionally Important Geological Sites (RIGS) are designated by locally developed criteria and are currently the most important sites designations for geology and geomorphology outside of statutory designations (i.e. SSSI) (GeoConservationUK, 2009). There are Regionally Important Geological Sites (RIGS) at Holyhead, South Stack and Porth Delisc. Gwynedd and Mon RIGS Group are responsible for the management of these sites.

### Geological Conservation Review Sites

Geological Conservation Review (GCR) sites are nationally and internationally important geological sites that are protected by law (JNCC, 2016a). The GCR began in 1977 and has evaluated documented and designated over 3,000 sites across Britain (JNCC, 2016a). On the Isle of Anglesey, there are 27 designated GCR sites, the South Stack GCR site is the only site located on Holyhead (Isle of Anglesey AONB, 2015).

There are no features of geological interest within the footprint of the proposed scheme.

## 7.2.2 Hydrology and hydrogeology

The Ynys Mor Secondary groundwater underlies both the landside port infrastructure and breakwater on Salt Island within Holyhead Port. This groundwater lies within the Western Wales River Basin. District and has an overall status of good for quantitative elements and poor for chemical elements. A WFD compliance assessment will be undertaken as part of the EIA to assess the impact of the proposed scheme on this groundwater (see **Section 27**). There are no principal aquifers within the study area of the proposed scheme.

Ordnance Survey (OS) mapping of the study area indicates a number of small water courses and drainage ditches within the scoping area, to the south and west of the Holyhead Port. The Porth-y-Felin is classed as a main river and flows to the north of Holyhead, discharging into the Harbour to the south of the marina, over 1km from the proposed scheme.

## 7.2.3 Soils

The soils of the northern half of Holy Island are generally characterised by brown earth soils. The coastal heathland areas west of the Breakwater have a mix of soil types, including thin peaty soils on the rock and better quality soils on glacial deposits (Black and Veatch, 2009b).

The site of the Anglesey Aluminium Metal Limited works is located nearby at Penrhos, this works closed in 2013, however there is the potential for the release of historic both non-ferrous and ferrous metals. During its operation, there were no instances of metalliferous release above guideline levels and the works were given an Industrial Operator Score of A-B with a Compliance Rating Score of 'Moderate' (Environment Agency (EA), 2016a). There is no evidence of potential sources of soil contamination within Holyhead Port. EA data reveals that there is a historic landfill site situated between the breakwater and Salt Island, at Soldier's Point (EA, 2016), however, this landfill site has remained unused for 44 years.

A 'Radon Map' produced from potential levels of Radon Exposures revealed that to the west side of the Stanley Embankment there are elevated levels of radon potential of up to 30% for homes in the

area having the potential to reach or exceed the recommended levels of 200 Bq m<sup>-3</sup> (Miles *et al.*, 2007).

### 7.3 Potential environmental issues associated with construction

Potential impacts to hydrology, hydrogeology, geology and soils during the construction phase of the proposed schemes include:

- Impacting upon the status of the groundwater waterbody; and,
- Ground instability due to dredging and piling works.

### 7.4 Potential environmental issues associated with operation

Potential impacts to hydrology, hydrogeology, geology and soils during the operational phase of the proposed schemes include:

- Changes in tidal currents and exposure of intertidal and foreshore areas to hydrodynamic forces which could in turn affect geological features; and,
- Changes in deposition (smothering) or erosion of geological features.

### 7.5 Proposed approach to EIA

Potential impacts to hydrology, hydrogeology will be considered as part of the WFD compliance assessment. In addition, a site investigation will be undertaken and the results used to ensure that any ground instability issues are managed. Potential impact to geology during the construction phase will be informed by the proposed geotechnical and geoenvironmental surveys (see **Section 6.4.2**).

Potential impacts to geological sites during the operational phase will be assessed using the findings of the proposed numerical modelling studies (see **Section 6.4.1**).

Should terrestrial sources be used to provide the required reclamation material, this would be managed under the Waste (England and Wales) Regulations 2011 and the Environmental Permitting (England and Wales) Regulations 2010.

## 8 Marine Water and Sediment Quality

### 8.1 Introduction

This section considers the current baseline marine sediment and water quality within Holyhead Port and adjacent Holyhead Bay coastal area. The study area considered for this section includes Holyhead Port and the surrounding coastal waters that could be influenced by a sediment plume resulting from the proposed dredging and disposal activities.

### 8.2 Baseline conditions

#### 8.2.1 Water quality

Water quality is regulated to EC Directives, which set out standards for water quality and impose monitoring requirements (see **Section 3**). The water catchment areas that surround the Port have a mix of rural, residential and commercial use but are predominantly rural in nature. Water catchment areas typically have a low level of sewage and industrial run-off (Royal HaskoningDHV, 2015).

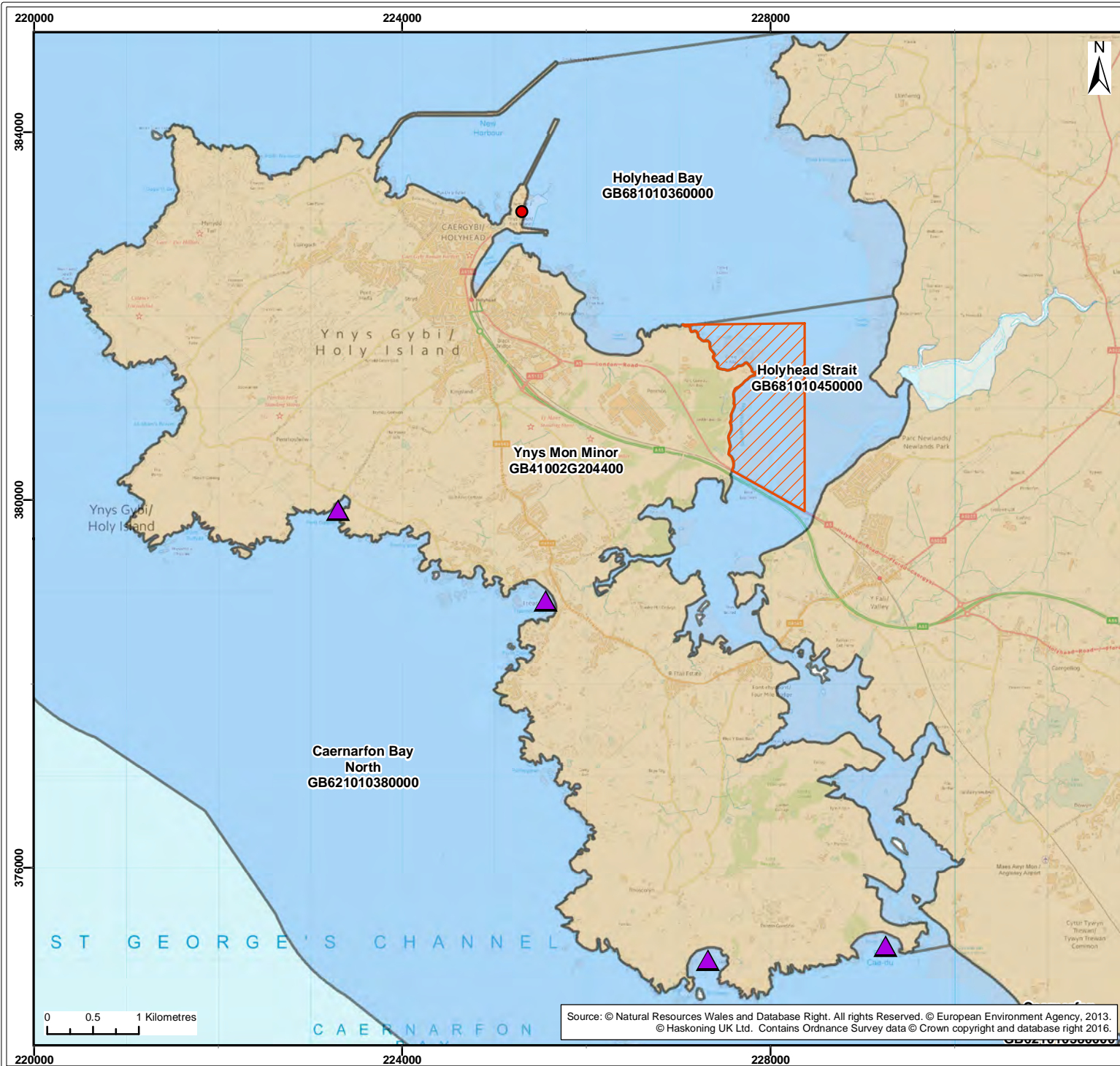
In 2007 a new wastewater treatment works was opened in Holyhead. The treatment works is located on the outskirts of the Penrhos Industrial Estate and treated effluent is discharged via a new marine outfall pipe to the north west of Holyhead town at Ynys Wellt. Prior to development of the new treatment works untreated effluent was discharged to sea through a series of short sea outfalls at Morawelon, Turkey Shore, Waterside, Coastguard / Porth Sach and Porth y Felin. Subsequent to completion of the wastewater treatment works, Holyhead Marina was awarded a Blue Flag for the first time and the Marina retains its status as a Blue Flag Marina. The Blue Flag criteria for marinas include specified environmental management practices and visually clean water with no oil, litter sewage or evidence of other pollution. Other influences on marine water quality within the wider Holyhead Harbour are likely to include shipping activities (Black and Veatch, 2009b).

NRW have three water quality monitoring sites that are located to the east of Holyhead Port. All three sites are located within 3km of the Port and form part of the Surface Water Surveillance Network established to monitor NRW's WFD commitments.

#### 8.2.2 Water Framework Directive

As described in **Section 3**, the requirement for compliance with the WFD (2006/60/EC) needs to be considered in the planning of all new activities and developments in the marine environment. NRW is the Competent Authority for the implementation of the WFD in Wales. Through the Standards and Classification (WFD) Directions (England and Wales) 2015, NRW provide the EQS for a number of 'specific pollutants' and 'other pollutants' within rivers and freshwaters, and transitional and coastal waters. The following water bodies lie within the study area for the proposed scheme (see **Figure 8-1**):

- Holyhead Strait Coastal Water Body (GB681010450000);
- Holyhead Bay Coastal Water Body (GB681010360000);
- Caernarfon Bay North Coastal Water Body (GB621010380000); and,
- Ynys Mor Secondary Groundwater (GB41002G204400).



**Legend:**

- Holyhead Port
- ▲ Bathing Waters
- Shellfish Waters
- WFD Coastal waterbody
- WFD Groundwater waterbody

<b>Client:</b> Stena Line	<b>Project:</b> Holyhead Port Reclamation EIA
------------------------------	--

**Title:**  
WFD waterbodies, Bathing and Shellfish Directive Waters

**Figure:** 8.1      **Drawing No:** PB6108-000-003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	22/12/16	AB	JM	A4	1:60,000

**Co-ordinate system:** British National Grid

**ROYAL HASKONINGDHV**  
**INDUSTRY, ENERGY & MINING**  
 2 ABBEY GARDENS  
 GREAT COLLEGE STREET  
 WESTMINSTER  
 LONDON  
 SW1P 3NL  
 +44 (0)20 7222 2115  
[www.royalhaskoning.co.uk](http://www.royalhaskoning.co.uk)

Source: © Natural Resources Wales and Database Right. All rights Reserved. © European Environment Agency, 2013. © Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.

The Port of Holyhead is encompassed within the Holyhead Bay coastal waterbody. The Caernarfon Bay coastal waterbody borders the Holyhead Bay waterbody to the north and the Holyhead Strait waterbody borders it to the south. The Ynys Mor Secondary groundwater underlies both the landside port infrastructure and breakwater on Salt Island within the Port. All four waterbodies lie within the Western Wales River Basin District; Holyhead Bay is classified as heavily modified and has a current overall status of moderate, Caernarfon has no designation and has a current overall status of good and Holyhead Strait also has no designation and has a current overall status of moderate. Ynys Mor Secondary groundwater currently has an overall status of good for quantitative elements and poor for chemical elements.

A WFD assessment will be required to assess the impact of the proposed scheme on these waterbodies to support any consent applications. For further details regarding the WFD, refer to **Section 27**.

### **8.2.3 Designated Shellfish Waters**

The only designated Shellfish Water near to the proposed scheme is the Beddmanarch Bay Shellfish Water, located approximately 1.7km to the east of the proposed scheme (see **Figure 8-1**).

### **8.2.4 Sediment Quality**

Limited data is available on the seabed sediment type within the Holyhead Port. A series of boreholes undertaken in 1993 tested surface samples for metals, tributyltin (TBT) and organic matter (see **Figure 8-2** and **Table 8-1**).

From **Table 8-1** it can be seen that the majority of samples showed levels of metals below Cefas Action Level 1, with only a few minor exceedance of this level. There was no exceedance of TBT in any of the samples. As such, it can be concluded that contaminant levels were low in the surface sediment samples analysed.

## **8.3 Potential environmental issues associated with construction**

Potential impacts to the marine sediment and water quality during the construction phase of the proposed scheme include:

- Re-suspension and deposition of suspended sediments during capital dredging and disposal activities;
- Re-suspension and dispersion of potentially contaminated sediment during capital dredging activities; and,
- Potential for leakage or spillage of hazardous materials during construction.

## **8.4 Potential environmental issues associated with operation**

Potential impacts to the marine sediment and water quality during the operational phase of the proposed scheme include:

- Increases in suspended sediment concentrations and turbidity during increased maintenance dredging and associated disposal; and,
- Potential for leakage or spillage of hazardous materials during operations.

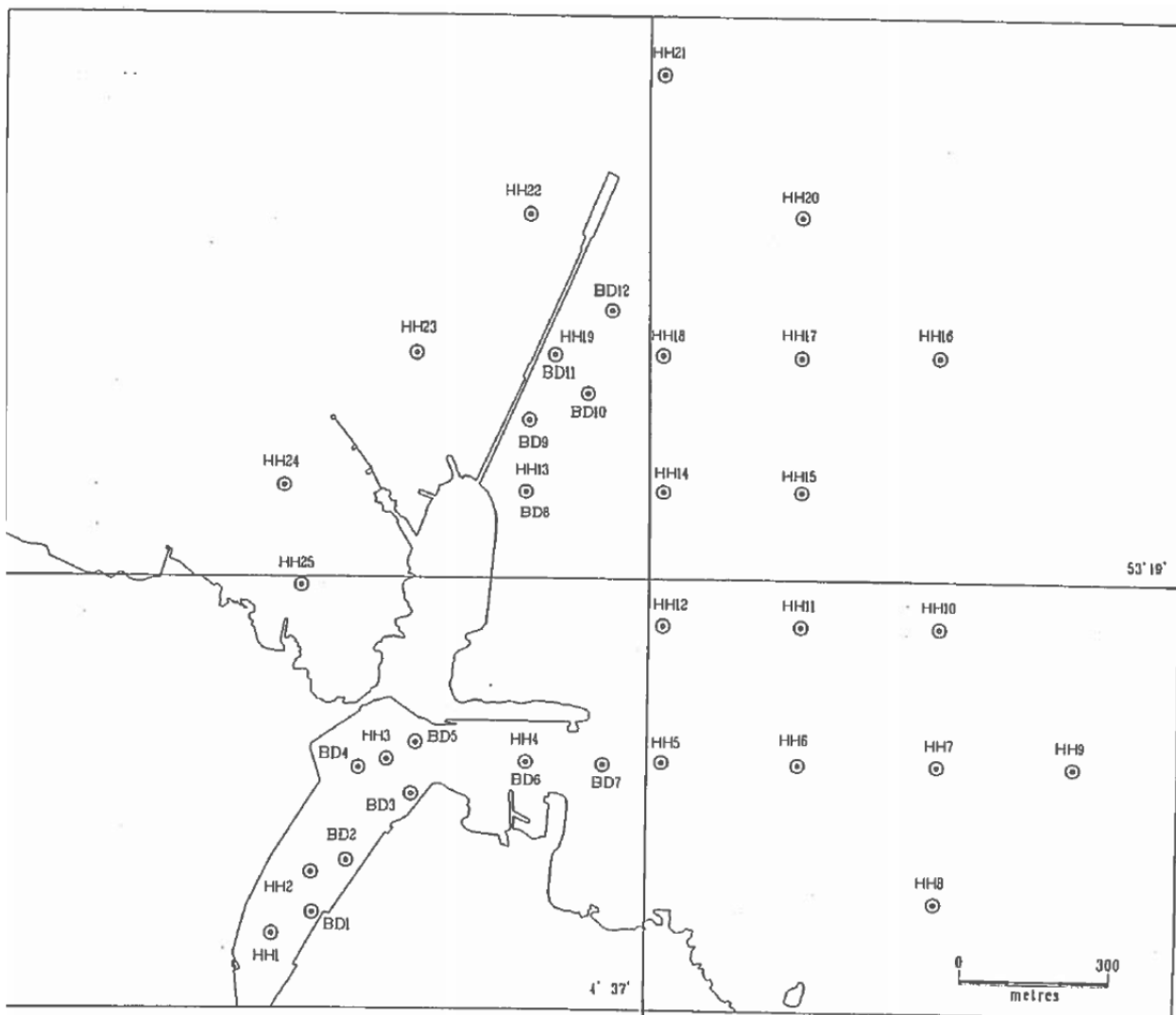


Figure 8-2 Location of surface sediment samples collected in 1993 (Mouchel & Partners, 1994)

Table 8-1 Metal, TBT and organic matter results at Holyhead Port (Source: Mouchel &amp; Partners, 1994)

Sample	Contaminant (mg/kg)									
	Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc	TBT	Organic matter (%)
MB2	0.1	<0.1	0.62	32.6	0.14	31	24.6	98	<0.05	0.0337
MB9	<0.1	<0.1	54	45.7	0.06	28	1.8	66	<0.05	0.0123
D1	<0.1	<0.1	37	7.9	0.02	34	<0.1	74	<0.05	<0.0001
D2	<0.1	<0.1	80	21.8	0.03	38	4.3	65	<0.05	<0.0001
D3	<0.1	<0.1	40	11	<0.02	28	1.8	69	<0.05	<0.0001
D4	<0.1	<0.1	59	10.2	0.02	32	2.5	88	<0.05	0.0077
D5	<0.1	<0.1	59	9	<0.02	23	28.9	69	<0.05	0.0343
D6	<0.1	<0.1	110	28.3	0.05	37	7.1	66	<0.05	<0.0001
D7	<0.1	<0.1	48	11.2	<0.02	25	5	51	<0.05	0.0013
D8	<0.1	<0.1	28	26	0.03	16	4.7	64	<0.05	<0.0001
D9	<0.2	<0.1	31	13.5	<0.02	19	31.8	63	<0.05	0.1055
D10	0.25	<0.1	65	22.6	0.7	34	4.5	55	<0.05	0.013
D11	0.2	<0.1	43	26.4	0.06	26	9.6	40	<0.05	0.0793
D12	0.2	<0.1	45	6.9	<0.02	22	2.3	41	<0.05	0.0086
<b>Action Level 1</b>	<b>20</b>	<b>0.4</b>	<b>40</b>	<b>40</b>	<b>0.3</b>	<b>20</b>	<b>50</b>	<b>130</b>	<b>0.1</b>	<b>-</b>
<b>Action Level 2</b>	<b>100</b>	<b>5</b>	<b>400</b>	<b>400</b>	<b>3</b>	<b>200</b>	<b>500</b>	<b>800</b>	<b>1</b>	<b>-</b>

Yellow cells denote exceedances of Action Level 1

## 8.5 Proposed approach to EIA

To further inform the marine water and sediment quality baseline, and subsequent environmental assessment, it is proposed that the following additional data and information will be obtained.

### 8.5.1 Water Quality

Water quality data from the three NRW monitoring sites will be obtained to inform the water quality baseline environment for the EIA. The assessment will also be informed by the findings of the proposed modelling studies (see **Section 6.4.1**), in particular the tidal flushing and sediment plume modelling.

### 8.5.2 Sediment Quality

The sediment quality baseline will be established through undertaking a geoenvironmental investigation (see **Section 6.4.2**). It is proposed that this investigation would be undertaken alongside the benthic ecology survey (see **Section 9.5**) so that the relationship between sediment type and benthic species composition can be understood. Sample location and sampling methodology will be discussed and agreed with NRW and Cefas.

## 9 Marine Ecology

### 9.1 Introduction

This section considers the marine ecology in the study area, namely benthic invertebrates. Fish and shellfish are considered within **Section 10**, marine mammals within **Section 11**, ornithology within **Section 13**, and terrestrial and coastal ecology within **Section 14**.

The study area for marine ecology comprises the following:

- the footprint of the reclamation and dredging areas;
- the near-shore intertidal and subtidal communities within Holyhead Port; and,
- the subtidal communities of Holyhead Bay.

### 9.2 Baseline conditions

It is generally considered that sediment types of the west coast of Wales are typically medium to coarse, consisting of mainly gravel and sand, with a low proportion of mud and clay sediments. Data from the Countryside Council of Wales (CCW) HabMap project<sup>8</sup> shows the predicted biotopes in and around Holyhead Port are:

- SS.SSa.IMuSa.FfabMag - Infralittoral muddy sand
- SS.SCS.ICs.SLan - Infralittoral Coarse Sediment
- SS.SMp.KSwSS.LsacR - Kelp and seaweed (on Sublittoral Sediment).

These biotopes are typically characteristic of those found on sandy/gravelly substrate and in mobile, well swept environments. Benthic communities typically consist of common polychaete, crustacean, mollusc or echinoderm based. The HabMap data shows that these biotopes are typically common in the Anglesey area and wider Welsh coastal area.

Surveys undertaken to inform the Deep Green Holyhead Deep Array Project Scoping Report (Minesto, 2016) identified Sandy Seabed habitat with small areas of bedrock reef to the east of Holyhead Port in the approach to Penrhos Beach. Grab samples taken from the same area as part of the survey campaign identified muddy sand and muddy sandy gravel sediments.

Sensitive species and habitats are not likely to be present in the operational Port however, approximately 2km south-east of the proposed works class B mussels beds are present (see **Section 12**).

The carpet sea squirt (*Didemnum vexillum*) is known to be present in Holyhead Port. *Didemnum vexillum* is an alien species capable of smothering large areas, posing a threat to native marine ecosystems (Black and Veatch, 2009b).

<sup>8</sup> CCW Habmap <http://www.ccg.gov.uk/landscape--wildlife/habitats--species/habmap/downloads.aspx>



### 9.3 Potential environmental issues associated with construction

Potential impacts to the marine ecology during the construction phase of the proposed scheme include:

- Direct loss of benthic and epibenthic species and habitats within the footprint of the areas to be reclaimed and dredged, comprising approximately 11ha of intertidal and subtidal habitat;
- Smothering of benthos from suspended sediment settling out of the sediment plume during dredging;
- Re-suspension and dispersion of potentially contaminated sediment during dredging activities; and,
- Spread of invasive species, i.e. *Didemnum vexillum*.

