

## REPORT

# **Holyhead Waterfront Development - Water Framework Directive Compliance Assessment**

Client: Conygar Holyhead Ltd

Reference: PB8908-RHD-ZZ-XX-RP-Z-0010

Status: S0/P01.01

Date: 02 September 2019

HASKONINGDHV UK LTD.

Honeycomb  
Edmund Street  
Liverpool  
L3 9NG  
Industry & Buildings  
VAT registration number: 792428892

+44 151 2362944 **T**  
+44 151 2272561 **F**  
info.liv@gb.rhdhv.com **E**  
royalhaskoningdhv.com **W**

Document title: Holyhead Waterfront Development - Water Framework Directive Compliance Assessment

Document short title:

Reference: PB8908-RHD-ZZ-XX-RP-Z-0010

Status: P01.01/S0

Date: 02 September 2019

Project name: Holyhead Waterfront Development

Project number: PB8908

Author(s): Sarah Marjoram

Drafted by: Sarah Marjoram and Kitty Taylor

Checked by: Ian Dennis

Date / initials: 20/09/19 IAD

Approved by: Gregor McNiven

Date / initials: 31/10/2019 GMcN

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 ISO 45001:2018.*

## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Holyhead Waterfront Development	1
1.2	The Water Framework Directive	1
1.3	Structure of this report	2
<b>2</b>	<b>Methodology: the WFD Compliance Assessment Process</b>	<b>3</b>
2.1	Overview	3
2.2	Stage 1: Screening	3
2.3	Stage 2: Scoping	3
2.4	Stage 3: Detailed Compliance Assessment	3
<b>3</b>	<b>Description of the Proposed Development</b>	<b>4</b>
<b>4</b>	<b>WFD Compliance Assessment</b>	<b>6</b>
4.1	Stage 1: Screening	6
4.2	Stage 2: Scoping	8
<b>5</b>	<b>Stage 3 – Detailed Assessment</b>	<b>23</b>
5.1	Construction activities	23
5.2	Operational activities	24
5.3	Located within a Heavily Modified Water Body	25
<b>6</b>	<b>Conclusion</b>	<b>25</b>
<b>7</b>	<b>References</b>	<b>26</b>

## Table of Tables

Table 4.1	WFD water body details - Holyhead Bay coastal water body	8
Table 4.2	WFD water body details - Ynys Môn Secondary groundwater body	8
Table 4.3	Construction activity description	15
Table 4.4	Analysis of surface water compliance criteria for construction activity	16
Table 4.5	Summary of construction activity analysis of surface water criteria	18
Table 4.6	Operation Activity Description	19
Table 4.7	Analysis of surface water compliance criteria for operational activity	20
Table 4.8	Surface water summary for the operational activity	22

Table 5.1 Area of WFD lower sensitivity habitats within the Holyhead Bay water body lost within the reclamation area and breakwater footprints	24
--	----

## Table of Figures

Figure 3.1 Holyhead Waterfront Development Masterplan. Zone 1 is highlighted in pink. Zone 2 is highlighted in yellow. Zone 3 is highlighted in blue.	5
Figure 4.1 WFD Water Bodies	7

## Acronyms

<b>Acronym</b>	<b>Acronym description</b>
A/HMWB	Artificial/Heavily Modified Water Body
EC	European Commission
GEP	Good Ecological Potential
GES	Good Ecological Status
IoACC	Isle of Anglesey County Council
MHWS	Mean High Water Springs
NRW	Natural Resources Wales
RBMP	River Basin Management Plan
WFD	Water Framework Directive

## 1 Introduction

### 1.1 Holyhead Waterfront Development

Conygar Holyhead Ltd. is applying for outline planning permission (with all matters reserved) to the Isle of Anglesey County Council (IoACC) for the development of Holyhead Waterfront Regeneration Scheme. The proposal is for a mixed-use regeneration scheme, to include a new marina, the reclamation of land from the sea, new residential development, together with a hotel, commercial, leisure and retail uses and associated infrastructure.

This development would lie along Holyhead seafront, in the shelter of the Great Breakwater with a new marina, surrounded by a new breakwater, extending into Holyhead Harbour. Further details of the development are provided in **Section 3** below.

### 1.2 The Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) is transposed into Welsh law by means of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. These regulations provide for the implementation of the WFD, from designation of all 'surface waters' (rivers, lakes, coastal and estuarine water) and groundwater as waterbodies, through to achieving good ecological status or potential by 2021. Natural Resources Wales (NRW) is the competent authority for implementation of the WFD in Wales. The WFD applies to all water bodies, including those that are man-made. The consideration of the proposed activity with reference to the requirements of the WFD will therefore be required.

There are two separate classifications for surface water bodies (including rivers, lakes, coastal and estuarine waters): ecological and chemical. For a water body to be in overall 'good' status, both ecological and chemical status must be at least 'good'.

#