### 9.4 Potential environmental issues associated with operation

Potential impacts to the marine ecology during the operational phase of the proposed scheme include:

- Potential impact on benthic community structure due to change in the maintenance dredging regime;
- Implications of any hydrodynamic change on patterns of sediment movement (erosion and/or accretion) and the influence on benthic communities;
- Potential changes in exposure of intertidal areas due to the effect on tidal propagation; and,
- Spread of invasive species, i.e. *Didemnum vexillum*.

### 9.5 Proposed approach to EIA

To determine the potential impact that the proposed scheme could have on the marine ecology of the study area, it is necessary to characterise the marine communities currently within, and immediately adjacent to, the proposed reclamation and dredge areas.

A benthic ecology survey will be undertaken to determine the subtidal biotopes within the footprint and areas that could be indirectly affected by the proposed works. The survey area will be informed by the proposed modelling studies (see **Section 6.4.1**). The scope of the survey will be discussed and agreed with NRW.

The assessment on marine ecology will also be informed by the findings of the sediment quality assessment (see **Section 8**) and proposed geoenvironmental investigation (see **Section 6.4.2**).

## 10 Fish and Shellfish Resource

### 10.1 Introduction

This section considers the fish and shellfish resource in the vicinity of the proposed scheme. The section focusses on fish and shellfish species of conservation importance and other species which play an important part in the marine ecology of the study area. Fish and shellfish species of commercial importance are covered in more detail in **Section 12**.

The study area for this section includes the Holyhead Straits and south Holyhead Bay.

### 10.2 Baseline conditions

#### 10.2.1 Fish spawning and nursery areas

The study area includes low intensity spawning grounds for sandeel (*Ammodytidae*), plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*), sole (*Solea solea*), cod (*Gadus morhua*) and mackerel (*Scomber scombrus*) (see **Figure 10-1** and **Figure 10-2**). In addition, the area includes low intensity nursery areas for tope shark (*Galeorhinus galeus*), thornback/spotted ray (*Raja clavata* and *R. monatgui*) and whiting (see **Figure 10-3**).

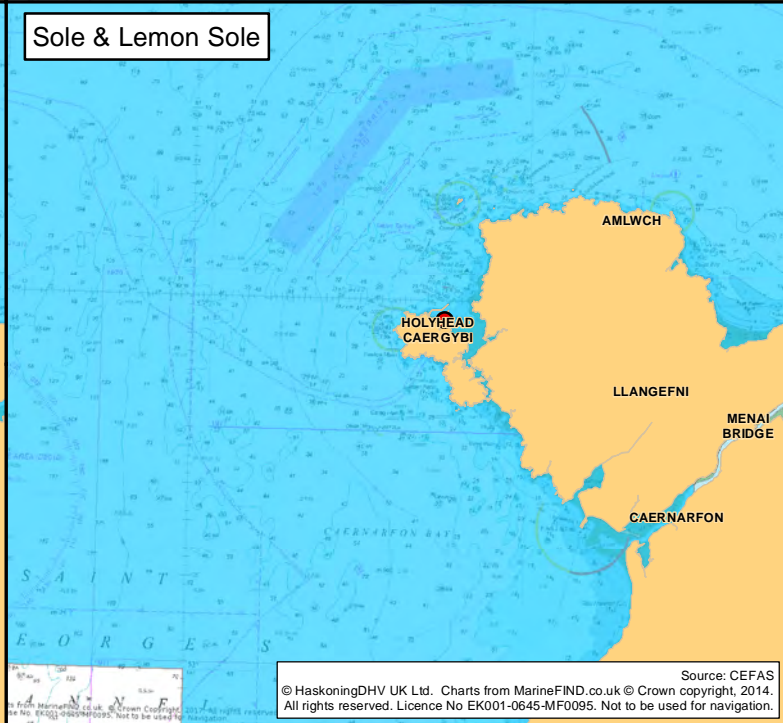
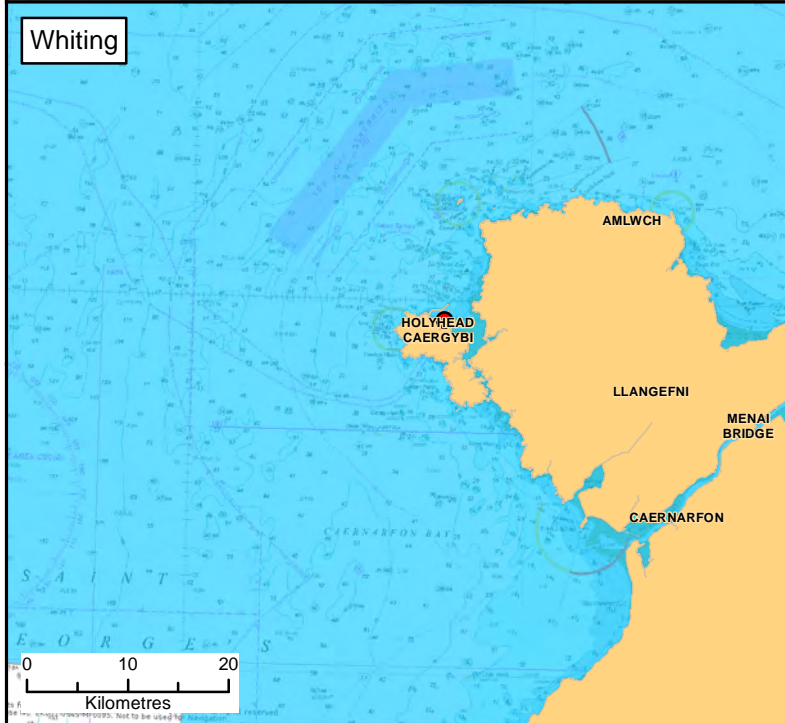
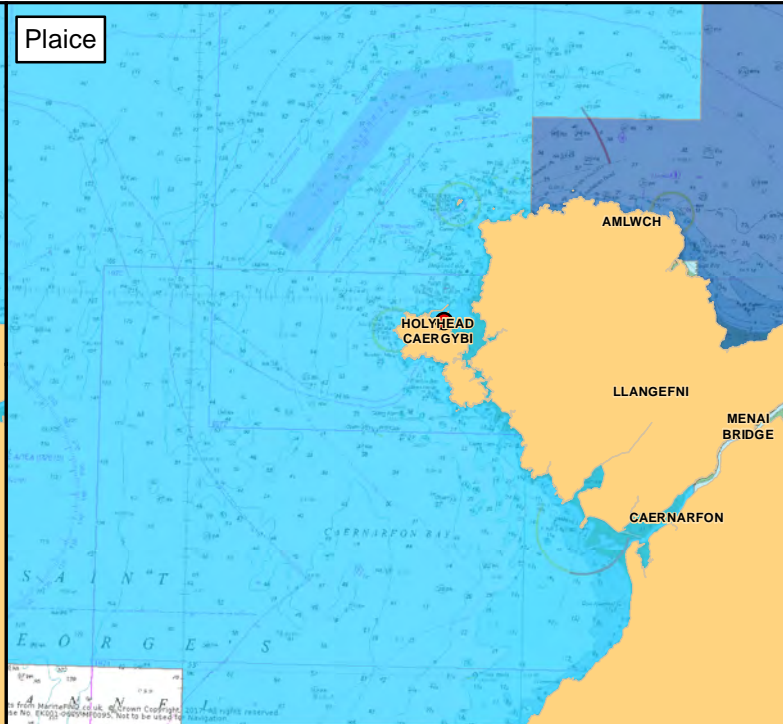
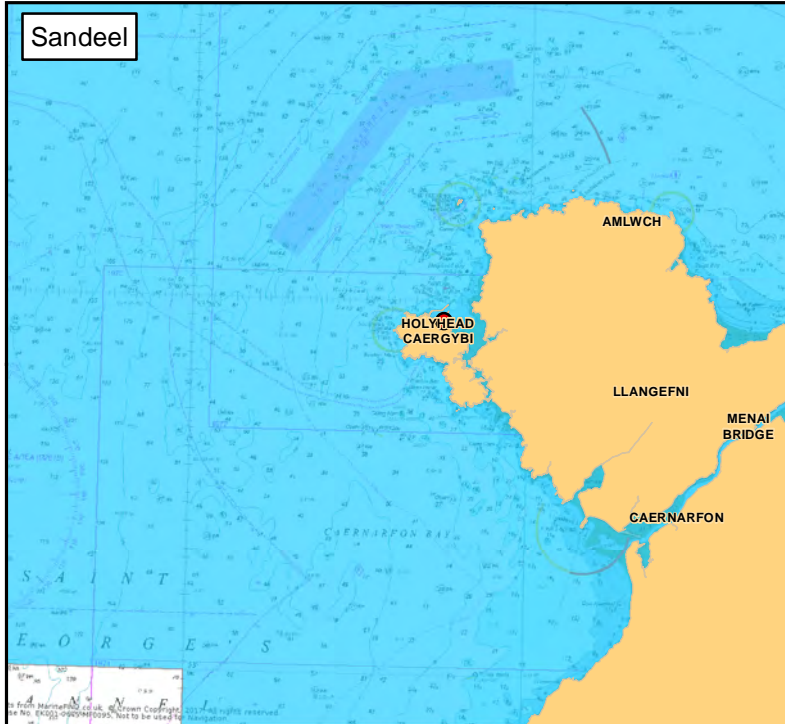
#### 10.2.2 Fish and shellfish species

Several species of conservation importance have been recorded during surveys along the north Anglesey coast, including Raitt's sandeel (*Ammodytes marinus*), plaice, herring (*Clupea harengus*), sole and tope shark (Horizon Nuclear Power, 2016).

Fish surveys along the north Anglesey coast since 2010 have recorded more than 90 species in the area. Fish eggs and larvae have been sampled along the north Anglesey coast showing abundance peaks between March and May (after the spring spawning of some species). Sandeels were found to dominate the samples, with gobies (*Gobiidae*), butterfish (*Pholis gunnellus*) and blennies (*Blennioidei*) along with plaice and dab (*Limanda limanda*) also found in abundance (Horizon Nuclear Power, 2016).

The offshore area has the potential to be within a transitory route for several migratory species including bass (*Dicentrarchus labrax*), salmon (*Salmo salar*) and sea trout (*Salmo trutta*) (Celtic Sea Trout Project, 2011).

There are also a number of shellfish species, which are of particular interest to fishermen in the area, including crabs (*Cancer Pagurus*) and lobsters (*Homarus gammarus*), as well as mussels (*Mytilus edulis*) (see **Section 12**). Class B mussel beds are located approximately 2km south-east of the proposed scheme. Queen scallops are known to be common in the wider Irish Sea area though are not a focus for fishing near Holyhead, suggesting they are not common within the study area (Royal HaskoningDHV, 2015).



Legend:

- Holyhead Port
- Spawning Ground (Ellis *et al.* 2010)
- Intensity Use**
- High intensity
- Low intensity

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title: Map of Sandeel, Plaice, Whiting and Sole spawning areas around Anglesey

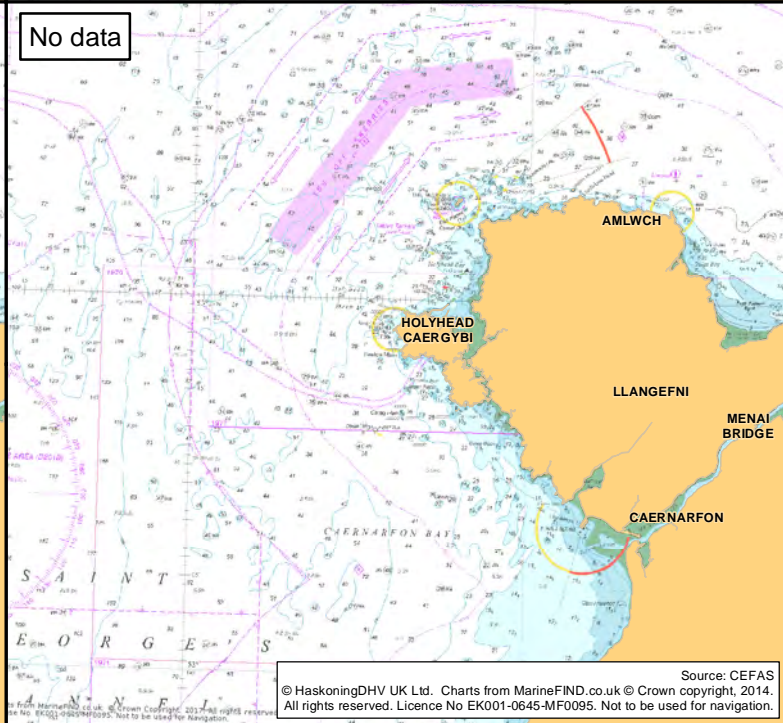
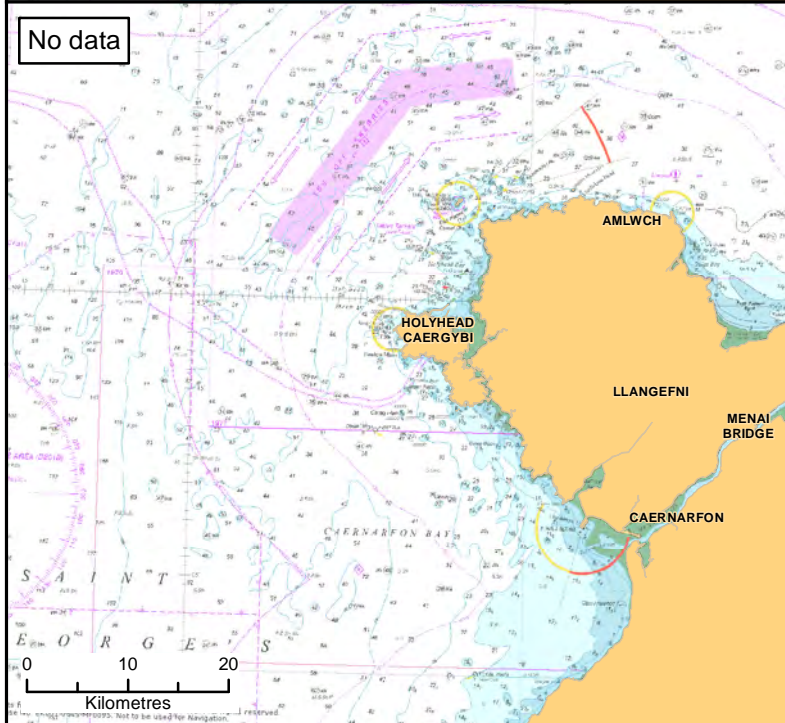
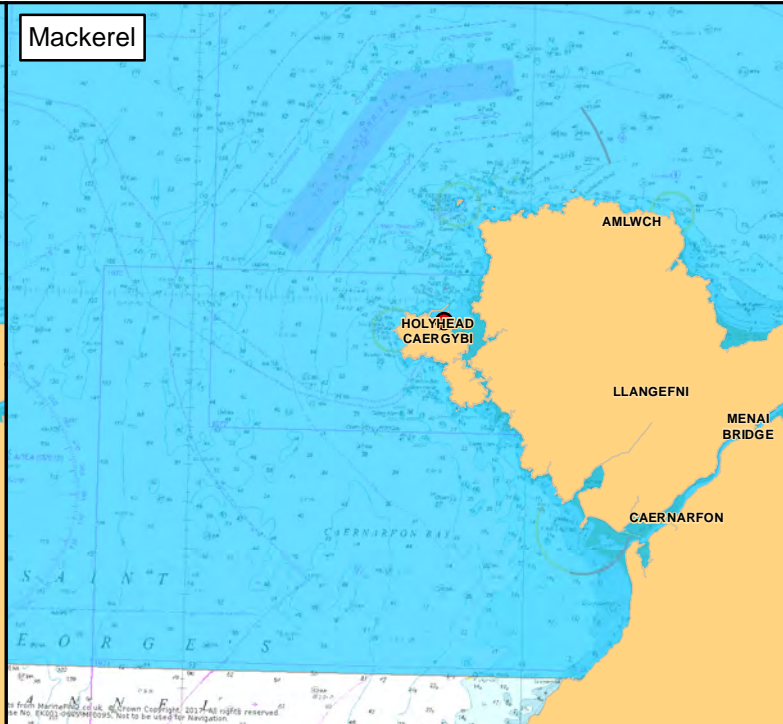
Figure: 10.1 Drawing No: PB6108-000-009

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	23/03/17	AB	JM	A4	1:750,000

Co-ordinate system: WGS84 UTM Zone 30N

**ROYAL HASKONINGDHV**  
 INDUSTRY, ENERGY & MINING  
 2 ABBEY GARDENS  
 GREAT COLLEGE STREET  
 WESTMINSTER  
 LONDON  
 SW1P 3NL  
 +44 (0)20 7222 2115  
[www.royalhaskoning.co.uk](http://www.royalhaskoning.co.uk)

Source: CEFAS  
 © HaskoningDHV UK Ltd. Charts from MarineFIND.co.uk © Crown copyright, 2014.  
 All rights reserved. Licence No EK001-0645-MF0095. Not to be used for navigation.



Legend:

- Holyhead Port
- Spawning Ground (Ellis *et al.* 2010)
- Intensity Use**
- High intensity
- Low intensity

Client: <b>Stena Line</b>	Project: <b>Holyhead Port Reclamation EIA</b>
------------------------------	--

Title:  
**Map of Cod and Mackerel spawning areas around Anglesey**

Figure: 10.2      Drawing No: PB6108-000-010

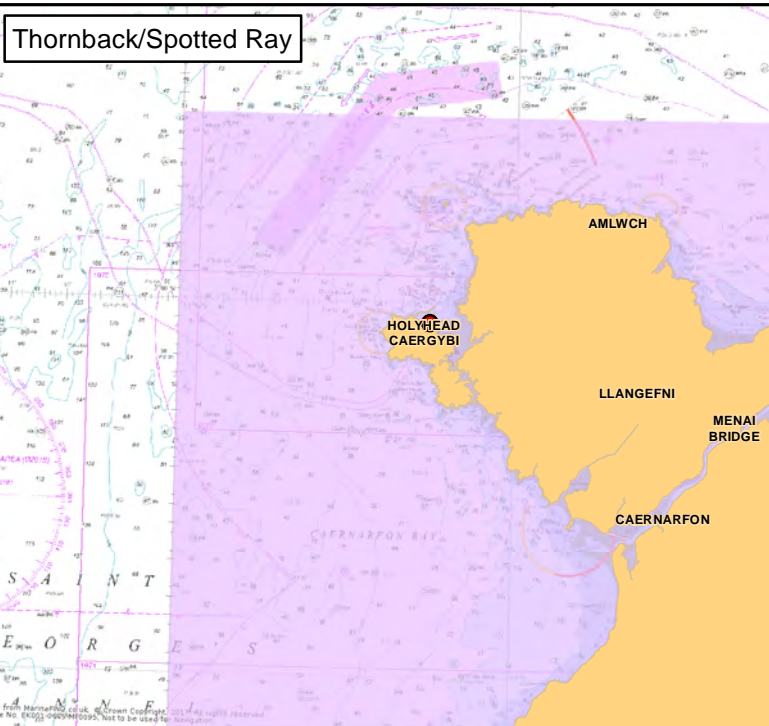
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	23/03/17	AB	JM	A4	1:750,000

Co-ordinate system: WGS84 UTM Zone 30N

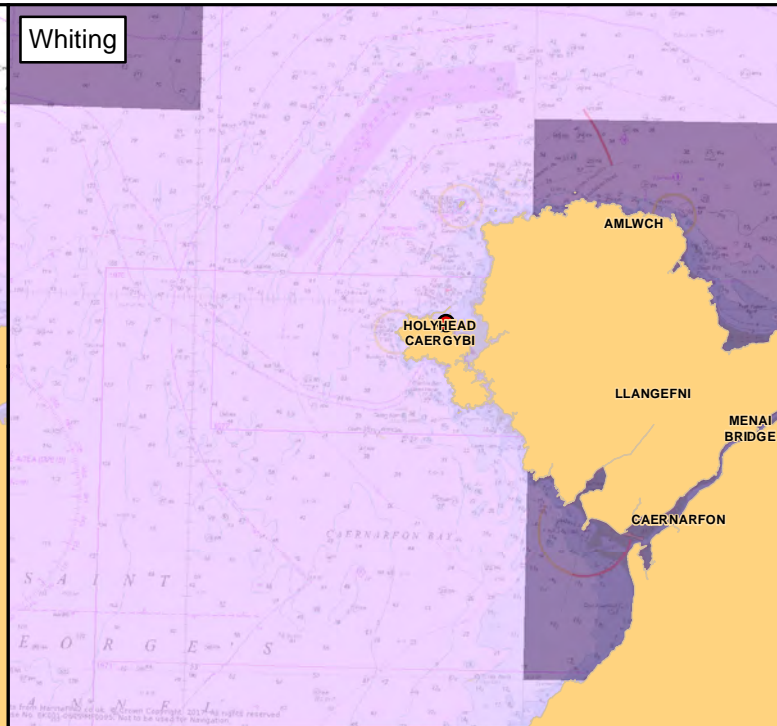
**ROYAL HASKONINGDHV**  
 INDUSTRY, ENERGY & MINING  
 2 ABBEY GARDENS  
 GREAT COLLEGE STREET  
 WESTMINSTER  
 LONDON  
 SW1P 3NL  
 +44 (0)20 7222 2115  
[www.royalhaskoning.co.uk](http://www.royalhaskoning.co.uk)

Source: CEFAS  
 © HaskoningDHV UK Ltd. Charts from MarineFIND.co.uk © Crown copyright, 2014.  
 All rights reserved. Licence No EK001-0645-MF0095. Not to be used for navigation.

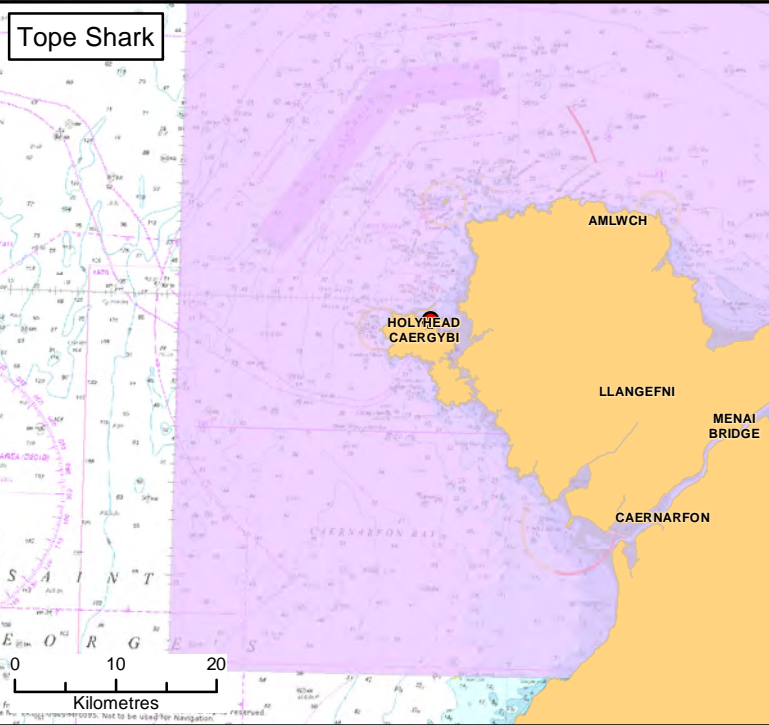
Thornback/Spotted Ray



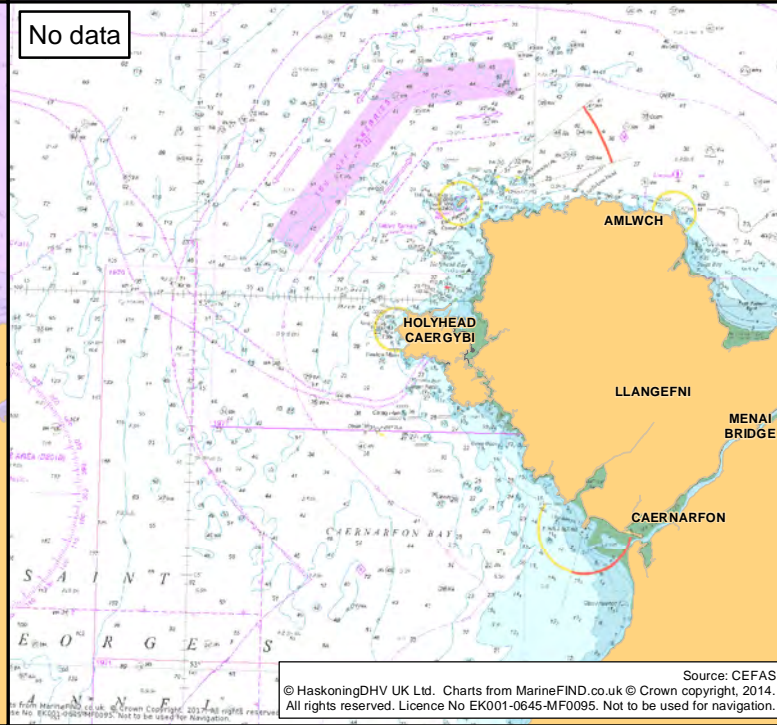
Whiting



Tope Shark



No data



Legend:

- Holyhead Port
- Nursery ground (Ellis *et al.* 2010)
- Intensity Use**
- High intensity
- Low intensity

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title:  
Map of Thornback/Spotted Ray, Whiting and Tope Shark nursery areas around Anglesey

Figure: 10.3	Drawing No: PB6108-000-011
--------------	----------------------------

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	23/03/17	AB	BK	A4	1:750,000

Co-ordinate system: WGS84 UTM Zone 30N

**ROYAL HASKONINGDHV**  
**INFRASTRUCTURE, ENERGY & MINING**  
 2 ABBEY GARDENS  
 GREAT COLLEGE STREET  
 WESTMINSTER  
 LONDON  
 SW1P 3NL  
 +44 (0)20 7222 2115  
[www.royalhaskoning.co.uk](http://www.royalhaskoning.co.uk)

Source: CEFAS  
 © HaskoningDHV UK Ltd. Charts from MarineFIND.co.uk © Crown copyright, 2014.  
 All rights reserved. Licence No EK001-0645-MF0095. Not to be used for navigation.

### 10.3 Potential environmental issues associated with construction

Potential impacts to fish and shellfish resource during the construction phase of the proposed scheme include:

- Underwater noise from piling and dredging;
- Smothering of fish spawning and nursery grounds, and shellfish due to deposition of the dredging plume, during the capital dredge;
- Decreased resource availability to fish species through loss of intertidal and subtidal habitats as a result of the reclamation works and smothering from the dredging plume; and,
- Increased risk from contaminants through the re-suspension of sediment.

### 10.4 Potential environmental issues associated with operation

Potential impacts to fish and shellfish resource during the operational phase of the proposed scheme include:

- Loss or smothering of fish spawning and nursery grounds, and shellfish due to changes in the hydrodynamic and sedimentary regimes; and,
- Smothering of fish spawning and nursery grounds, and shellfish due to deposition of the dredging plume during maintenance dredging.

### 10.5 Proposed approach to EIA

Taking account of the localised footprint of the proposed scheme, the low level intensity of potentially affected spawning and nursery grounds, and the level of existing information, a demersal trawl survey is not considered necessary. A detailed desk-based assessment on the potential impacts of the proposed scheme will be undertaken on fish and shellfish resource. This assessment will be informed through consultation with local fishermen and NRW.

This assessment will also be informed by the findings of the numerical modelling studies and geoenvironmental investigation (see **Sections 6.4.1** and **6.4.2**), and benthic ecology survey (see **Section 9.5**).

## 11 Marine Mammals

### 11.1 Introduction

This section considers the presence of marine mammals in the vicinity of the proposed scheme. Due to the high mobility of marine mammals, the study area for this section includes the Celtic and Irish seas.

### 11.2 Baseline conditions

The west coast of Anglesey has one of the highest diversities of marine mammals within the Celtic and Irish Seas (Baines and Evans, 2012). There are three species of marine mammal that are common on or near to Holyhead Port: harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*) and grey seal (*Halichoerus grypus*). There are also several species that have the potential to be near including: common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), minke whale (*Balaenoptera acutorostrata*) and harbour seal (*Phoca vitulina*).

#### 11.2.1 Harbour porpoise

Consistently high densities of harbour porpoise were identified in the summer months to the northern coast of Anglesey and around Holyhead, with 25% of the Inter-Agency Marine Mammal Working Group (IAMMWG) Celtic and Irish Sea population present (which has a total of 104,695 individuals) (Heinänen and Skov, 2015; IAMMWG, 2015). Although there are obvious peaks in abundance in the summer months, harbour porpoise are present year-round. Holyhead and the Isle of Anglesey have been identified as a hotspot for harbour porpoise, particularly Point Lynas and South Stack. Calves are spotted throughout North Wales and Anglesey (Baines and Evans, 2012).

#### North Anglesey Marine pSAC

The proposed scheme sits within the North Anglesey pSAC (**Figure 5.1**) designated specifically for harbour porpoise. The proposed site has been selected upon the evidence that it is an area of persistent high densities of harbour porpoises and covers important summer habitats for the species (JNCC and NRW, 2015). Much of the site has water depths of below 40m with deeper areas offshore and has been predicated as being a key foraging ground for the species.

#### 11.2.2 Bottlenose dolphin

Cardigan Bay on the west coast of North Wales is one of the main areas of resident bottlenose dolphins in the UK. Due to this, the waters off Holyhead have the potential to have relatively high numbers of bottlenose dolphins present. Long-term sightings rates data, as collated in the Atlas of the Marine Mammals of Wales (Baines and Evans, 2012), found that bottlenose dolphins occur with moderately high density rates along the north coast of Wales, particularly Anglesey. Bottlenose dolphins breed throughout the year and calves are spotted throughout North Wales and Anglesey (Baines and Evans, 2012).

#### Lleyn Peninsula and the Sarnau & Cardigan Bay SACs

The Lleyn Peninsula and The Sarnau SAC lies 37km from Salt Island. Bottlenose dolphin is listed as a qualifying feature of the SAC. Bottlenose dolphins are not resident to the site, but nevertheless spend a significant amount of time within the SAC, especially from July to October. Photo-ID studies

have shown that the dolphins present are largely the population from the nearby Cardigan Bay SAC (CCW, 2009a).

Cardigan Bay SAC has one of the two main resident populations of bottlenose dolphins in the UK (CCW, 2009b). Although it lies over 100km from the proposed scheme, Photo-ID studies have shown that the animals move up the coastline and into Liverpool Bay and Manx waters, particularly during winter months, indicating a possibility of bottlenose dolphins being present around Holyhead (Norman *et al.*, 2015).

### **11.2.3 Grey seal**

High numbers of grey seals are present around the coastline of North Wales with relatively high densities around Holyhead and Anglesey (Jones *et al.*, 2013). Tracking data collected by the Sea Mammal Research Unit (SMRU) for grey seals in Welsh waters (1991-2012) revealed high levels of use around the North and West Wales coastline (SMRU, 2013). There are 37 known haul-out sites for grey seals in Anglesey and the Llyn Peninsula, with the closest being the North Stack coast (Westcott and Stringell, 2003).

Grey seals around the Isle of Anglesey have been noted to have high levels of interconnectivity with the Llyn Peninsula and the Sarnau SAC, Cardigan Bay SAC and Pembrokeshire Marine SAC. Holy Island is used by grey seals as a haul-out location more in the winter months than in summer. Sea caves and gullies around the North Stacks and the Skerries are known to be important pupping locations for grey seals (Westcott and Stringell, 2003).

The Skerries lie 11.7km from Salt Island and comprises of a group of small rocky islets; grey seals use this area as a haul-out and breeding site. In 2002 – 2003, regionally significant numbers (49) of grey seals were recorded at the Skerries (Westcott and Stringell, 2004). The Skerries are known to have high numbers of grey seal presence year-round, with at least 24 seals present. Grey seals pups are present at this site from November to February, with up to 12 pups in November. The colony of grey seals at this site is vulnerable to disturbance during the pupping season (autumn) and increased human and vessel activity during this time should be limited (CCW, 2012a).

The North Stack coast was found to be the second most important pupping area for grey seals in north Wales. This coastline stretches from South Stack up to North Stack and along the north coast of Holy Island to Porth Namarch near Holyhead Harbour. It is made up of inaccessible remote beaches and complex sea caves, the tides here are strong and dangerous swells (generated every day by the passing ferries to Holyhead Harbour) inundate the caves and beaches. Most locations along this coastline are used solely for the breeding season; however, two locations were found to be used year round, Ogor Arw and Ogor Morlo (south of Parliament House). September to December is an important time along the coastline for pups, with up to 16 noted along the coast at any one time (Westcott and Stringell, 2004).

### **11.2.4 Other marine mammals**

Within the Celtic and Irish Seas, the common dolphin is predominantly seen in the Celtic deep and St Georges Channel, however, they are present in the Irish Sea (although have relatively low densities in these areas) and have the potential to be within close proximity to the proposed scheme (Baines and Evans, 2012).



The highest densities of Risso's dolphins within the Celtic and Irish Seas are found off the Western end of the Llyn Peninsula, with lower densities found on North and Western Anglesey. Risso's dolphins are found in highest numbers in the summer months, with individuals being sighted all around the Welsh coastline and up to the Isle of Man, indicating a single population. Calves are spotted around Anglesey (Baines and Evans, 2012).

Minke whales (*Balaenoptera acutorostrata*) have been sighted off of the Anglesey coastline and Bardsey Island; however, there have been relatively few individuals sighted. The sightings rates for minke whales in Welsh waters are highest from April to September, with the species becoming rare to the entirety of the UK coastal waters in winter months, where they tend to move further offshore. It is unlikely that minke whale calve in Welsh waters (Baines and Evans, 2012).

Harbour seals have no breeding sites in Wales; however, they are present in small numbers, with 35 seals counted in the Scientific Council on Seals (SCOS) Survey 2007 – 2014 (SCOS, 2015).

### 11.3 Potential environmental issues associated with construction

Potential impacts to marine mammals during the construction phase of the proposed scheme include:

- Underwater noise from construction vessels and dredging;
- Increased collision risk with construction vessels;
- Disturbance to seals at haul-out sites;
- Risk from contaminants due to re-suspended sediments during the capital dredge;
- Increased suspended sediment during the capital dredge and disposal activities; and,
- Changes in prey availability due to habitat loss as a result of the reclaimed areas and smothering of habitats as a result of the deposition of the dredge and disposal plume.

### 11.4 Potential environmental issues associated with operation

Potential impacts to marine mammals during the operational phase of the proposed scheme include:

- Increased collision risk with vessels; and,
- Increased disturbance to seals at haul-out sites.

### 11.5 Proposed approach to EIA

Holyhead Port has existing high levels of shipping, contributing to the underwater noise of the site. The underwater noise produced by shipping activities is unlikely to cause physical trauma to harbour porpoise, but it has the potential to impact on disturbance and displacement of preferred habitat areas and cause avoidance. Due to the currently high levels of shipping on the site, it is unlikely that further increases in the level of shipping traffic will require management as there are evidently high numbers of porpoises using the area despite the already high levels of shipping traffic within Holyhead Port. Collision risk of vessels and porpoises is not currently considered a significant risk. Likewise, any risk of dredging within the pSAC is considered to be relatively low for porpoises (JNCC and NRW, 2016).

It is considered that there is sufficient existing information from surveys and monitoring programs for marine mammals within the area is available to assess the potential impacts. As such, further surveys are not considered necessary.

To fully assess the potential impacts of underwater noise, underwater noise modelling will be undertaken. The potential impacts from increased vessel numbers will be fully assessed as part of the EIA process (for construction and operation) and the changes to prey availability will be informed by the proposed modelling studies (see **Section 6.4.1**), the benthic ecology survey (see **Section 9**) and the assessment of fish and shellfish resource (see **Section 10**).

## 12 Commercial Fisheries

### 12.1 Introduction

This section considers the commercial fishing activity within Holyhead Port and the surrounding area. The study area considered for this section includes Holyhead Port and the surrounding coastal area that could be affected by the proposed construction and dredging and disposal activities and resultant sediment plume. Fish and shellfish resource are considered within **Section 10**; commercial and recreational navigation is considered within (**Section 15**).

### 12.2 Baseline conditions

Holyhead Port is one of three commercial fishing ports in Wales which record landing statistics and is one of the most active ports for the Welsh fishing fleet (Pantin *et al.*, 2015). The most significant fishing activity in the inshore waters around Anglesey and Holyhead Port is potting to catch shellfish.

Holyhead Port lies within the International Council for the Exploration of the Seas (ICES) Rectangle Area 35E5. This area encompasses the entire Isle of Anglesey, within which the Holyhead Port is located. **Table 12-1** summarises the landings data for the key species from 2010-2014 for vessels of all lengths for ICES rectangle 35E5.

Table 12-1 Key species landed from ICES rectangle 35E5 between 2010 - 2014 by all vessel sizes (MMO, 2015a) (adapted from Minesto, 2016)

Species	Value (£)		Liveweight (tonnes)	
	Total	% total	Total	% total
Whelks ( <i>Buccinum undatum</i> )*	566,949	43	795	50
King Scallops ( <i>Pecten maximus</i> )*	322,144	24	172	11
Queen Scallops ( <i>Aequipecten opercularis</i> )*	218,732	16	584	37
Lobsters ( <i>Homarus gammarus</i> )*	174,170	13	17	1
Sole ( <i>Solea solea</i> )	12,142	1	2	<1
Common Prawns ( <i>Palaemon serratus</i> )	7,731	1	<1	<1
Brown Crab ( <i>Cancer pagurus</i> )	7,254	1	7	<1

\*Top four landed species

In addition to those species identified in **Table 12-1**, other species landed within ICES rectangle 35E5 include salmon (*Salmo salar*), sea trout (*Salmo trutta*), halibut (*Hippoglossus hippoglossus*), spider crab (*Libinia emarginata*), john dory (*Zeus faber*) and red mullet (*Mullus surmuletus*), amongst numerous others (MMO, 2015a).

As demonstrated by **Table 12-1**, four of the most landed species (in terms of value) within ICES rectangle 35E5 are shellfish, which contributed to 96% of the value of landings and 99% of the liveweight of landings between 2010 and 2014. Whelks have the highest economic value and are principally landed at Amlwch and Holyhead Port (Minesto, 2016). According to data obtained from the FishMap Môn project, whelk potting occurs mainly offshore from Holyhead, with low levels of

lobster and crab potting occurring further inshore, to the north of the Holyhead Port (Minesto, 2016). King and queen scallops are targeted primarily by dredgers, however a scallop no take zone is currently imposed within 1nm from the coast, therefore scallop dredgers are not active within the 1nm of Holyhead Port.

**Table 12-2** summarises the top five (value) species landed by Welsh fishing vessels at Holyhead Port in 2012. This data mirrors that obtained from the wider ICES rectangle 35E5 (**Table 12-1**), further highlighting the important of Holyhead Port to shellfisheries.

*Table 12-2 Top four species of fish landed at Holyhead Port in 2012 (Source: Gwynedd and Anglesey Fisheries LAP, 2013)*

Species	Weight (tonnes)	Value (£)	Gear used
Queens scallops	749	267,740	Dredgers
Whelks	376	257,428	Whelk pots and dredgers
King Scallops	137	250,825	Dredges
Lobsters	8.6	78,359	Pots

In 2015, Holyhead Port recorded 2,600 tonnes of landed shellfish with a reported value of £2.2 million (MMO, 2015a). This demonstrates a slight reduction in landed fish in comparison to 2014 data where 3,000 tonnes of fish were landed with a reported value of £2.4 million. During both 2014 and 2015, no demersal or pelagic fish were landed at Holyhead Port (MMO, 2015a).

In December 2016, the number of commercial vessels whose home port (the port at which they land their catch) was listed as Holyhead was 22 vessels (10m and below) and four vessels (greater than 10m) (MMO, 2015b). Vessels smaller than 10m are rarely at sea for more than 24 hours on any one trip and thus tend to fish close to their home port. Larger vessels in this class size tend to work inshore, generally within 6nm of the coast (Minesto, 2016).

There is an active mussel fishery located approximately 4.5km south east of Holyhead Port (**Figure 12-1**), where seed stocks are laid on the lower intertidal and subtidal area. The meat yields obtained here are not optimal, so stocks are then transferred to mussel lays in in the eastern Menai Strait where they are fattened further and harvested. There is also a planned oyster/clam/mussel area to the east of Holyhead Port, north of the existing mussel fishery (**Figure 12-1**) (Cefas, 2014).



Figure 12-1 Location of existing and planned shellfishery sites (Source: Cefas, 2014)

### 12.3 Potential environmental issues associated with construction

Potential impacts to commercial fisheries during the construction phase of the proposed scheme include:

- Potential disruption to fishing activities / increased risk of collision;
- Smothering of fish spawning and/or nursery area as a result of the deposition of the capital dredge plume;
- Smothering of fish feeding grounds/habitats as a result of the deposition of the capital dredge and disposal plume;
- Smothering of shellfish of as a result of the deposition of the capital dredge and disposal plume; and,
- Disruption to the local fishing industry during the development of Area C.

## 12.4 Potential environmental issues associated with operation

Potential impacts to commercial fisheries during the operational phase of the proposed scheme include:

- Potential disruption to fishing activities / increased risk of collision;
- Smothering of fish spawning and/or nursery area as a result of the deposition of the maintenance dredge plume;
- Smothering of fish feeding grounds/habitats as a result of the deposition of the maintenance dredge plume; and,
- Loss damage to the above as a result of changes in coastal processes.

## 12.5 Proposed approach to EIA

To further inform the existing commercial fisheries baseline and to better inform the EIA, additional data and information will be obtained. Additional data used in the EIA will include MMO landings data and information from the Fish Map Môn project. Vessel Monitoring System (VMS) data will also be used, however, only vessels over 15m are required to publish this data, VMS data may therefore be limited for the Holyhead Port.

Due to the importance of Holyhead Port in supporting the local commercial fishing industry, consultation with relevant stakeholders will be undertaken, including NRW, the Welsh Government and local fishermen.

The assessment on commercial fisheries will be informed by the proposed modelling studies (see **Section 6.4.1**) and the assessments on fish and shellfish resource (**Section 10**) and commercial and recreational navigation (**Section 15**).

## 13 Ornithology

### 13.1 Introduction

This section considers the ornithological interest in the vicinity of the proposed scheme. The study area for this section includes Holy Island and south Holyhead Bay.

### 13.2 Baseline conditions

The Irish Sea around Anglesey is used by a wide number of seabird species, including coastal and offshore birds. As the proposed scheme is located within an existing operational port, there is the potential for both offshore and coastal species to be present.

#### 13.2.1 Designated sites

As noted in **Section 5** and presented on **Figure 5-1**, there are a number of sites in the immediate vicinity of the proposed scheme that are designated (either in whole or in part) for their ornithological interests under national and international legislation.

#### 13.2.2 Salt Island breeding bird survey

RPS was commissioned by Stena Line to conduct a breeding bird survey relating to a proposed reclamation on the west side of Salt Island. The survey area included Salt Island and an area water to the west (see **Figure 13-1**). The breeding bird survey was carried out in May and June 2016 (RPS, 2016).

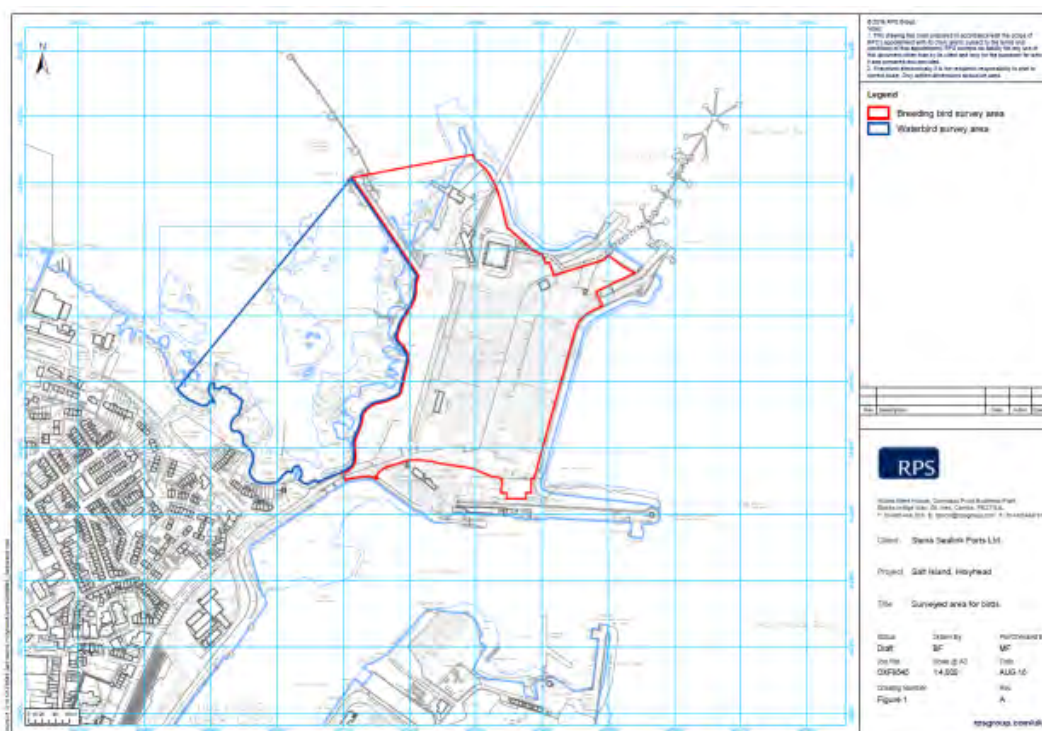


Figure 13-1 Salt Island breeding bird survey area (Source: RPS, 2016)

A total of 17 species of breeding birds were recorded, as well as three additional probable breeding species, above the Mean High Water Mark (MHWM) (see **Table 13-1**). None of the species identified were listed on either Annex 1 of the EU Birds Directive (Directive 2009/147/EC) or under Schedule 1 of the Wildlife and Countryside Act 1985, as amended. No bird species were found to be breeding in numbers of national significance (RPS, 2016).

Table 13-1 Breeding birds species list (Source: RPS, 2016).

Bird Species	Breeding Status	Number of Breeding Territories		Conservation Status
		Minimum number of breeding territories within development area	Minimum number of breeding territories within wider survey area	
Blackbird	Confirmed	2	4	-
Black guillemot	Confirmed	-	7	BoCC (UK) listed as Amber BoCC (Wales) listed as Amber
Carion crow	Confirmed	1	1	-
Collared dove	Confirmed	-	1	-
Dunnock	Confirmed	2	4	UK BAP priority species NERC Section 42 BoCC (UK) listed as Amber
Feral pigeon	Confirmed	1	1	-
Goldfinch	Probable	-	-	-
Greylag goose	Confirmed	1	1	BoCC (UK) listed as Amber
Herring gull	Confirmed	1	11	UK BAP priority species NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Red
House martin	Confirmed	-	3	BoCC (UK) listed as Amber BoCC (Wales) listed as Amber
House sparrow	Confirmed	1	9	UK BAP priority species NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Amber
Lesser black-backed gull	Confirmed	-	1	BoCC (UK) listed as Amber BoCC (Wales) listed as Amber
Lesser redpoll	Non-breeding	-	-	UK BAP priority species NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Red
Linnet	Probable	-	-	UK BAP priority species NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Red
Oystercatcher	Confirmed	3	5	BoCC (UK) listed as Amber
Pied wagtail	Confirmed	1	2	-



Bird Species	Breeding Status	Number of Breeding Territories		Conservation Status
		Minimum number of breeding territories within development area	Minimum number of breeding territories within wider survey area	
Ringed plover	Non-breeding	-	-	NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Amber
Robin	Confirmed	1	1	-
Shag	Possible	-	-	Annex 1 of the EU Birds Directive BoCC (UK) listed as Red
Starling	Confirmed	1	2	UK BAP priority species NERC Section 42 BoCC (UK) listed as Red BoCC (Wales) listed as Red
Swallow	Confirmed	-	2	BoCC (Wales) listed as Amber
Wheatear	Non-breeding	-	-	BoCC (Wales) listed as Amber
Wren	Confirmed	1	1	-

Seven pairs of black guillemot (*Cephus grylle*) were found to be breeding within the wider area and were considered to be at a level that was regionally significant to Wales. The large boulders scattered along the shoreline close to Salt Island were considered prime nesting sites for the species. Intertidal habitats below MHW were considered to be of little or of no importance to water birds (RPS, 2016).

### 13.2.3 Wetland Bird Survey

The Wetland Bird Survey (WeBS) monitors non-breeding waterbirds in the UK. The principal aims of WeBS are to identify population sizes, determine trends in numbers and distribution, and identify important sites for waterbirds. The survey collects two types of data: core count data, collected around high water and showing potential high tide roosts, and low tide counts, showing feeding areas.

There are three core count monitoring locations of relevance to the proposed scheme:

1. Holyhead Harbour (site code 68408), which covers the new harbour area between the Breakwater and Salt Island;
2. Beddmanarch Bay (site code 68402), to the south east; and,
3. Inland Sea (site code 68401), immediately south of Beddmanarch Bay.

There is only one low tide count station near to the proposed scheme, that being Inland Sea.

### 13.3 Potential environmental issues associated with construction

Potential impacts to ornithology during the construction phase of the proposed scheme include:

- Displacement and disturbance to breeding birds due to construction activities (noise, vehicle and vessel movements, and light pollution); and,
- Changes in turbidity affecting prey availability.

### 13.4 Potential environmental issues associated with operation

Potential impacts to ornithology during the operational phase of the proposed scheme include:

- Displacement and disturbance to breeding birds due to increased human and vessel traffic; and,
- Changes to coastal processes affecting benthic habitats and prey resources.

### 13.5 Proposed approach to EIA

Potential effects to SPAs (both proposed and fully designated) will be considered by the HRA (see **Section 28**).

There will be no 'noisy activities', such as impact piling, during the construction and operation of the proposed scheme, direct impacts to ornithology are considered to be limited to the vicinity of the port area. Given this, and the fact that the areas of ornithological interest are located at a distance from the port, to the west of the Outer Breakwater and south of Penhros Beach, an over-wintering bird survey is not considered necessary.

A detailed desk-based assessment on the potential impacts to ornithology will be undertaken using available information (including information on designated sites and information produced for nearby developments, such as Minesto's tidal array), the purchase of WeBS core count and low tide data and through consultation. The assessment of potential impacts to ornithology will also be informed by the findings of the numerical modelling studies (see **Section 6.4.1**) and noise assessment (see **Section 17**).

## 14 Terrestrial and Intertidal Ecology

### 14.1 Introduction

This section considers the terrestrial and coastal ecology within Holyhead Port and the surrounding area. Designated sites for nature conservation are considered within **Section 5**; ornithology is considered within **Section 13**, marine ecology is considered within **Section 9**, fish and shellfish resource is considered within **Section 10** and marine mammals are considered within **Section 11**.

The study area considered for this section includes Holyhead Port and surrounding terrestrial and coastal areas within a 1km buffer.

### 14.2 Baseline conditions

#### 14.2.1 Terrestrial ecology

The study area is largely urban in character, with some pastoral land to the south and west. As such, the study area is expected to be of limited ecological importance. The proposed scheme is unlikely to have significant effects on terrestrial protected species including otter, great crested newt, reptiles, bats, badger and water vole.

#### 14.2.2 Intertidal ecology

In general, the west coast of Anglesey has substantial length of exposed shores which are largely coastal cliff headlands interspersed with beaches of moderately coarse sediment. The intertidal areas within Areas B and C are typical of those encountered along the Anglesey coast. Details of the habitats present within these three areas are described below<sup>9</sup>.

Area B features the following intertidal habitats:

- *Laminaria digitata* on moderately exposed sublittoral fringe bedrock
- *Fucus serratus* and red seaweeds on moderately exposed lower eulittoral rock
- *Fucus serratus* on full salinity lower eulittoral mixed substrata
- Littoral mixed sediments
- *Chthamalus* spp. on exposed upper eulittoral rock
- Yellow and grey lichens on supralittoral rock

Area C features the following intertidal habitats:

- Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata
- Barren littoral shingle
- *Fucus serratus* and red seaweeds on moderately exposed lower eulittoral rock
- *Ascophyllum nodosum* on full salinity mid eulittoral rock
- *Enteromorpha* spp. on freshwater-influenced and/or unstable upper eulittoral rock

<sup>9</sup> CCW data taken from <http://www.emodnet.eu/> [Accessed 13 December 2016]

### 14.3 Potential environmental issues associated with construction

Potential impacts to terrestrial and coastal ecology during the construction phase of the proposed scheme include:

- Permanent intertidal and subtidal habitat loss as a result of reclamation activities;
- Smothering of intertidal habitats as a result of the deposition of the capital dredge sediment plume;
- Re-suspension and dispersion of potentially contaminated sediment a result of the capital dredge sediment plume; and,
- Spread of invasive species, in particular *Didemnum vexillum*.

### 14.4 Potential environmental issues associated with operation

Potential impacts to terrestrial and coastal ecology during the operational phase of the proposed scheme include:

- Smothering of intertidal habitats as a result of the deposition of the maintenance dredge sediment plume;
- Spread of invasive species, in particular *Didemnum vexillum*.

### 14.5 Proposed approach to EIA

Given the limited terrestrial ecological interest within the study area, terrestrial ecology has been scoped out of the EIA.

To confirm the intertidal habitats present within Areas B and C, and in order to identify any species of conservation importance, an intertidal survey will be undertaken and used to inform the assessment.

The assessment on intertidal ecology will also be informed by the proposed modelling studies (see **Section 6.4.1**) and geoenvirometnal investigation (see **Section 6.4.2**).

## 15 Commercial and Recreational Navigation

### 15.1 Introduction

This section considers navigation (both commercial and recreational) within Holyhead Port. The study area considered for this section includes Holyhead Port.

### 15.2 Baseline conditions

Holyhead Port handles approximately two million passengers each year. The port has a 2.4km long breakwater and two sheltered anchorage areas. The Statutory Harbour Authority is Stena Line Ports Ltd. At present, the maximum keel depth accepted by the port is 13.5m for privately owned vessels (1 berth), and 7m for Ro-Ro vessels (7 berths) (UK Ports, 2016). Statistics from the Department for Transport (2016a) show that freight traffic in and out of Holyhead Port has increased between 2005 and 2015 (4.1 million tonnes to 4.5 million tonnes) but trends show annual fluctuations in the region of one million tonnes. **Table 15-1** below shows the number of cargo vessels arriving at the Port between 2009 and 2015, and shows a total increase of 325 vessels (Department for Transport, 2016a).

Table 15-1 Holyhead Port cargo vessel arrivals between 2009 and 2015 (Source: Department for Transport, 2016a).

2009	2010	2011	2012	2013	2014	2015
2,902	3,097	3,018	3,024	3,027	3,391	3,227

Stena Line and Irish Ferries sail from Holyhead to Dublin, forming the principal link for surface transport from north Wales and central and northern England to Ireland. Annually, there are approximately 8,000 ferry movements and 500 other large vessel calls (including bulk carriers, cruise liners, coasters and other large fishing vessels). There is also a fish dock which services a fleet of small fishing vessels, and both recreational fishing vessels and small workboats also use the harbour (UK Ports and Harbour Information, 2015). **Figure 15-1** shows that approximately 50% of vessel movements in the past 30 days were passenger vessels, approximately 14% high speed craft and approximately 12.5% fishing vessels. Recreational vessels form only a very small proportion of total vessels using the port over the past 30 days.

Holyhead Marina currently has 200 berth-holders with the capacity for a further 150 with over 3,000 visitor boat nights recorded each year (Holyhead Regen, 2016). Holyhead Sailing Club resides in the adjacent boatyard and has over 600 members and moorings for up to 170 boats (Holyhead Marina, 2016). The recreational use of Holyhead Harbour has increased over recent years, with the result that there has also been an increase in sailing events and races, such as the Celtic Goodwill Raid and Gaffers Sailing Event (Holyhead Regen, 2016). The normal approach keeps yachts close to the Breakwater away from the shipping traffic.

In December 2016, the number of commercial vessels whose home port (the port at which they land their catch) was listed as Holyhead was 22 vessels (10m and below) and four vessels (greater than 10m). Vessels smaller than 10m are rarely at sea for more than 24 hours on any one trip and thus tend to fish close to their home port. Larger vessels in this class size tend to work inshore, generally within 6nm of the coast (Minesto, 2016).

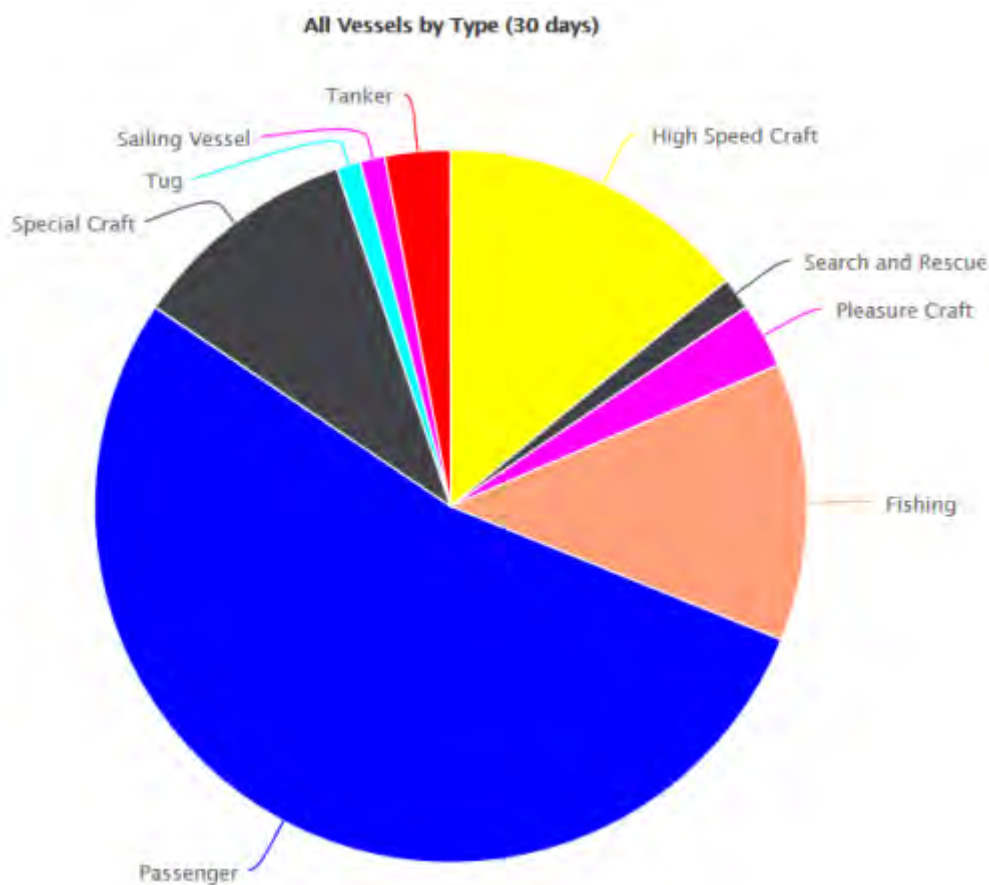


Figure 15-1 Proportion of vessel movements at Holyhead Port by type of vessel over the past 30 days (November-December 2016)<sup>10</sup>

### 15.3 Potential environmental issues associated with construction

Potential impacts to commercial and recreational navigation during the construction phase of the proposed scheme include:

- Extended transiting time for vessels leaving/approaching the Port; and,
- Impacts on navigational safety due to the presence of construction vessels and equipment in a busy port area.

### 15.4 Potential environmental issues associated with operation

Potential impacts to commercial and recreational navigation during the operational phase of the proposed scheme include:

- Extended transiting time for vessels leaving/approaching the Port; and,
- Impacts on navigational safety due to the presence of construction vessels and equipment in a busy port area.

<sup>10</sup> [http://www.marinetraffic.com/en/ais/details/ports/431/United%20Kingdom\\_port:HOLYHEAD](http://www.marinetraffic.com/en/ais/details/ports/431/United%20Kingdom_port:HOLYHEAD) [Accessed 22 December 2016]

## 15.5 Proposed approach to EIA

A Navigational Study will be undertaken and used to inform the EIA. The requirement for maintenance dredging will be assessed using the findings of the modelling studies (see **Section 6.4.1**). The assessment will be informed through consultation with the Harbour Master and other key stakeholders.

## 16 Traffic and Transport

### 16.1 Introduction

This section considers the current traffic and transport baseline at Holyhead Port. The study area considered for this section has been defined as Holyhead Port and the local highway network.

### 16.2 Baseline conditions

The A55 North Wales Expressway provides the primary link between North Wales, Anglesey and Holyhead for vehicles. A single carriageway road connects Holyhead Port to the A55 whilst bypassing the edge of the town centre. The A5154 connects the A55 directly to Salt Island, through the main Port area.

Holyhead is also served by the North Wales Coast Line railway which operates between Crewe and Holyhead. Holyhead railway station is located adjacent to Holyhead Port and the main bus terminus, providing an integrated interchange between rail, ferries and buses. The bus terminus provides access to an extensive bus network connecting Holyhead to Anglesey and further afield.

Holyhead Port is a major ferry link between Britain and Ireland with services provided by Stena Line and Irish Ferries. In 2015, approximately two million passengers, 430,000 cars and 10,000 coaches utilised these services.

### 16.3 Potential environmental issues associated with construction

Potential impacts to traffic and transport during the construction phase of the proposed scheme include:

- Temporary increase in road traffic as a result of reclamation, dredging and construction workers accessing and leaving the site, and delivery of construction materials; noting that the reclamation material will be delivered by sea;

### 16.4 Potential environmental issues associated with operation

Potential impacts on traffic and transport during the operation phase of the proposed scheme include:

- Increase in port traffic as a result of the increased capability of the port, including:
  - Operational staff;
  - Predicted visitor increases and;
  - Cruises and associated traffic e.g. coaches and taxi pick-up/drop off

### 16.5 Proposed approach to EIA

The principle guidelines for the assessment of the environmental impacts of road traffic associated with new developments are the 'Guidelines for the Environmental Assessment of Road Traffic' (GEART) published by the Institute of Environmental Assessment in January 1993. The guidance provides a framework for the assessment of traffic borne environmental impacts, such as pedestrian severance and amenity, driver delay, accidents and safety, and noise, vibration and air quality.



GEART suggests the following rules to define the extent and scale of the assessment required:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

The above GEART rules will be applied to the proposed scheme traffic demand will dictate the extent of the study area and the scale of the impact assessment. If the levels are below the GEART threshold, consultation with IACC will be undertaken to determine whether a Traffic Impact Assessment is required for the operational phase of the proposed scheme.

## 17 Noise and Vibration

### 17.1 Introduction

This section considers the potential noise and vibration baseline in relation to the proposed scheme. The study area considered by this section includes Holyhead Port and a 2km buffer, radiating from the proposed scheme.

### 17.2 Baseline conditions

Receptors at the proposed scheme are likely to be influenced by the baseline traffic flows on the surrounding road network along with existing commercial noise from the Port and RAF Valley. Existing ground-borne vibration may also be present associated with the movements of heavy vehicles.

The main noise and vibration sensitive receptors potentially affected by the proposed scheme are residential properties in the vicinity of the site as well as marine and terrestrial species (in particular birds and seals).

A baseline noise survey was undertaken to inform the Anglesey Aluminium Renewable Energy Plant ES (Parsons Brinckerhoff, 2009) in June 2009. This survey identified a number of Noise Sensitive Receptors (NCRs) related to the project; those in closest proximity to the proposed scheme include Pentowyn, Penrhos Beach Road and New Road. Table 17-1 provides a summary of the lowest measured  $L_{A90}^{11}$  noise level recorded at the three NSRs.

Table 17-1 Summary of lowest background noise levels at NCR sites in closest proximity to the proposed scheme (Parsons Brinckerhoff, 2009)

Noise Sensitive Receptor	Lowest Recorded LA90 dB	
	Daytime	Night-time
Location 1 – Pentowyn, Penrhos Road	39	40
Location 2 – Penrhos Beach Road	41	43
Location 7 – New Road	40	40

### 17.3 Potential environmental issues associated with construction

The potential impacts associated with noise and vibration during the construction phase may include:

- Noise and vibration associated with construction activities, for example:
  - Piling;
  - Importation and placing of bulk materials;
  - Cutting of concrete and steel;
  - Dredging;

<sup>11</sup> This represents the sound pressure level which is exceeded 90% of the time, expressed in dB or dB(A).  $L_{A90}$  is used to quantify background noise levels

- Hammering and the breaking out of hard ground; and,
- Movement of mobile plant on the construction site.
- Noise and vibration impacts associated with the movements of construction related vehicles on public roads leading to the site;
- Noise and vibration associated with demolition activities requiring use of mobile plant;
- Noise and vibration associated with earthworks and landscaping activities requiring the use of mobile plant; and,
- Noise and vibration from temporary fixed plant which may be required for construction activity.

## 17.4 Potential environmental issues associated with operation

The potential impacts associated with noise and vibration during the operational phase may include:

- Increased disturbance to local residents and terrestrial and marine species (birds and seals) connected with increased vessel movements, vessels at the berths and vehicles (including HGVs). Other noise sources affecting sensitive receptors are likely to include sound sources from plant and loading/unloading activities within the landside areas.

## 17.5 Proposed approach to EIA

A baseline noise survey will be undertaken at receptor locations that are relevant to the proposals. It is expected that the noise survey will comprise short duration attended measurements covering the daytime (07:00hrs to 23:00hrs) and night time (23:00hrs to 07:00hrs) reference periods, supported by long-term (up to 24 hours) unattended measurements.

### 17.5.1 Construction phase assessment

A construction noise impact assessment will be undertaken which will assess the potential noise impact at the nearest residential and ecological receptors.

The construction phase assessment will comprise of a desk-based review of potential construction noise and vibration impacts on existing relevant potentially affected noise sensitive receptors adjacent to the site or to the principal construction and occupation traffic access routes.

The modelling exercise will be undertaken using SoundPLAN noise prediction software which directly implements the calculation algorithm described in International Standard (ISO) 9613. The calculation method takes account of air absorption, distance attenuation, barriers and topography, and light downwind conditions from source to receptor. The assessment of the potential noise impact associated with the construction phase will be undertaken with regard to the methodology contained within BS 5228:2009+A1:2014, 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'.

### 17.5.2 Operational phase assessment

The operational phase assessment will comprise a desk-based review of potential operational noise and vibration impacts on existing relevant potentially affected noise sensitive receptors adjacent to the site or to the principal construction and occupation traffic access routes. The operational phase noise assessment will comprise the following:

- Road traffic noise:
  - An initial screening exercise will be undertaken to determine whether traffic flows associated with the development have the potential to result in adverse noise impacts upon the local road network.
  - Dependent upon the results of the screening exercise a detailed assessment of potential road traffic noise impacts will be undertaken in accordance with the methodology and guidance contained within the Department of Transport (Welsh Office) Technical Memorandum Calculation of Road Traffic Noise (CRTN) and the Highways Agency's Design Manual for Roads and Bridges (DMRB).
- Fixed and mobile plant noise:
  - Compile and analyse all available noise source data associated with proposed fixed and mobile plant and vessels.
  - Model the propagation of noise from any new fixed and mobile plant noise sources and from vessels using SoundPLAN.
  - A noise assessment based on the guidance contained within British Standard (BS) 4142:2014 – Method for Rating and Assessing Industrial and Commercial Sound will be undertaken.
  - Where noise data for fixed and mobile plant is unavailable target noise emission criteria will be provided to ensure that noise from such sources is below the criteria detailed within BS 4142:2014 at sensitive receptors. Recommendations will be provided on noise mitigation where appropriate.

## 18 Air Quality

### 18.1 Introduction

This section considers the potential air quality baseline in relation to the proposed scheme. The study area considered by this section includes Holyhead Port and a 2km buffer, radiating from the proposed scheme.

### 18.2 Baseline conditions

Existing sources of air pollution in the vicinity of the proposed scheme include road transport, and existing ferry and marine vessel movements associated with existing operations at Holyhead Port. The main pollutants of concern from these emission sources are likely to be those relating to fuel combustion, such as oxides of nitrogen (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), carbon monoxide (CO) and particulate matter (including PM<sub>2.5</sub> and PM<sub>10</sub>).

The proposed scheme footprint is not situated within an existing statutory designated Air Quality Management Area (AQMA) and the IACC has not declared any AQMAs in Anglesey.

Nitrogen dioxide (NO<sub>2</sub>) is monitored across Anglesey as part of the Welsh NO<sub>2</sub> Diffusion Tube Monitoring Network. There are no current NO<sub>2</sub> monitoring sites within the study area, the most recent data recorded was from Newry Beach in 2011, where an average of 13.75 µg/m<sup>3</sup> was recorded (Welsh Air Quality Forum, 2017). Continuous monitoring of SO<sub>2</sub> is performed by the Welsh Automatic Urban Pollution Monitoring Network (WAUN). The latest data obtained in 2010 from the Anglesey Holyhead site recorded an hourly average of 3.74 µg/m<sup>3</sup> (Welsh Air Quality Forum, 2017).

#### 18.2.1 Receptor Locations

Existing human and ecological receptors are located in the vicinity of the proposed development. The Defra publication 'Local Air Quality Management, LAQM.TG(16)' (Defra, 2016) identifies locations that should be considered as receptor locations in air quality assessments. Details are provided in **Table 18-1**.

Table 18-1 Examples where the Air Quality Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties <sup>11</sup> .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean	Kerbside sites where the public would

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
	and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes	

The closest existing residential dwellings to the proposed scheme are located in the vicinity of Prince of Wales Road, Turkey Shore Road and Victoria Road in Holyhead. In addition, Salt Island, the Ports principle passenger reception standing area, will be considered as a receptor in the assessment and pollutant concentrations will be compared to the short-term pollutant averaging periods where appropriate.

There are no statutorily designated ecological sites in the vicinity of the proposed scheme or shipping routes. The Beddmanarch-Cymyran SSSI is situated adjacent to the A55, which is likely to be the main transport route used by road traffic vehicles during the construction and operational phases of the proposed scheme.

### 18.3 Potential environmental issues associated with construction

The following emission sources associated with the construction phase of the proposed scheme have the potential to impact on local air quality conditions:

- Dust emissions generated by excavation, construction and earthwork activities associated with the construction of the proposed scheme, have the potential to cause nuisance to, and soiling of, sensitive receptors;
- Generation of dust from the movement of HGVs and other construction plant on unpaved roads within the site area;
- Emissions of exhaust pollutants, from construction traffic on the local road network and capital dredging activities, have the potential to adversely impact upon local air quality at sensitive receptors;
- Emissions of NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> from non-road mobile machinery (NRMM) operating within the proposed scheme footprint, have the potential to adversely impact local air quality at sensitive receptors in close proximity to the works; and,
- Potential odour, fugitive particulate emissions and vessel exhaust emissions, associated with dredging of marine sediment to be used as part of the reclamation, approach channel and disposal of material.

## 18.4 Potential environmental issues associated with operation

The following emission sources have the potential to impact on local air quality conditions during the operational phase of the proposed scheme:

- Emissions of exhaust pollutants associated with operational phase road traffic movements on the local road network; and,
- Emissions of exhaust pollutants associated with ferries and cruise ships travelling to and from the Holyhead Port and maintenance dredging activities.

## 18.5 Proposed approach to EIA

An air quality assessment will be undertaken as part of the environmental assessment. Baseline air quality conditions will be established using the most recently available Local Air Quality Management (LAQM) reports published by the IACC. The assessment will also consider the air pollution background concentration maps published by Defra.

### 18.5.1 Construction Phase

A risk based approach will be used to assess the impacts of construction activities upon air quality. The assessment will be carried out in accordance with guidance provided by the Institute of Air Quality Management (IAQM, 2014). The dust assessment will also define a suitable level of mitigation required based upon the risk of dust impacts.

The methods for delivery of construction goods and materials is currently unknown, however it is likely that a combination of road vehicles and marine vessels would be utilised for this purpose. The potential impact of emissions from road vehicle or marine vessel movements would depend on the volume and frequency of movements, the type of vehicles or vessels used and the proximity of the vehicles or vessels routes to sensitive receptor locations. An initial screening assessment using the screening criteria provided in IAQM & Environmental Protection UK (EPUK) 2015 guidance (IAQM & EPUK, 2015) will be carried out to determine if a detailed assessment of construction road traffic emissions is required.

The source of the reclamation material is not yet known at this stage, there are a number of possible options that will be considered. If dredged material is required, emissions from dredgers have the potential to impact ambient air pollutant concentrations, although the magnitude of the impact will depend on the type and number of dredgers to be employed, the location of dredging activities and their frequency. A qualitative assessment of pollutant emissions associated with the movement of dredgers during the construction phase will be undertaken.

There is potential for odour to be generated during dredging works if capital dredging of undisturbed sediments is required. The decomposition of biological material in an anaerobic environment, such as the seabed, can produce odorous gases, such as hydrogen sulphide. Dredging activity can release these gases, which may impact upon nearby receptor locations. A qualitative assessment of odour emissions associated with dredging works during the construction phase will be carried out.

### 18.5.2 Operational Phase

An increase in the capacity of the Holyhead Port is likely to give rise to an increase in development-generated road traffic movements. An initial screening assessment will be conducted to determine

locations where detailed assessment of road traffic emissions is required. The assessment will use the screening criteria provided in IAQM & EPUK 2015 guidance (IAQM & EPUK, 2015) to determine where detailed assessment of road traffic emissions is required for operational phase development-generated traffic movements.

Should the screening criteria be exceeded, a detailed road traffic emissions assessment may be required which will utilise dispersion modelling software to predict increases in NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> concentrations as a result of the proposed development at identified human receptor locations, and the Beddmanarch-Cymyran SSSI . The technical approach to the air quality assessment will be in accordance with Defra Local Air Quality Management Technical Guidance (Defra, 2016).

The potential for exhaust emissions, from maintenance dredging will also be considered in the assessment. It is likely that the number of movements required during the operation phase will be small and insignificant in terms of existing vessel movements. It is therefore anticipated that a qualitative consideration of vessel emissions will be undertaken.

The proposed scheme is anticipated to increase the number of ferry and cruise ship vessels calls per year to the Holyhead Port. It is unknown if a shore side power supply will be available, therefore the cruise vessels may use auxiliary engines to provide power during hotelling. There are likely to be emissions of NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, CO and SO<sub>2</sub> from the vessels during manoeuvring, cruising and hotelling, which may lead to an increase in ambient air pollutant concentrations in the vicinity of the proposed scheme.

If marine vessel movements are not anticipated to be significant, it is likely that a qualitative assessment could be undertaken. If a detailed assessment is required, emissions of NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, CO and SO<sub>2</sub> from the marine vessels will be considered at human receptor locations in the vicinity of the Port of Holyhead.



## 19 Archaeology and Cultural Heritage

### 19.1 Introduction

This section considers the existing archaeological and cultural heritage baseline conditions in relation to the proposed scheme. The study area for this initial consideration of archaeological and cultural heritage impacts was a 1km buffer from the scheme's boundary for all known (recorded) designated and non-designated heritage assets. Designated heritage assets and Conservation Areas are presented on **Figure 19.1**.

### 19.2 Baseline conditions

The baseline information obtained to support this section has come from available online data sources including:

- Cadw (the Welsh Government's Historic Environment Service) (<http://cadw.gov.wales/historicenvironment/recordsv1/cof-cymru/?lang=en>);
- Royal Commission on the Ancient and Historical Monuments of Wales (<http://map.coflein.gov.uk>); and;
- Gwynedd Archaeological Trust Historic Environment Record ([http://www.cofiadurcahcymru.org.uk/arch/gat/english/gat\\_interface.html](http://www.cofiadurcahcymru.org.uk/arch/gat/english/gat_interface.html)).

There are no World Heritage sites, Scheduled Monuments or Registered Historic Landscapes located within, or adjacent to, the three areas of proposed land reclamation. Less than 300m to the south-west of Area B, are the Scheduled remains of a Roman wall which surround St Cybi's Churchyard (AN031). The Roman wall forms the remains of a coastal fort located on a low cliff which would have originally fronted the shore. The fort is believed to date to the late 3<sup>rd</sup> century. The interior of the fort was occupied by St Cybi's church and associated graveyard from the 6<sup>th</sup> century onwards.

Within the wider study area, there is a Scheduled prehistoric coastal fort at Trefadog (AN082) located approximately 4km to the north-east, and located at the same distance to the south-east is a post-medieval Fish Weir at Newlands (AN145). Within 4km south of the site are a number of Scheduled Monuments dating to the Prehistoric period, including for example Porth Dafarch Hut Circles (AN034), Plas Meliw Hut Circles (AN033) and Trefignath Burial Chamber (AN011). Located to the west of the site at the top of Holyhead Mountain is the Iron Age hillfort of Caer y Twr (AN019) and to the south of this is the Holyhead Mountain Hut Circles (AN016).

In 1810 an Act of Parliament was passed which included much needed improvements to the harbour at Holyhead which had, by that time, become established as the principal port for communication with Ireland, in particular as the station for the Post Office steam packets. This work involved the construction of the Admiralty Pier and lighthouse to the east of Salt Island and the Harbour-Master's Offices and Customs House, with the later addition of the George IV Arch.

223000 224000 225000 226000

ID	Name
1	STANLEY HOUSE, MARKET SQUARE
2	THE CAPTAINS TABLE, MARKET SQUARE
3	ZODIAC RESTAURANT, BEACH ROAD (N SIDE)
4	CAERNARFON CASTLE PUBLIC HOUSE, SUMMER HILL
5	TABERNACL CHAPEL, THOMAS STREET (SW SIDE)
6	HYFRYDLE CHAPEL (INCLUDING FORECOURT GATES AND RAILINGS), THOMAS STREET (SW SIDE)
7	TRAIN SHED AT HOLYHEAD STATION, TURKEY SHORE ROAD
8	SOUTH PIER, TURKEY SHORE ROAD
9	LOWER CHURCHYARD WALLS AND GATEWAY, VICTORIAL ROAD (W SIDE)
10	ADMIRALTY PIER (INCLUDING SEA WALL BETWEEN SALT ISLAND BRIDGE AND GEORGE IV ARCH), SALT ISLAND
11	LIGHTHOUSE ON ADMIRALTY PIER
12	ST CYBI'S CHURCH
13	CAPEL Y BEDD, MARKET SQUARE
14	WALLS OF UPPER CHURCHYARD, MARKET SQUARE
15	SKINNER MONUMENT, TURKEY SHORE ROAD (SE SIDE)
16	FITTING, BOILER AND SMITHY SHOPS, AT MARINE YARD, HOLYHEAD DOCKS, VICTORIA ROAD (SE SIDE)
17	OFFICE AND STORES BUILDING, VICTORIA ROAD (SE SIDE)
18	SAILMAKERS, SEAMSTRESSES AND POLISHERS WORKSHOPS VICTORIA ROAD (SE SIDE)
19	STORES, OLD BOILER SHOP AND SAWMILL BUILDINGS AT MARINE YARD, VICTORIA ROAD (SE SIDE)
20	MARKET HALL, STANLEY STREET (W SIDE)
21	CUSTOMS HOUSE, SALT ISLAND
22	HARBOUR OFFICE, SALT ISLAND
23	GEORGE IV ARCH, SALT ISLAND
24	BREAKWATER AND LIGHTHOUSE

Caer gy bi  
y head Bay



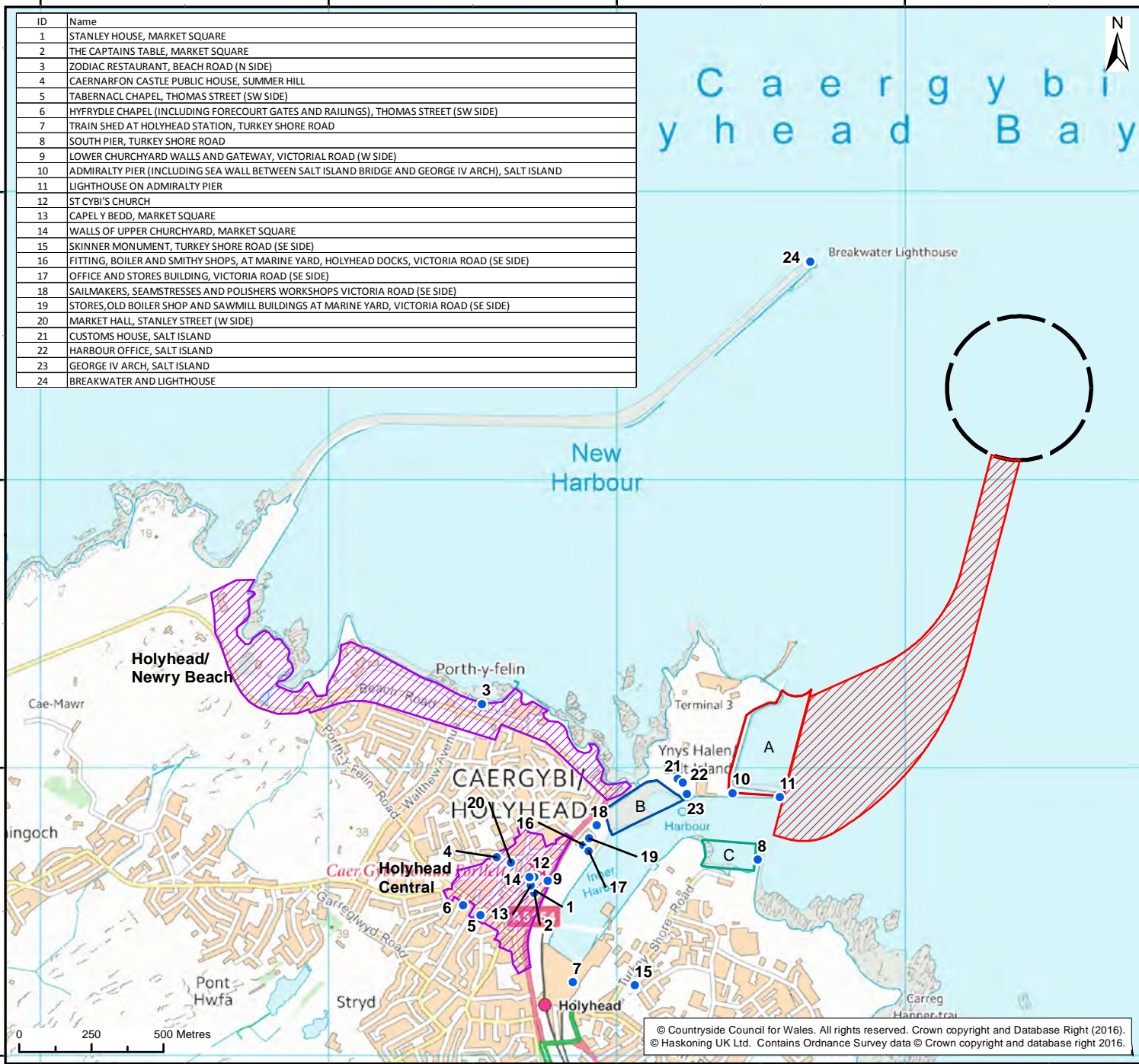
385000

384000

383000

382000

223000 224000 225000 226000



Legend:

- Dredge Channel
- Turning Circle
- Area A
- Area B
- Area C
- Conservation Area
- Listed Buildings

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA
Title:	
Cultural Heritage Assets	

Client: Stena Line  
Project: Holyhead Port Reclamation EIA

Title: Cultural Heritage Assets

Figure: 18.1	Drawing No: PB6108-000-005				
Revision: 01	Date: 16/01/17	Drawn: AB	Checked: JM	Size: A4	Scale: 1:20,000

Co-ordinate system: British National Grid

**ROYAL HASKONINGDHV**  
INDUSTRY, ENERGY & MINING  
2 ABBEY GARDENS  
GREAT COLLEGE STREET  
WESTMINSTER  
LONDON SW1P 3NL  
+44 (0)20 7222 2115  
www.royalhaskoning.co.uk

© Countryside Council for Wales. All rights reserved. Crown copyright and Database Right (2016).  
© Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.

These buildings are designated as Listed Buildings and, along with a number of other Listed Buildings, are located adjacent to the three areas proposed for land reclamation. Forming the eastern boundary of Area C is the Grade II Listed South Pier (14742) built between 1820 and 1821 by John Rennie. The pier is listed for its group value with Admiralty Pier to the north and was an integral part of the harbour's improvements in the early 19<sup>th</sup> century. Located to the south-west of South Pier is a former dry dock which may have been the first in Wales (Cadw, 2016).

Forming the southern boundary of Area A is the Grade II Listed Admiralty Pier (14757) built between 1810 and 1821, and located at the end of the pier is the Grade II Listed Lighthouse (14758) which is a well-preserved example of an early 19<sup>th</sup> century lighthouse in Wales (Cadw, 2016).

Located to the south-west of Area B are a large group of marine workshop buildings dating to the second half of the 19<sup>th</sup> century; these include the Sailmakers, Seamstresses and Polishers Workshops (5736), the Fitting, Boiler and Smithy Shops (5734), the Old Boiler and Sawmill buildings at Marine Yard (5737) and the Office and Stores building (5735). All four buildings are listed as Grade II for their group value as purpose-built marine service buildings for a major British ferry port (Cadw, 2016).

Located adjacent to the north-east boundary of Area B is the Grade II\* George IV Arch (5773) built between 1822 and 1824 by Thomas Harrison to commemorate George IV landing at Holyhead on 7<sup>th</sup> August 1821 on route to Ireland. The monument formed part of the early 19<sup>th</sup> century improvement works at the harbour and is a fine Welsh example of a classical monument by Thomas Harrison (Cadw, 2016).

Located between Areas A and B are the Grade II\* Harbour Office (5772) and the Grade II Customs House (5771). Both buildings are rare examples of maritime architecture from the Georgian period and formed an integral part of Rennie's harbour scheme improvements (Cadw, 2016).

Located to the north west of Salt Island is the Grade II\* Listed Holyhead Breakwater (5743), which was built between 1848 and 1873, and is possibly one of the longest piers in the British Isles (Cadw, 2016). Located at the end of the breakwater is the Grade II Listed Lighthouse (5744) which is a unique structure owing to its square tower shape, and its distinctive black and white design forms a prominent historic landmark. Three buildings considered to be associated with the construction of the breakwater are located nearby on the foreshore; Soldier's Point House (14760), a Screen Wall to Soldier's Point House (14761) and Porthyfelin House (14759); these are all Grade II Listed Buildings.

Other Listed Buildings located along the shoreline of the New Harbour, include the Zodiac Restaurant (former lifeboat house) (14729), the Trinity House Office (14730), the Trinity Yard Large Workshop (14731) and the Trinity Yard Small Workshop (14732); all designed as Grade II and dating to the second half of the 19<sup>th</sup> century.

The nearest recorded protected wreck is the Royal Yacht Mary (DW3) located at Skerries, approximately 11km north of the Port of Holyhead. The yacht was built by the Dutch East India Company in 1660 and was given by the City of Amsterdam to Charles II on his restoration to the English throne. Yachts were built for speed and Charles II used it for recreational sailing; later it was used for official tours of duty and on one such trip in 1675 it sank off Anglesey. The wreck was rediscovered in 1971, and has been archaeologically excavated over a twenty five year period; the associated artefacts, such as fine jewellery and cutlery, have been taken to Merseyside Museums (Cadw, 2016).

There are numerous records of non-designated heritage assets located both onshore and offshore within close proximity of the proposed land reclamation works. Within the vicinity of Area C is the wreck of James, a wooden sailing vessel which ran onto the rocks at the entrance of Holyhead Harbour in 1822. Within area 4 there is a separate record of an unnamed wreck thought to be post-medieval in date. Both wrecks were reported in 1976, however the full character and extent of any archaeological remains are currently unknown (RCAHMW, 2016).

### **19.3 Potential environmental issues associated with construction**

Potential impacts to archaeology and cultural heritage during the construction phase of the proposed scheme include:

- The reclamation work and associated dredging, along with the piling activities have the potential to cause direct disturbance and damage, and possibly even loss of known and undiscovered artefacts of marine archaeological significance as well as historic quay side structures; and,
- Construction activities have the potential to disturb the setting of heritage assets and historic landscapes/seascapes on a temporary basis.

### **19.4 Potential environmental issues associated with operation**

Potential impacts to archaeology and cultural heritage during the operational phase of the proposed scheme include:

- Changes to hydrodynamic and sedimentary process could trigger renewed degradation of marine archaeological assets as a result of changes in physical, biological or chemical processes; and,
- The physical appearance of the proposed scheme and its operation has the potential to affect the setting of heritage assets and historic landscapes/seascapes.

### **19.5 Proposed approach to EIA**

A Historic Environment (Archaeology, Built Heritage and Historic Landscape/Seascape) Baseline Assessment will be undertaken, including, but not limited to the following:

- Description of the known and potential past human activities that were undertaken over time, based on available records which will be obtained from the UK Hydrographic Office, Cadw, the Royal Commission on the Ancient and Historical Monuments of Wales and Gwynedd Archaeological Trust Historic Environment Record;
- A Settings Assessment of all designated and key non-designated heritage assets and the historic landscape/seascape; and,
- An assessment of the significance (heritage value) of the assets identified in the baseline assessment.

The assessment will consider direct impacts, setting impacts and indirect impacts, and will be undertaken in accordance with relevant standards and guidance provided by the Chartered Institute for Archaeology (CIfA), Cadw and Gwynedd Archaeological Trust. Specific reference will be made to a range of guidance including, but not limited to, the following:

- ClfA (2014) Standards and guidance for historic environment desk-based assessment; and,
- Cadw (2011) Conservation Principles for sustainable management of the historic environment in Wales.

The scope of archaeological investigations could entail a programme of geophysical survey, and monitoring and assessment of geotechnical investigations with the potential for bespoke geoarchaeological assessment to inform the EIA process or prior to the construction phase. The assessment will also be informed by the findings of the modelling studies (see **Section 6.4.1**).

The scope of archaeological investigations would be agreed with IACC and Cadw, where required. Consultation will be undertaken at key stages throughout the EIA process with these organisations and other relevant stakeholders. The information obtained from the desk based study and evaluation stages would inform the EIA process, and mitigation would be embedded in the scheme's design in order to, as far as possible, avoid impacts to known heritage assets.

## 20 Landscape/Seascape and Visual Setting

### 20.1 Introduction

This section considers the existing landscape and seascape character in relation to the proposed scheme. The study area for this section considers Holyhead Port up to 4nm (nautical miles) offshore.

### 20.2 Baseline conditions

The waterfront of Holyhead contains residential properties and recreational and leisure facilities. To the west of the port, these buildings have unrestricted views of the Breakwater and Holyhead Bay. The properties towards the east of the port can clearly view Salt Island and the existing cruise liner berth, Orthios jetty. The tall chimney stack at the former Anglesey Aluminium works forms a major landmark feature, standing in stark contrast to the nearby expanses of flat, open areas within Beddmanarch Bay to the east (NRW, 2015c). The scale of infrastructure and the frequent moving and stationary ferries create an overall large scale character, forming a dominant presence visible from across Holyhead Bay and the western coastline of Anglesey.

#### 20.2.1 Seascape Character

A seascape assessment undertaken for the IACC in 2013 identified a number of Seascape Character Areas (SCA) of which three are relevant to the study area (up to 4nm offshore, which is the point of the horizon), though the whole of the proposed scheme will fall within SCA 11. These are detailed in **Table 20-1** and their location is shown on **Figure 20-1**.

Table 20-1 SCAs identified as part of Anglesey Seascape Assessment (Source IACC, 2013a)

SCA	Description
Carmel Head to Penrhyn (SCA 10)	Carmel Head has spectacular coastal scenery with islets, cliffs, caves, beaches and wave-cut platforms. There are several prominent formations in the Skerries, White Ladies, Coal Rocks and West Mouse. Within the SCA there is a variety of habitats including rocky shores, coastal heath, forestry and farming inland. Holyhead Port influences views particularly in the southern area of the SCA and ships within the approach can be seen from the coast.
Holyhead (SCA 11)	This area is characterised by a high level of development (Holyhead) and the influence of Holyhead Port. Views are dominated by long breakwaters, commercial shipping, cranes and smaller vessels. The landscape is settled and busy and at nights it is a well-lit environment. Holyhead mountain rises above the town providing a rocky profile with heather cover which contrasts with the built environment of the town and port.
Holyhead Mountain (SCA 13)	Holyhead mountain forms a high profile over Holy Island and is a prominent landmark from both land and sea. The cliffs associated with the coastal area of the SCA are high and rugged to create a dramatic coastline. South Stack Lighthouse is a prominent maritime feature and is still in use. The mountain itself is the largest expanse of coastal

SCA	Description
	heath on Anglesey and consists of heather, bracken, gorse and grassland as well as the unique <i>Spatulate fleawort</i> . The SCA supports a variety of seabirds and has a tranquil and remote feel despite the close proximity to Holyhead. It is also a site that is popular with visitors due to the panoramic view of the area.



Figure 20-1 Seascops Character Areas (Source IACC, 2013a)

### 20.3 Potential environmental issues associated with construction

Potential impacts to the landscape/seascope and visual setting during the construction phase of the proposed scheme include:

- Impacts to the area's cultural heritage and historic setting (see **Section 19**);
- Changes to the seascope/landscape character due to the presence of the construction activities (lighting during night working, movement of construction equipment and the presence of onshore and marine construction plant); and,
- Changes to visual amenity due to the presence of the construction activities (lighting during night working, movement of construction equipment and the presence of onshore and marine construction plant).

## 20.4 Potential environmental issues associated with operation

Potential impacts to the landscape/seascape and visual setting during the operational phase of the proposed scheme include:

- Changes to visual amenity due to the presence of vessels at the new berths and new landside infrastructure.

## 20.5 Proposed approach to EIA

The proposed scheme is not considered to have the potential to significantly affect the overall landscape/seascape character of the area, given that it will result in the addition of new land to be used for existing port operations. As such, a full Landscape and Visual Impact Assessment (LVIA) is not considered necessary.

The proposed scheme will however result in the provision of new berths in new locations and as such it is proposed that a visual assessment is undertaken to understand the proposed scheme's potential impact on the area's visual setting.



## 21 Coastal Defence and Flood Risk

### 21.1 Introduction

This section considers the current coastal defence and flood risk situation at Holyhead Port and the surrounding area. The study area considered for this section includes Holyhead Port and immediate surrounding coastline, including Holyhead Bay.

### 21.2 Baseline Conditions

#### 21.2.1 Flood Risk

The NRW flood risk map (NRW, 2016b) indicates that all of Holyhead Port, including Salt Island and the surrounding coastline are located within both Flood Zones 2 and 3 (**Figure 21-1**). Flood Zone 2 is land which is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year (NRW, 2016c). Flood Zone 3 is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year (NRW, 2016c).



Figure 21-1 Extract from NRW flood risk map illustrating Flood Zone 2 (left image) and Flood Zone 3 (right image) (NRW, 2016b)

The West of Wales Shoreline Management Plan (SMP) 2 (Royal Haskoning, 2011a) identified a risk of flooding to the areas surrounding the Old Harbour area of Holyhead Port (now referred to as the Inner Harbour) (**Figure 21-2**). A 1m predicted Sea Level Rise (SLR) identified further risk of flooding, with the areas surrounding the Inner Harbour below normal spring high water and the eastern side of the Salt Island and western side of the New Harbour also at risk. Under a more extreme scenario of a 2m SLR, the areas at risk increase around the periphery of those areas already identified. For instance, a much larger proportion of Salt Island is at risk from flooding and a large area surrounding the Inner Harbour (**Figure 21-3**).



Figure 21-2 Predicted flood risk to Anglesey and Holyhead based on present data and on predicted 1m SLR (Source: Royal Haskoning, 2011a)



Figure 21-3 Predicted flood to Anglesey and Holyhead based on a predicted 2m SLR (Source: Royal Haskoning, 2011a)

Data from the NRW flood risk map (NRW, 2016b) also indicates that a number of areas within Holyhead Port, specifically the area to the east of the Inner Harbour and the southern and western edges of Salt Island are designated as 'low' (light purple) and 'high' (dark purple) risk flood areas from rivers and sea (**Figure 21-4**). NRW define 'high' risk flood areas as having a greater than 1 in 30 (3.3%) chance of flooding each year (NRW, 2016d), 'low' risk flood areas are defined as having a 1 in 1000 (0.1%) and 1 in 100 (1%) chance of flooding each year (NRW, 2016e).

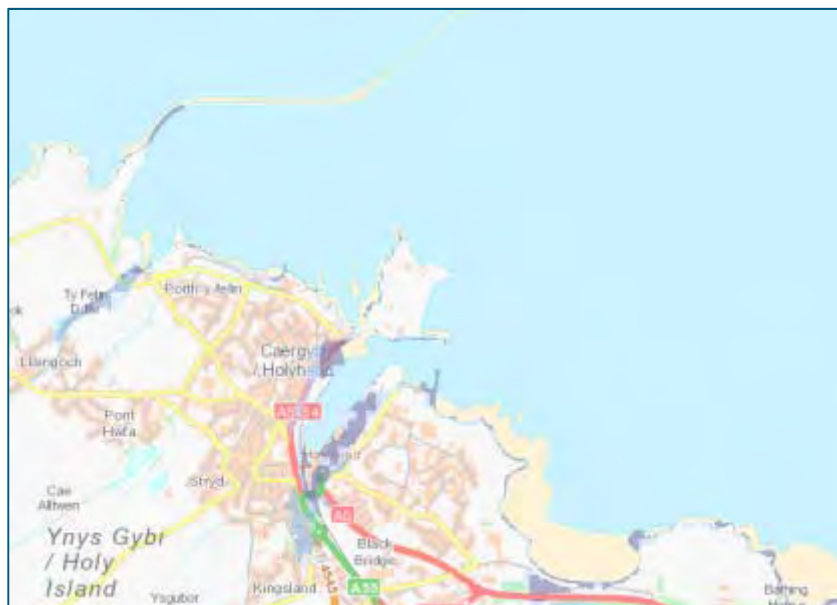


Figure 21-4 Extract from NRW flood risk map illustrating areas of high and low risk from flooding from rivers and the sea (Source: NRW, 2016b)

## 21.2.2 Coastal Defence

At Holyhead Port, coastal defences exist in the form of sea wall and groynes as well as that of the main breakwater which provides shelter to a significant area of the coast (Royal Haskoning, 2011a). Without the influence of the breakwater, many areas within the inner Holyhead Bay would be exposed to coastal flooding.

As outlined in the West of Wales SMP2, Holyhead Port lies within Management Area 50 and Policy Unit 17.15. Defence within this Management Area would be maintained to the main port area and Holyhead town. At Penrhos Bay the intent would be to allow the backshore area to adapt to sea level rise, examining the need for a retired flood defence line. Locally, around Penrhos headland, the intent would be for no active intervention. This would not preclude private maintenance of local defences, subject to normal approvals. This would not include, however, extension of defence or improvement that would impact on the nature conservation value or the landscape. The West of Wales SMP2 indicates that the policy for the coastal areas within and surround the Port will 'Hold the Line' and maintain the current standard of coastal and flood protection (Royal Haskoning, 2011a).

## 21.3 Potential environmental issues associated with construction

The construction phase of the proposed scheme is not anticipated to have any impacts on coastal defence and flood risk in the study area.

## 21.4 Potential environmental issues associated with operation

The potential impacts on coastal defences and flood risk during the operation phase include:

- Changes in water levels within Holyhead Port and surrounding coastline that could reduce the level of protection of existing flood and coastal defences;
- Increased risk of flooding in the Inner Harbour and Outer Harbour as a result of extending the culvert under Salt Island Bridge; and,

- Changes in wave heights and patterns of wave energy reflection approaching Holyhead Port and surrounding coastline that could alter the performance of the flood and coastal defences.

## 21.5 Proposed approach to EIA

To further inform the coastal defence and flood risk baseline, additional data and information will be required. This will include the outputs from the wave and flow modelling (see **Section 6.4.1**) and coastal processes assessment. The modelling will use the latest climate change guidance available. In addition, the proposed scheme is likely to require a Flood Consequence Assessment (FCA). The requirements for a FCA are set out in the Planning Policy Wales Technical Advice Note 15 (TAN 15): Development and Flood Risk (Welsh Government, 2004). A FCA is required for developments in flood zones C1 and C2. Holyhead Port and surrounding coastline lie within flood zone C2 therefore it is likely that the proposed scheme will require a Flood Consequence Assessment. This will be discussed further with NRW as part of the consultation process.

## 22 Tourism and Recreation

### 22.1 Introduction

This section considers the tourism and recreational interests of the Isle of Anglesey and Holyhead in particular, in relation to the proposed scheme. Details of recreational navigation and socio-economics are covered in **Sections 24**, and **25**, respectively.

The study area considered for this section includes the coastline of Holyhead, from the Breakwater to Penrhos, as well as the wider tourism effects to Holyhead, the Isle of Anglesey and Wales.

### 22.2 Baseline Conditions

The Isle of Anglesey's tourism industry is its biggest economic revenue and provides over 20% of all income for the area (IACC, 2013b), with an average of £85 million spent annually from 2011-2013 (GBTS, 2014). A total of 3.45 million visitors were recorded for the Isle of Anglesey from 2010 to 2012, comprising of day and overnight visitors from the UK and overseas (Statistics for Wales (SfW), 2014). The highest numbers of visitors to the Isle of Anglesey from 2010 to 2012 were for cultural activities; with 54% of the total number (SfW, 2014). Coastal destinations are more important within the Isle of Anglesey tourism sector than they are for Wales as a whole, with 62% of tourists visiting a coastal location (SfW, 2014).

Tourism associated with the port includes the existing ferry terminal, the marina and maritime museum amongst other leisure and recreational facilities. Ferries arrive and depart the port as frequently as twice a day bringing tourists to and from the Republic of Ireland. Approximately two million passengers travelled the ferry route from Holyhead to Dublin in 2015, increasing 5% from the total number in 2014 (DfT, 2016b) and accounting for 71.5% of all ferry passengers between the UK and the Irish Republic (DfT, 2016c). There is an obvious seasonal trend in the number of passengers using this ferry route, with numbers from July to September rising considerably (DfT, 2016b).

The top 10 visitor attractions in Holyhead (as listed by TripAdvisor LLC, 2016) are:

1. South Stack Lighthouse;
2. South Stack Cliffs RSPB Reserve;
3. Holyhead Breakwater Country Park;
4. Holyhead Maritime Museum;
5. Stena Line Limited Day Trips;
6. Climbing Tours;
7. Adrenaline and Extreme Tours;
8. Kayaking and Canoeing;
9. Ellins Tower Visitor Centre; and,
10. St. Cybi Church.

South Stack Lighthouse lies to the north-west of Holyhead and is a functioning Lighthouse for the vessels coming into Holyhead Port crossing the Irish Sea. Additionally, there is a RSPB Nature Reserve at South Stack Cliffs which is also a popular tourist destination. Holyhead Breakwater Country Park is located a short drive from the Breakwater, and is situated within the Isle of Anglesey's AONB. The park provides fishing facilities, walking routes and a café. The Holyhead

Mountain coast is defined as a Heritage Coast and forms part of the Isle of Anglesey AONB. The surrounding beaches and cliff top views attract visitors throughout the year.

The number of cruise ships reaching the Port of Holyhead in recent years has been growing and has great potential to increase employment and provide a substantial boost to the local economy. Cruise ship passengers increased by 40% in 2015 when compared to 2014, contributing more than £2.4m to the Welsh economy.

Holyhead Bay is a regional hub for recreational sailing and boating. Holyhead Marina currently provides space for around 200 berth-holders, with infrastructure for 350 berths. The marina generates a significant influence on the local seascape, prominent in views from the sea when entering the harbour. The marina also functions as a research hub for wildlife and conservation, with specialist dive surveys frequently departing from the facility.

The Isle of Anglesey Coastal Path is a Public Right of Way (PRoW) and runs directly past the entrance to Holyhead Port. A total of 93,217 walkers were recorded along the Isle of Anglesey Coastal Path from June 2012 to June 2013, an increase of 11% from 2009 to 2010 (NRW, 2014).

### **22.3 Potential environmental issues associated with construction**

Potential impacts to tourism and recreation during the construction phase of the proposed scheme include:

- Construction related vessels impacting on recreational sailing and tourism activity in and around the port;
- Construction activities impacting on cultural setting and visual amenity of Holyhead Port and the surrounding environs; and,
- Construction workforce reducing the availability of tourist accommodation (could also be a benefit as an increase in income (see **Section 24**).

### **22.4 Potential environmental issues associated with operation**

Potential impacts to tourism and recreation during the operational phase of the proposed scheme include:

- Increased vessel activity impacting on recreational sailing and tourism activity in and around the port;
- The proposed scheme impacting on the cultural setting and visual amenity of Holyhead Port and the surrounding environs; and,
- Increased tourism and revenue though continuation increased of the ferry and cruise operations.

### **22.5 Proposed approach to EIA**

The main potential impacts of the scheme on tourism and recreation relate to issues that will be investigated elsewhere within the EIA (e.g. potential impacts on socio-economics, bathing waters, cultural heritage, landscape, noise and air quality, and on commercial and recreational navigation). It is not therefore envisaged that any additional detailed assessment will be required with respect to effects on tourism and recreation, and it is proposed that this topic is scoped out of any further



assessment. However it will be important to identify the key organisations that are likely to be affected by the proposals and to undertake consultation to identify the main issues and to suggest possible mitigation.

## 23 Existing Infrastructure and Other Users

### 23.1 Introduction

This section considers the existing infrastructure and other users of Holyhead Port and Holy Island, in relation to the proposed scheme. Details of navigation and socio-economics are covered in **Sections 15**, and **24**, respectively.

The study area considered for this section includes Holyhead Port and the coastline from the Breakwater to Penrhos Beach.

### 23.2 Baseline Conditions

#### 23.2.1 Existing infrastructure

Holyhead Breakwater provides shelter to the town of Holyhead and the Port of Holyhead. The breakwater provides direct shelter to the shipping berths on Salt Island, which include conventional ferry berths, cargo/tanker berths, and the Orthios jetty. A culvert under Salt Island Bridge allows the passage of water from the New Harbour to the Old Harbour.

Existing and disused power cables include the CeltixConnect which runs from Holyhead to Dublin and the Emerald Bridge Fibres which run from Holyhead to Clonsaugh, Ireland (PriMetrica Inc., 2016). There are also three out of service BT sub-sea cables that run out of Holyhead Port. A tunnel connects the Orthios Jetty to the disused Anglesey Aluminium Plant, which houses a conveyor that transported aluminium ore to the plant. It is proposed that this conveyor would be used to transport wood pellets should the biomass project go ahead. The tunnel runs under Salt Island, across the entrance to the Old Harbour and across the eastern edge of Area C.

There are no Oil and Gas sectors that have been leased, or new Carbon Capture and Storage Projects close to Holyhead Port. There are, however, existing locations of renewable projects (including Holyhead Deep Tidal Array, The Skerries Tidal Array and Wylfa Nuclear Power Plant). Additionally there is the West Anglesey Marine Demo Zone, and Lateral eco-parks Biomass Project. Given that these projects are proposed rather than existing, they will be considered as part of the Cumulative Impact Assessment (CIA) (see **Section 26**).

### 23.3 Other Users

Irish Ferries Freight lies on Salt Island and is a commercial shipping company handling up to 12 sailings between Holyhead and Dublin a day (Irish Ferries Freight, 2016). A total of 3,212 tonnes of freight passed through Holyhead in 2013 (DfT, 2015). Holyhead Port is also used by Holyhead Marina, Holyhead Sailing Club boathouse and moorings, small boat holders' association moorings, Holyhead Boatyard (comprising the Holyhead Group of companies: Holyhead Towing Company, Holyhead Marine Services, Holyhead Shipping Agency), Holyhead Maritime Museum, Holyhead coastguard station.



### 23.4 Potential environmental issues associated with construction

Potential impacts to the existing infrastructure and other users during the construction phase of the proposed scheme include:

- Damage to the part of the tunnel that runs under Area C as a result of the construction of the quay wall.
- Blocking up/reducing flows through Salt Island Bridge culvert.
- Increase in the interaction of vessels with commercial and recreational vessels leading to an increase in collision risk;
- Disruption to fishing activities during the development of Area C;
- Disruption to local transport and travel access and temporary increase in traffic (road);
- Disruption to port related traffic (road and vessel); and,
- Impact to sub-sea cabling.

### 23.5 Potential environmental issues associated with operation

Potential impacts to the infrastructure and other users of the area due to the operation phase of the proposed scheme include:

- Increase in the interaction of vessels with commercial and recreational vessels leading to an increase in collision risk;
- Increase in vessel traffic and road traffic; and,
- New facilities to support the fishing industry.

### 23.6 Proposed approach to EIA

The potential effect to other users will be investigated elsewhere within the EIA (e.g. potential impacts on socio-economics, commercial and recreational navigation, commercial fisheries, traffic and transport). It is not therefore envisaged that any additional detailed assessment will be required with respect to effects on other users, and it is proposed that this topic is scoped out of any further assessment. However it will be important to identify the key organisations that are likely to be affected by the proposals and to undertake consultation to identify the main issues and to suggest possible mitigation.

Potential effects to existing infrastructure, including the tunnel, cables and services will be addressed during the design phase of the proposed scheme, e.g. a caisson wall is proposed at Area C, rather than a piled solution to remove any risk to the tunnel. As such, whilst existing infrastructure is a material consideration for the design of the scheme, it is envisaged that additional detailed assessment is not necessary, and it is proposed that this topic is scoped out of any further assessment.

## 24 Socio-economics

### 24.1 Introduction

This section considers the current socio-economics at Holyhead and the Isle of Anglesey.

### 24.2 Baseline conditions

Holyhead is the largest town in the county of Isle of Anglesey in Wales, with a population of 11,431 (Office for National Statistics, 2016). Holyhead suffered a loss of its two main industrial employers in 2010, which had historically provided jobs for hundreds of families for the previous 40 years: Anglesey Aluminium ceased smelting losing 600 jobs, and Eaton Electric ceased its manufacturing operations losing 220 jobs. A further 350 jobs were lost from Welsh Country Foods and the area also faces loss of public sector work as well as the continued decline of young people in the area (IACC, 2013b). Holyhead is now categorised as a 'deprived' area, and is the highest level of any other town in North or Mid Wales. It also has the highest level of Jobs Seekers Allowance rate which is a continued concern for the area (IACC, 2013b).

Holyhead Port is a major source of employment, with most jobs being linked to ferry services to the Republic of Ireland operated by Stena Line and Irish Ferries. Within Holyhead, there are an estimated 4,500 jobs available, and the Port provides 25% of those to the local workplace (BPA and UK-MPG, 2010). Many more jobs have been created through Anglesey as an indirect employment of the Port. The number of cruise ships reaching the Port of Holyhead in recent years has been growing and has great potential to increase employment and provide a substantial boost to the local economy. Cruise ship passengers increased by 40% in 2015 when compared to 2014, contributing more than £2.4m to the Welsh economy. In 2015, Holyhead Port recorded 2,600 tonnes of landed shellfish with a reported value of £2.2 million (MMO, 2015a). This demonstrates a slight reduction in landed fish in comparison to 2014 data where 3,000 tonnes of fish were landed with a reported value of £2.4 million. During both 2014 and 2015, no demersal or pelagic fish were landed at Holyhead Port (MMO, 2015a).

The Isle of Anglesey's tourism industry is its biggest economic revenue and provides over 20% of all income for the area (IACC, 2013b), with an average of £85 million spent annually from 2011-2013 (GBTS, 2014).

### 24.3 Potential environmental issues associated with construction

Potential impacts to the socio-economics of the area during the construction phase of the proposed scheme are:

- Direct and indirect benefits to local employment and business opportunities through the introduction of contract staff to the area and use of the local supply chain. Local opportunities will be maximised where identified;
- Beneficial impacts on the local economy and community services through increased local population through contractor migration to the area using local businesses (e.g. hotels, restaurants);
- Disturbance to local tourism through the presence of a large contractor workforce being seen as intimidating; and,

- An influx of contractors to the area could result in an increase in house or rental price depending on the availability of homes and relocation preferences. This could benefit existing home owners but have negative implications for first time buyers/renters in the area.

#### **24.4 Potential environmental issues associated with operation**

Overall the proposed scheme is considered to have a significance beneficial impact on the socio-economics of Holyhead, the Isle of Anglesey and Wales as a whole, through increased trade and tourism to the area and country.

#### **24.5 Proposed approach to EIA**

A desk based assessment will be undertaken on the local social, employment and public sector services of the area to determine the potential impacts as a result of the proposed Scheme. The potential socio-economic impacts will be assessed against the Local Planning Policies.

## **25 Waste**

### **25.1 Introduction**

This section considers the current waste disposal options and waste production within Holyhead Port. The study area for this section considers Holyhead Port and any disposal or landfill sites being utilised.

### **25.2 Baseline conditions**

#### **25.2.1 Waste Management at the Port of Holyhead**

Within the current extent of the Port of Holyhead, Stena Line has achieved a zero landfill target. All waste generated by the Port and visiting ships is 100% recycled with nothing sent to landfill. The Port currently handles approximately 55 tonnes of waste per month.

Waste is segregated into different streams which then go to different recycling plants. Plastics are sent to Deeside and Warrington where the hard plastic is processed to make car dashboards and the soft plastic is recycled to make children's toys. Glass is recycled at Ellesmere to become double glazing, wood is shredded and compacted into logs and food waste is processed and then sent to a bio-waste power plant located in St Asaph. Along with recycling within the UK itself approximately 15% of the waste generated by the Port is baled and sent by sea to Denmark and Sweden where it is converted to heat and power (Stena Line, 2016)

#### **25.2.2 Holyhead Deep disposal site**

The closest open offshore disposal site is approximately 8km to the west of Holyhead Port, called Holyhead Deep disposal site (IS040). The site currently measures approximately 13km in length and 4.4km in width. Adjoining the southern corner of this site are two closed disposal sites, Holyhead South (IS041) and Holyhead East (IS042). Up to 99,000 tonnes of material is disposed of each year and the only current licensee is Stena Line, who uses the site to dispose of spoil from maintenance dredging at Holyhead Port.

### **25.3 Potential environmental issues associated with construction**

Potential impacts to waste during the construction phase of the proposed scheme are:

- Dredging of 1,044,670m<sup>3</sup> of material, some of which may require disposal; and,
- Generation of typical construction site related waste (e.g. plastics, food, hazardous, demolition waste, portal waste).

### **25.4 Potential environmental issues associated with operation**

Potential impacts to waste during the operational phase of the proposed scheme are:

- Increased port related and vessel waste.

## 25.5 Proposed approach to EIA

Construction waste will be managed using a Site Waste Management Plan (SWMP). Material will be reused on site as much as possible, with landfill waste kept as low as possible.

Where possible, dredged arisings will be used as reclamation fill within Areas A, B, C. In the instance that dredged arisings are unsuitable for use in reclamation, there may be the requirement for the disposal of dredged material, this may be either onshore or offshore at the Holyhead Deep licenced disposal site, as is permitted. A disposal options study will be undertaken to identify the most appropriate route of disposal for any arisings that cannot be used in the reclamations.

During the operational phase, any increase in waste will be managed according to the Port's existing procedures.

Taking the above into account, it is not envisaged that additional detailed assessment will be required with respect to effects of waste, and it is proposed that this topic is scoped out of any further assessment.

## 26 Cumulative Impact Assessment

### 26.1 Introduction

There is no legislation that specifically applies to cumulative impact assessment (CIA) or that outlines how such assessment should be undertaken; however, the EIA Directive (85/337/EEC) and associated EIA Regulations require consideration of direct impacts and any indirect, secondary and cumulative effects of a project. Government guidance states that: "cumulative effects could refer to the combined effects of different development activities within the vicinity" (Department of Environment, 1999).

CIA assesses the potential impacts of a proposed scheme with other past, present (current) and reasonably foreseeable (proposed) plans and projects. With respect to 'past' projects, a useful ground rule in CIA is that the environmental impacts of schemes that have been completed should be included within the environmental baseline; as such, these impacts are already taken into account in the EIA process for a development. Consequently, generally completed projects can be excluded from the scope of CIA. However, the environmental impacts of recently completed projects may not be fully manifested and, therefore, the potential impacts of such projects should be taken into account.

In line with established practice, this assessment will be limited to plans and projects where there is sufficient information to allow consideration of the potential for a cumulative effect to arise. In the absence of publicly available information (usually in the form of consent applications) or a defined 'scheme', it is not possible to undertake a proper consideration of cumulative effects (i.e. if proposals are speculative or where assumptions regarding potential impacts may be contentious).

All receptors considered as part of the EIA will initially be considered as part of the CIA, with a view to remove receptors from the scope where no pathway is predicted. The CIA will be undertaken using the same methodology as used for the EIA. The approach to and scope of the CIA will be agreed through consultation with the MMO and NRW.

### 26.2 Initial list of potential plans and projects

The following projects have been identified as having the potential to result in cumulative effects with the proposed scheme as a result of their location and the potential impacts that could arise during the construction and operational phases (the location of these projects are presented on **Figure 26-1**):

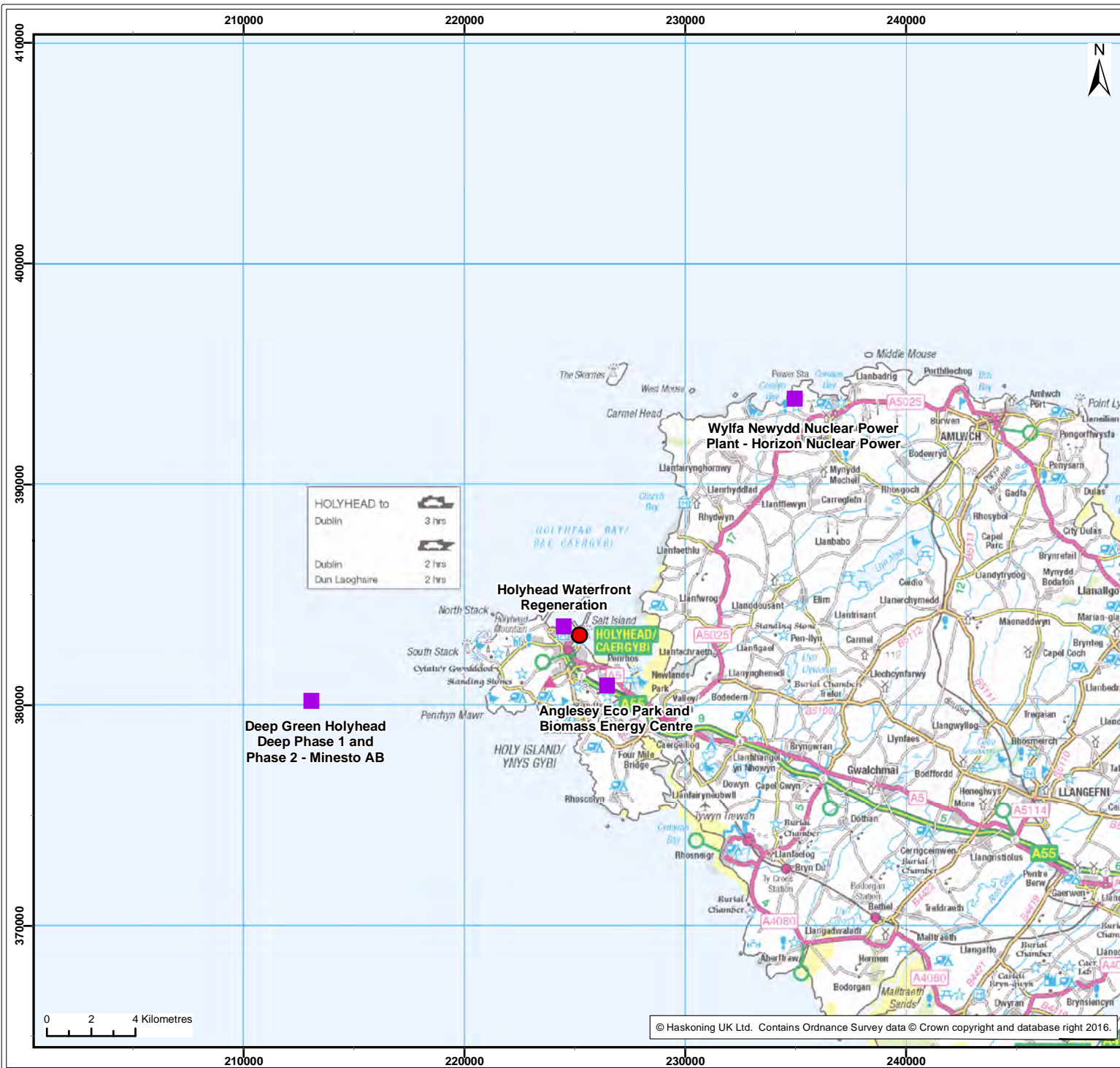
- **Deep Green Holyhead Deep Phase 1** – Phase 1 will comprise a single unit with maximum operational period for the single 0.5 MW device covered by this application will be five years, following installation at some point during Q2/3 2017. At this stage, it is known that onshore infrastructure and further turbines will be proposed for construction, but the details are not known (Minesto, 2016).
- **West Anglesey Demonstration Zone (WADZ)** – Morlais Marine Energy are proposing a tidal demonstration array to the south of the Holyhead Deep disposal site. The proposals also incorporate offshore electrical infrastructure, offshore inter-array cables, landfall and onshore cable route and an onshore substation. The landfall for the export cable from the WADZ is expected to be at Penrhos Beach.

- **Wylfa Newydd Nuclear Power Plant** – Horizon Nuclear Power are proposing the construction of a new nuclear power station. The site is on land beside the former Magnox Wylfa Power Station, which is now being decommissioned. The new nuclear power station at Wylfa is expected to comprise the following components: a power station incorporating nuclear reactors with a combined generating capacity of up to 5.3 GW; construction stage areas and facilities, including a marine off-loading facility; infrastructure and ancillary facilities associated with the operation of a nuclear power station site including cooling water infrastructure; electricity transmission infrastructure; interim waste storage facilities; access roads; and Landscape and biodiversity initiatives and mitigation measures associated with the construction and operation of a new power station (Horizon Nuclear Power, 2009).
- **Anglesey Eco Park and Biomass Energy Centre** – Orthios Group are proposing a 299 MW Energy Centre and Eco Park in Penhros, Holyhead, which will comprise: a 299 MW biomass power station with aquaculture and hydroponic facilities, a compostable food packaging facility and a deep water jetty for bulk import<sup>12</sup>.
- **Holyhead Waterfront Regeneration** – A joint venture between Stena Line and Conygar Investment Company PLC (Conygar), who are proposing a mixed use marina development on Newly Beach, Holyhead. This development will include 326 homes, a 500 berth marina and 50,000 sq.ft of marine related retail, leisure, restaurants hotel and office space (Conygar, 2011). Planning permission for this development was granted in 2012; however no development works have begun.

These projects and any others identified during the EIA process will be monitored so that updated and new information can be incorporated into the CIA, as far as practicable.

---

<sup>12</sup> <http://www.orthios.com/projects/> [Accessed December 2016]



HOLYHEAD to		
Dublin		3 hrs
Dublin		2 hrs
Dun Laoghaire		2 hrs

Deep Green Holyhead  
Deep Phase 1 and  
Phase 2 - Minesto AB



© Haskoning UK Ltd. Contains Ordnance Survey data © Crown copyright and database right 2016.



Legend:

- Holyhead Port
- Other Projects

Client:	Project:
Stena Line	Holyhead Port Reclamation EIA

Title:

Projects under consideration in the  
Cumulative Impact Assessment

Figure:	26.1	Drawing No:	PB6108-000-004		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
	01	16/01/17	AB	JM	A4 1:250,000

Co-ordinate system: British National Grid

**ROYAL HASKONINGDHV**  
INDUSTRY, ENERGY & MINING  
2 ABBEY GARDENS  
GREAT COLLEGE STREET  
WESTMINSTER  
LONDON  
SW1P 3NL  
+44 (0)20 7222 2115  
www.royalhaskoning.co.uk



## 27 Water Framework Directive

### 27.1 Introduction

Stena Line will be applying for a new Marine Licence(s) to permit the proposed construction and reclamation works associated with the expansion of Holyhead Port, as well as for any offshore disposal of dredged material that may be required.

Expansion of Holyhead Port will be through the reclamation of three areas to provide new berths and associated landside infrastructure for port-related use. Holyhead Port is currently operating near full capacity; with the port surrounded by Holyhead Town there is no space available to expand to meet the current and future demand of its operations, reclamation and dredging within the port is therefore required to facilitate this expansion.

### 27.2 Water Framework Directive

The Water Framework Directive (WFD) (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission in December 2000. The directive requires that all EU Member States must prevent deterioration and protect and enhance the status of aquatic ecosystems. This means that Member States must ensure that new schemes do not adversely impact upon the status of aquatic ecosystems, and that historical modifications that are already impacting it need to be addressed.

The Directive came into force in December 2000 and became part of UK law in December 2003 under the Water Environment (Water Framework Directive) (England and Wales) Regulation 2003. The Directive seeks to protect and enhance the quality of:

- Surface freshwater (including lakes, streams and rivers);
- Groundwater;
- Groundwater dependent ecosystems;
- Estuaries; and,
- Coastal waters up to one nautical mile from mean low water.

The WFD applies to all water bodies, including those that are man-made. The consideration of the proposed scheme under the WFD will, therefore, need to be applied to all water bodies that have the potential to be impacted by the proposed scheme. This includes those within which dredging and disposal activities will take place but also those other water bodies that have the potential to be impacted by these activities.

Unlike other directives such as the EU Birds and Habitats Directives (EC Directive on the Conservation of Wild Birds (2009/147/EC) and EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC), respectively), which apply only to designated sites, the WFD applies to all water bodies, including those that are man-made. The consideration of the proposals under the WFD will, therefore, apply to all surface and groundwater bodies that have the potential to be affected by the dredging and disposal activities.

To appropriately assess the impacts of the proposed scheme on WFD waterbodies, a WFD Compliance Assessment will be undertaken as part of the EIA. WFD water bodies in the vicinity of the scheme are shown in **Figure 8-1**.

### 27.3 Method of Assessment

The way in which WFD impacts are assessed is different to the approach conventionally used within the EIA process. The standard EIA approach assesses whether an impact is minor, moderate or major, and whether it is beneficial or adverse. This is not compatible with the requirements of the WFD, which requires an assessment of whether a scheme (or element of a scheme) is compliant or non-compliant with the environmental objectives for surface waters as outlined in **Table 27-1**.

Table 27-1 *Environmental objectives in WFD for surface and ground waters*

Objectives (taken from Article 4 of the WFD)	Reference Article
<b>Surface Waters</b>	
Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water	4.1(a)(i)
Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015	4.1(a)(ii)
<b>Heavily Modified and artificial water bodies</b>	
Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015	4.1(a)(iii)
Progressively reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances	4.1(a)(iv)
<b>Groundwater</b>	
Member states shall implement the measures necessary to prevent or limit the deterioration of the status of all bodies of groundwater.	4.1(b)(i)
Member states shall protect, enhance and restore all bodies of groundwater, ensure a balance between abstraction and recharge of groundwater status.	4.1(b)(ii)
Member states shall implement the measures necessary to reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater.	4.1(b)(iii)

As detailed on NRW website (NRW, 2017), this assessment has followed the guidance developed by the EA. The approach adopted in this assessment will therefore be to determine whether the scheme has the:

- Potential to cause deterioration in surface water body status by adversely affecting biological, hydromorphological and/or physico-chemical quality elements;

- Potential to cause deterioration in groundwater body status by adversely affecting quantitative and chemical quality elements;
- Potential to prevent achieving WFD status objectives by impacting upon proposed mitigation measures already identified for water bodies in the area if designated heavily modified; and,
- Potential to incorporate mitigation measures included in the appropriate River Basin Management Plan(s) (RBMP).

This assessment will predominantly use the 'Clearing the Waters For All' guidance produced by the EA (2016b) to undertake WFD compliance assessments for projects in estuarine and coastal waters. Where the assessment suggests that deterioration in water body status is likely to occur as a result of the scheme, measures to mitigate the likely impacts and, therefore, avoid deterioration in status will be recommended. The 'Clearing the Waters for All' guidance recommends a three stage process which is outlined in more detail in the following sections.

### 27.3.1 Stage 1 - Screening

The Clearing the Waters for All guidance (EA, 2016) requires a relatively short screening stage which considers the activity against whether it is considered to be low risk. The criteria for determining whether the activity is at low risk are as follows:

- a fast-track or accelerated marine licence activity that meets specific conditions;
- maintaining pumps at pumping stations – if you do it regularly, avoid low dissolved oxygen levels during maintenance and minimise silt movement when restarting the pumps;
- removing blockages or obstacles like litter or debris within 10m of an existing structure to maintain flow;
- replacing or removing existing pipes, cables or services crossing over a water body – but not including any new structure or supports, or new bed or bank reinforcement; and
- 'over water' replacement or repairs to, for example, bridge, pier and jetty surfaces, if you minimise bank or bed disturbance.

If the activity was carried out between the period 2009 to 2014 (when evidence was collected for the 2015 RBMPs) and a WFD assessment exists, a repeat assessment is not required unless:

- Significant changes have occurred to the activity, including method, size or scale, volume, depth, location or timings; and
- There has been a pollution incident since your activity was last carried out

Since the proposed scheme does not fit into the low risk activity list and is a capital scheme (i.e. was not ongoing during the period 2009-2014), the proposed scheme has been screened in to requiring a new WFD Compliance Assessment

### 27.3.2 Stage 2 – Scoping

Using the 'Clearing the Waters for All' guidance (EA, 2016b), identification of the risks of the proposed scheme on the following receptors will be undertaken during Stage 2 of the WFD Compliance Assessment:

- Hydromorphology;

- Biology (Fish);
- Biology (Habitats);
- Water Quality; and
- Protected Areas.

This phase of the WFD Compliance Assessment will use the scoping tables as prescribed by the 'Clearing the Waters for All' guidance (EA, 2016b).

### 27.3.3 Stage 3 – Consideration of Impacts and Mitigation

To determine which activities are of relevance to the WFD Compliance Assessment, all potential impacts on the receptors identified in Stage 2 will need to be considered during Stage 3.

The following bullet points summarise the activities associated with the proposed scheme that could potentially impact WFD compliance parameters:

- Any accidental spillages of materials during construction and operation (water quality, ecology, Protected Areas);
- Disturbance of the seabed during construction (water quality, ecology,, Protected Areas);
- Release of suspended solids and any associated sediment contamination during dredging and disposal (water quality, ecology, Protected Areas)
- Obstruction of fish passage associated with underwater noise during construction (ecology; specifically fish fauna, Protected Areas);
- Loss of intertidal and subtidal habitat under reclamation and resulting from dredging (ecology, Protected Areas) and,
- Changes to coastal processes (which could influence erosion or accretion) in and around Holyhead Port a result of the presence of the reclamation and dredge channel (hydrodynamic parameters, ecology).

The scheme will be assessed to determine whether any of the proposed activities will have a significant non-temporary effect on the status of one or more WFD parameters at a water body level. If it is established that an activity is likely to affect water body status (that is by causing deterioration or by preventing achievement of the WFD objectives for that water body) potential measures to avoid the non-temporary deterioration will be investigated and evaluated in terms of cost and whether the cost of implementing them is disproportionate.

## 28 Information for Habitats Regulations Assessment

The Habitats Directive (92/43/EEC) protects habitats and species of European nature conservation importance. Together with the Birds Directive (2009/147/EC), the Habitats Directive establishes a network of internationally important sites designated for their ecological status; Natura 2000. SACs and Sites of Community Importance (SCIs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. SPAs are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds.

The Conservation of Habitats and Species Regulations 2010 incorporate all SPAs into the definition of European sites and, consequently, the protections afforded to European sites under the Habitats Directive also apply to SPAs designated under the Birds Directive (including pSPAs). In addition potential SPAs (pSPAs), possible SACs (pSACs) and Ramsar sites are also to be considered (DCLG, 2012).

In accordance with Section 61 of the Habitats Regulations 2010, an Appropriate Assessment (AA) is required for any plan or project, not connected with the management of a European Site, which is likely to have a LSE on the site either alone or in combination with other plans and projects.

Should the works associated with the proposed scheme, either alone or in combination with other plans or projects, be deemed to have a LSE on any European sites (or it cannot be determined that there would not be a likely significant effect), then an AA must be undertaken by the Competent Authority when assessing the potential implications of the proposed scheme in view of the conservation objectives of the site(s), in accordance with Article 6 of the Habitats Directive and with advice from NRW. This takes the form of a HRA (which would firstly encompass the LSE test and then, should an LSE be determined, provide information for AA).

The proposed scheme is located within the following European designated sites (see

**Figure 5-1):**

- North Anglesey Marine possible Special Area of Conservation (pSAC); and,
- North Anglesey Marine proposed Special Protection (pSPA).

The proposed scheme is located within 2.5km of the following European designated sites (see

**Figure 5-1):**

- Glannau Ynys Gybi/Holy Island Coast SPA; and,
- Glannau Ynys Gybi/Holy Island Coast SAC.

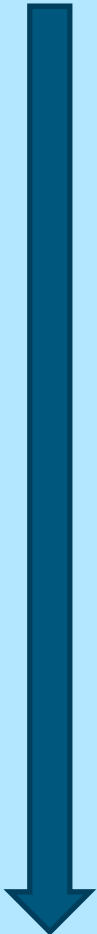
A HRA will therefore be undertaken to assess the potential impacts of the proposed scheme, both along and in isolation, on the European sites listed above. The information for HRA will be presented as a chapter in the ES.

## 29 Proposed Approach to the EIA

### 29.1 EIA Methodology

This section presents the proposed methodology for undertaking the EIA for the proposed scheme. The EIA is required under the EIA Directive (2014/52/EU) and is an iterative tool for systematically examining and assessing the impacts of the construction methods, operation and decommissioning phases of a development on the environment. Relevant EIA legislation and good practice guidelines recommend that EIA proceeds in a number of steps which are summarised below in **Table 29-1** (IEMA, 2004).

Table 29-1 Stages of the EIA process

	Task	Aim	Output (Examples)
	Consultation	Consult with statutory and non-statutory organisations	Local knowledge and information
	Primary data collection	Identify the baseline/ existing environment	Background data including existing literature and specialist studies
	Specialist studies	To further investigate those environmental parameters which may be subject to potentially significant effects	Specialist reports (e.g. hydrodynamic modelling and ecology)
	Impact assessment	To evaluate the baseline environment in terms of sensitivity  To evaluate and predict the impact (i.e. magnitude) upon the baseline  To assess the resultant effects of the above impacts (i.e. determine significance)	Series of significant adverse and beneficial impacts
	Mitigation measures	To identify appropriate and practicable mitigation measures and enhancement measures	The provision of solutions to avoid offset or reduce adverse impacts (e.g. sensitive scheduling to avoid noise and traffic impacts)  Feedback into the design process
	Draft ES	Production of the ES in accordance with EIA guidance	Final ES
	Pre-licence application to the MMO/NRW to request review of draft ES	Reduced likelihood of the need for subsequent addendums to the ES post submission.	Final ES



### 29.1.1 Topics scoped out of the EIA

Topics that are considered to not require further assessment and therefore have been scoped out of the EIA are presented in **Table 29-2**.

Table 29-2 Topics scoped out of the EIA

Topic	Justification
Bathing waters	No bathing waters located near to the proposed scheme.
Terrestrial ecology	No terrestrial habitats will be affected by the proposed scheme.
Tourism and recreation	Potential impacts to tourism will be considered within socio-economics, commercial and recreational navigation, commercial fisheries, traffic and transport chapters of the ES and no separate chapter is considered necessary for this topic.
Other users	Potential impacts to other users will be mitigated through design of the scheme, including construction methods.  In addition, potential impacts to other users will be considered within socio-economics, commercial and recreational navigation, commercial fisheries, traffic and transport chapters of the ES and no separate chapter is considered necessary for this topic.
Waste	Construction waste managed using a SWMP. No new or significant waste streams anticipated.  Disposal of dredged arisings will be considered by undertaking a disposal options study.

### 29.1.2 Impact Assessment

An EIA provides an assessment of the potential impacts on sensitive receptors as a result of a proposed scheme's effects upon the environment. For each potential impact, the assessment will identify each receptor's sensitivity to change and the magnitude of the impact on that receptor. It is not always possible to assess impacts from specific construction methods as they are not always known. In these instances, the impacts will be assessed against either a range of potential construction methodologies or using the construction method that is anticipated to result in the most significant impacts, to ensure all options for the construction of the proposed scheme are assessed.

Each impact will be defined as direct, indirect, or cumulative, any inter-relationships present, whether it is a temporary or permanent impact and if it is a beneficial or adverse impact, local, regional or national. If the resultant impact assessed is considered to be 'significant', then further options for mitigation may be required. The following sections outline the approach that will be undertaken to impact assessment.

### 29.1.3 Sensitivity of Receptor

The sensitivity of a receptor is the level at which that receptor has the capacity to change and adapt to identified impacts and the level at which it has the ability to recover. This is informed through the

baseline information gathering within the EIA process. **Table 29-3** defines the level of sensitivity of receptors.

Table 29-3 The sensitivity of receptor

Sensitivity	Definition
High	Individual receptor has very limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Medium	Individual receptor has limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Low	Individual receptor has some tolerance to avoid, adapt to, accommodate or recover from the anticipated impact.
Negligible	Individual receptor is generally tolerant to and can accommodate or recover from the anticipated impact.

#### 29.1.4 Magnitude of Effect

The magnitude of effect relates to the level at which the receptor will be impacted using the duration of the impact, timing, scale, size and frequency to determine the magnitude of the impact to each receptor. The definitions of magnitude (**Table 29-4**) be used as a guide only and may be more specific for some receptors (for example marine mammals).

Table 29-4 The magnitude of effect

Magnitude	Definition
High	<b>Spatial &amp; Temporal Extent:</b> the impact will occur over a large spatial scale and/ or over a long time period or create a permanent change. <b>Intensity:</b> the impact occurs repeatedly or continuously and/ or at a high level of intensity.
Medium	<b>Spatial &amp; Temporal Extent:</b> the impact will occur over a local to medium spatial scale and/ or over a short to medium time period. <b>Intensity:</b> the impact occurs at a medium to high frequency (or repeatedly/ continuously for a moderate length of time) and/ or at a moderate level of intensity (or occurring occasionally/ intermittently for short time frames at a moderate to high intensity).
Low	<b>Spatial &amp; Temporal Extent:</b> the impact will occur with the development site or on a small spatial scale and/ or over a short time period and create a temporary change. <b>Intensity:</b> the impact occurs occasionally/ intermittently for a short period of time and/ or at a low level of intensity.
Negligible	<b>Spatial &amp; Temporal Extent:</b> the impact will occur over a very localised spatial scale and/ or will occur over a very short time period or create a temporary change.

### 29.1.5 Impact Matrix

The significance of the impact on each receptor is determined by a combination of the sensitivity of receptor and the magnitude of impact using an 'Impact Matrix'. Once both the sensitivity and magnitude of an impact to a receptor have been identified the impact matrix set out in in Table 29-5 below will be used to determine the significance of that impact. Potential impacts should always be assessed on the basis of the worst-case scenario in order to assess and mitigate to the highest possible level of impact.

Table 29-5 Impact matrix used for the assessment of impacts

Magnitude of Effect	Receptor Sensitivity			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Impacts defined as either 'Major' or 'Moderate' as a result of the above process will be considered as significant. Where significant impacts are identified, the impact must be reduced through mitigation to below the level of significance wherever possible.

### 29.1.6 Mitigation

Mitigation can be implemented either through the project design process or through additional specific measures such as; avoidance of the receptor, reduction of impact, compensation, remediation or enhancement. Once mitigation measures have been proposed, the impact will again be assessed to determine the new significance of impact; these are the residual impacts. Potential monitoring of those impacts would also be set out in order to monitor and assess the actual impacts to receptors and/ or to conform to legal requirements of the developmental consent of the project.

## 29.2 Consideration of Alternatives

In accordance with Article 5 of the EIA Directive, the ES will include a description of the main alternatives considered by the applicant and an indication of the main reasons for selecting the preferred option, taking into account the environmental effects of the alternatives. This section of the ES helps to justify the selection of the preferred option(s) to be taken forward.

## 29.3 Consultation Process

It will be necessary to engage with stakeholders throughout the EIA process with the aim of ensuring that all relevant stakeholders with the potential to be impacted by the proposed scheme are consulted.

Key stakeholders will be identified through a stakeholder mapping exercising. The likely key stakeholders that will be included in all consultations are: the MMO, NRW, Isle of Anglesey County Council, Cadw, RSPB Cymru, Holyhead Town Council, Gwynedd Archaeological Trust, The Crown Estate, North Wales Wildlife Trust, Holyhead Coastguard, Holyhead Marina, various users of sea

around Holyhead (such as Holyhead Sailing Club and Anglesey Divers, local fishermen and the local communities).

## 29.4 Preparation of the Environmental Statement

The ES is a formal document that presents the findings of the EIA process. The ES will take the form of:

- **Project Introduction** – including a statement of need and a description of the EIA process, with details on Screening, Scoping, consultation and impact assessment methodology;
- **Project Description** – a detailed description of the construction and operational phases of the proposed scheme, including the alternatives considered and reasons for selection preferred project;
- **Baseline Environment** – detailed description of the existing environment for all environmental parameters identified as requiring further assessment during the Scoping stage;
- **Impact Assessment** – detailed description of the potential impacts of the proposed scheme (both positive and negative), mitigation measures and residual impacts for all environmental parameters;
- **Summary of Findings** – a summary table detailing the predicted impacts and residual impacts following mitigation;
- **A list of references** of information and publications cited in the ES; and,
- **Appendices** – survey information and supplementary report that may be produced during the EIA process.

### 30 References

- Anglesey Nature (2016a) Beddmanarch–Cymyran SSSI. Available at: <http://angleseynature.co.uk/webmaps/beddmanarch.html>. [Accessed on 5 December 2016].
- Anglesey Nature (2016b) Holy Island Coast SSSI. Available at: <http://www.angleseynature.co.uk/WEBMAPS/glannauydesc.htm>. [Accessed on 5 December 2016]
- Baines, M.E and Evans, P.G.H (2012). Atlas of the marine mammals of Wales. CCW Marine Monitoring Report No. 68. 2nd edition, 139pp.
- Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000). Bird Census Techniques: 2nd edition. Academic Press, London.
- Black & Veatch. (2009a). Holyhead Breakwater Engineering Report. September 2009.
- Black and Veatch, (2009b). Holyhead Breakwater Environmental Scoping Report. September 2009.
- British Geological Society. (2016). BGS Rock Classification Scheme.
- British Standards Institute. (2003). BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures. BSI, London.
- British Standards Institute. (2009). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1: Noise. BSI, London.
- British Standards Institute. (2009). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration. BSI, London.
- British Standards Institute. (2014). BS 4142:2014 Methods for rating and assessing industrial and commercial sound. BSI, London.
- British Ports Association and UK Major Ports Group. (2010). Welsh Ports: Driving Growth. Report to the Welsh Ports Group.
- Conygar Investment Company PLC. (2011). 06/06/2012 – Go ahead for Holyhead Waterfront Development. Available online: <http://www.conygar.com/News/GoAheadForHolyheadWaterfrontDevelopment/54> [Accessed 21/03/2017].
- Countryside Council for Wales. (2008). Beddmanarch – Cymyran Site of Special Scientific Interest.
- Countryside Council for Wales. (2009a). Llyn Peninsula and the Sarnau European Marine Site. Regulation 33 Advice.
- Countryside Council for Wales. (2009b). Cardigan Bay European Marine Site. Regulation 33 Advice.
- Countryside Council for Wales. (2009c). Site of Special Scientific Interest Citation: Anglesey, Beddmanarch-Cymyran.
- Countryside Council for Wales. (2012a). The Skerries Site of Special Scientific Interest Site Management Statement.
- Cefas Lowestoft Laboratory. (2012). Monitoring of the quality of the marine environment, 2008–2010. Science Series Aquatic Environmental Monitoring Report, 63: 111pp.
- Countryside Council for Wales. (2013). Core management plan including conservation objectives for Glannau Ynys Gybi SAC & Glannau Ynys Gybi SPA.

Cefas, (2014). Sanitary survey of Anglesey. Cefas report on behalf of the Food Standards Agency, to demonstrate compliance with the requirements for classification of bivalve mollusc production areas in England and Wales under EC regulation No. 854/2004.

Celtic Sea Trout Project. (2011). *Catching sea trout in the sea*. [online] Available at: <http://celticseatrout.com/project-updates/willow/> [Accessed 12 Dec. 2016].

Coull, K.A., Johnston, R., and Rogers, S.I. 1998. Fisheries Sensitivity Maps in British Waters. Published and distributed by UKOOA Ltd., v + 58 pp.

DCLG (2012). National Planning Policy Framework. Department for Communities and Local Government. March 2012

Defra. (2006). Flood and Coastal Defence Appraisal Guidance FCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts. October 2006.

Defra. (2016). Air Quality Management Technical Guidance 2016. LAQM.TG(16)

Department of Transport, Welsh Office (1988); Calculation of Road Traffic Noise HMSO, London.

Department for Transport. (2015). Department for Transport Port Statistics: Key Port Statistics.

Department for Transport, (2016a). Department for Transport Statistics Shipping Fleet Statistics. Available at: <https://www.gov.uk/government/statistical-data-sets/port04-uk-ship-arrivals> [Accessed 20 December 2016].

Department for Transport. (2016b). Sea Passenger Statistics: Final 2015.

Department for Transport. (2016c). UK International Short Sea Passenger Movements by Overseas Country: 1950 – 2015.

Ellis, J. R., Milligan, S., Readdy, L., South, A., Taylor, N. and Brown, M. 2010. Mapping spawning and nursery areas of species to be considered in Marine Protected Areas (Marine Conservation Zones). Cefas, Lowestoft.

Environment Agency (2012) Clearing the Waters: A User Guide for Marine Dredging Activities.

Environment Agency. (2016a). What's in your backyard?: Interactive Mapping Tool.

Environment Agency. (2016b). Water Framework Directive assessment: estuarine and coastal waters.

GeoConservationUK. (2009). Available online: Introduction to RIGS.

[http://wiki.geoconservationuk.org.uk/index.php5?title=Introduction\\_to\\_RIGS](http://wiki.geoconservationuk.org.uk/index.php5?title=Introduction_to_RIGS). [Accessed 20 December 2016].

GeoMôn. (2016a). GeoMôn UNESCO Global Geopark. Available online:

<http://www.geomon.co.uk/welcome/4533286587>. [Accessed 20 December 2016].

GeoMôn. (2016n). Geosites. Available online: <http://www.geomon.co.uk/geosites/4557751310>. [Accessed 20 December 2016].

Gilbert, G., Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods: A manual of techniques for key species. RSPB/BTO/JNCC/WWT/ITE/The Seabird Group. RSPB/BTO, Sandy, Beds.

Great Britain Tourism Survey. (2014). Volumes and Values of Domestic Tourism in Great Britain – 2013. Report of VisitEngland, VisitScotland and Visit Wales.

Gwynedd and Anglesey Fisheries Local Action Group. (2013). Gwynedd and Anglesey local Fisheries Strategy European Fisheries Fund: Axis 4. Available online:

<http://www.mentermon.com/editorimages/Gwynedd-Anglesey-Fisheries%20Strategy-english.pdf> [Accessed 19 December 2016].

Heinänen, S. & Skov, H. (2015). The identification of discrete and persistent areas of relatively high harbour porpoise density in the wider UK marine area, JNCC Report No.544 JNCC, Peterborough.

Highways Agency (2011); Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7: Noise and Vibration. The Highways Agency.

Horizon Nuclear Power, (2016). Wylfa Newydd Generating Station Environmental Impact Assessment Scoping Report.

Horizon Nuclear Power, (2009). Scoping Report November 2009.

Holyhead Regen. (2016). Marine Sector. Available online: <http://www.holyhead2020.com/en-GB/Marine-Sector> [Accessed 23 December 2016].

Holyhead Marina. (2016). Holyhead Marina. Available online: <https://www.holyheadmarina.co.uk/> [Accessed 23 December 2016].

IAMMWG. (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough. 42 pp.

IAQM. (2014) Guidance on the Assessment of Dust from Demolition and Construction.

IAQM & EPUK (2015): Land-use Planning & Development Control: Planning for Air Quality. Institute of Air Quality Management.

International Standard (1996) ISO 9613-2:1996 Acoustics – Attenuation of sound during propagations outdoors – Part 2: General method of calculation. ISO, Switzerland.

Isle of Anglesey County Council, (2013a). Anglesey Seascape Character Assessment. January 2013.

Isle of Anglesey County Council. (2013b). Holyhead 2020: Realising Sustainable Community Benefit. Stage 2 submission to The Welsh Government Vibrant and Viable Places Programme.

Isle of Anglesey County Council (2016) The Anglesey Area of Outstanding Natural Beauty (AONB). Available at: <http://www.anglesey.gov.uk/planning-and-waste/countryside/areas-of-outstanding-natural-beauty-aonbs/the-anglesey-aonb/>. [ Accessed on 5 December 2016].

Isle of Anglesey AONB. (2015). Management Plan Review 2015-2020. Appendix 1: Summary of evidence base, legislative and policy context. Available online: <http://www.anglesey.gov.uk/Journals/h/x/l/Anglesey-AONB-Appendix-1.pdf> [Accessed 20 December 2016].

JNCC (2001). SPA Description: Holy Island Coast.

JNCC and NRW. (2015). SAC Selection Assessment: North Anglesey Marine / Gogledd Môn Forol. January, 2016. Joint Nature Conservation Committee, UK.

JNCC and NRW. (2016). Harbour Porpoise possible Special Area of Conservation: North Anglesey Marine / Gogledd Môn Forol Draft Conservation Objectives. January, 2016. Joint Nature Conservation Committee, UK.

JNCC. (2016a). The Geological Conservation Review Sites. Available online: <http://jncc.defra.gov.uk/page-2947> [Accessed 22 December 2016].

JNCC. (2016b). SAC Selection, Holy Island Coast. Available at: <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013046>. [Accessed 5 December 2016].

Jones, E., McConnel, B., Sparling, C., and Matthiopoulos, J. (2013) Grey and harbour seal density maps. Sea Mammal Research Unit Report to Scottish Government.

Marine Traffic, 2016. Marine Traffic - Port of Holyhead. Available at: [http://www.marinetraffic.com/en/ais/details/ports/431/United\\_Kingdom\\_port:HOLYHEAD](http://www.marinetraffic.com/en/ais/details/ports/431/United_Kingdom_port:HOLYHEAD) Accessed 13/12/2016.

Miles. J.C.H, Appleton. J.D, Reed. D.M, Green. B.M.R, Adlam K.A.M and Myers, A.H., 2007. Indicative Atlas of Radon in England and Wales. 29 pp.

Minesto, 2016. Deep Green Holyhead Deep Project: Phase 1 Environmental Statement. June 2016.

MMO. (2013). UK Sea Fisheries Statistics. <https://www.gov.uk/government/statistical-data-sets/uk-sea-fisheries-annual-statistics-report-2013>. [Accessed 15 December 2016].

MMO, (2015a). UK Sea Fisheries Statistics 2015. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/555665/UK\\_Sea\\_Fisheries\\_Statistics\\_2015\\_full\\_report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/555665/UK_Sea_Fisheries_Statistics_2015_full_report.pdf) [Accessed 15 December 2016].

MMO. (2015b). UK Vessel Lists. Available at: <https://www.gov.uk/government/collections/uk-vessel-lists> [Accessed 20 Dec 2016].

Mouchel and Partners Limited. Holyhead Port Development: Environmental Impact Assessment of East Dock Phase One Proposal. November 1994.

Natural Resources Wales. (2014). Wales Coast Path – End of Project Report. NRW Evidence Report No. 25.

Natural Resources Wales. (2015a). Marine Character Areas MCA 7: Holyhead Bay and the Skerries. Available online: [https://www.naturalresources.wales/media/674485/mca-07-holyhead-bay-and-the-skerries\\_final.pdf](https://www.naturalresources.wales/media/674485/mca-07-holyhead-bay-and-the-skerries_final.pdf) [Accessed 21 December 2016].

Natural Resources Wales. (2015b). Proposal to extend and reclassify Ynys Feurig, Cemlyn Bay and The Skerries Special Protection Area and rename it as Anglesey Terns SPA. Advice to the Welsh Government.

Natural Resources Wales, (2015c). National Seascape Assessment for Wales. Marine Character Areas: MCA 07. November 2015.

Natural Resources Wales. (2016a). Water Watch Wales: WFD Cycle 2 Rivers and water-bodies in Wales. Available at: <https://nrw.maps.arcgis.com/apps/webappviewer/index.html?id=2176397a06d64731af8b21fd69a143f6>. [Accessed 12 December 2016].

Natural Resources Wales. (2016b). Flood risk map. Available online: <https://naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map/?lang=en> [Accessed 22 December 2016].

Natural Resources Wales. (2016c). Flood zones. Available online: <https://naturalresources.wales/flooding/managing-flood-risk/flood-risk-map-guidance/flood-zones/?lang=en> [Accessed 22 December 2016].

Natural Resources Wales. (2016d) High risk of flooding from rivers and sea. Available online: <http://naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map-guidance/High-risk-of-flooding-from-rivers-and-sea/?lang=en> [Accessed 22 December 2016]

Natural Resources Wales. (2016e) Low risk of flooding from rivers and sea. Available online: <http://naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map-guidance/Low-risk-of-flooding-from-rivers-and-sea/?lang=en> [Accessed 22 December 2016]

Natural Resources Wales. (2017). Water Framework Directive. Available online: <https://naturalresources.wales/apply-for-a-permit/marine-licensing/water-framework-directive/?lang=en> [Accessed 22/03/2017]



Norrman, E.B., Duque, S.D. and Evans, P.G.H. (2015). Bottlenose Dolphins in Wales: Systematic Mark-Recapture Surveys in Welsh Waters. Sea Watch Foundation. Report for Natural Resources Wales. 84 pp.

Office for National Statistics. (2016). Neighbourhood Statistics: Isle of Anglesey, Holyhead Community Parish. Available at:

<http://www.neighbourhood.statistics.gov.uk/dissemination/viewFullDataset.do;jsessionid=gJm4RnTB DLy7JMQThnyGvtx5L2L96TNJ7ZbTJ9xFW5N5hR1QB83p!99717270!1366167073125?step=4&productId=779&instanceSelection=03070&timeld=1&containerAreald=790559&startColumn=1&numberOfColumns=4&viewAction=fullScreen&maxi=1&nsjs=true&nsck=true&nssvg=false&nswid=792>.

[Accessed on 12 December 2016]

OSAPR. (2010). The Quality Status Report 2010. OSPAR Commission, London, 176pp.

Pantin, J.R., Murray, L. G., Hinz, H., Le Vay, L. and Kaiser, M. J. (2015). The Inshore Fisheries of Wales: Paxton, C.G.M., Scott-Hayward, L., Mackenzie, M., Rexstad, E., & Thomas, L. 2016. Revised Phase III.

PriMetrica Inc. (2016). TeleGeography: Submarine Cable Map. Available from:

<http://submarinecablemap.com/#/submarine-cable/emerald-bridge-fibres>. [Accessed 19 December 2016].

Royal Haskoning.( 2011a). West of Wales Shoreline Management Plan 2: Section 4. Coastal Area G. November 2011.

Royal Haskoning, (2011b). Holyhead Terminal 5: 31 March 2010 Storm Event. Report. April 2011.

Royal HaskoningDHV (2015). Morlais Tidal Demonstration Array Scoping Report. April 2015.

Royal HaskoningDHV. (2016). New cruise berth location at the Port of Holyhead Environmental Appraisal. January 2016.

RPS. (2016). Salt Island, Holyhead: Survey of Breeding Birds 2016. Report to Stena Sealink Ports Ltd.

RSPB. (2013). South Stack Cliffs. Available from: <https://www.rspb.org.uk/reserves-and-events/find-a-reserve/reserves-a-z/reserves-by-name/s/southstackcliffs/index.aspx> [Accessed 12 December 2016].

SCOS. (2015). Scientific advice on matters related to the management of seal populations: 2015. Special Committee on Seals, 211pp.

Statistics for Wales. (2014). Local Authority Tourism Profiles 2010-2012: Isle of Anglesey. Report to the Welsh Government.

Stena Line. (2016). Stena Line port achieves zero landfill target. Available online:

<http://news.stenaline.co.uk/pressreleases/stena-line-port-achieves-zero-landfill-target-1569915> [Accessed 22 December 2016].

TripAdvisor LLC. (2016). Things to Do in Holyhead. Available from [www.tripadvisor.co.uk](http://www.tripadvisor.co.uk). [Accessed 14 December 2016].

UK Hydrographic Office. (2017). Admiralty Tide Tables Volume 1B - UK and Ireland excluding Isles of Scilly, English Channel to River Humber, Channel Islands & European Channel Ports. Taunton: UKHO.

UK Ports and Harbour Information, (2015). [www.ports.org.uk](http://www.ports.org.uk) [Accessed 14 December 2016]

UK Ports, (2015). UK Ports Directory: Holyhead. Available at: <http://uk-ports.org/Holyhead/>. [Accessed 14 December 2016].

UNESCO. (2015). Geomôn UNESCO Global Geopark (United Kingdom of Great Britain and Northern Ireland).

UNESCO. (2016). UNESCO in the UK. Available online: <http://www.unesco.org.uk/unesco-in-the-uk/> [Accessed 20 December 2016].

United Kingdom Marine Monitoring & Assessment Strategy. (2010). Charting Progress 2: The State of the UK Seas.

WeatherSpark. (2016). Average weather for Anglesey, United Kingdom. Available online: <https://weatherspark.com/averages/28745/Anglesey-Wales-United-Kingdom> [Accessed 21 December 2016].

Welsh Government, (2014) Planning Policy Wales <http://gov.wales/topics/planning/policy/ppw/?lang=en> [Accessed 22 December 2016].

Welsh Government. (2004). Technical Advice Note 15: Development and Flood Risk. Available online: <http://gov.wales/docs/desh/publications/040701tan15en.pdf>. [Accessed 22 December 2016].

Westcott S.M. and Stringell T.B. (2003) Grey seal pup production for North Wales, 2002. CCW Marine Monitoring Report, no.5, 57 pp.

Westcott SM and Stringell TB (2004). Grey seal distribution and abundance in North Wales, 2002-2003. CCW Marine Monitoring Report No.13.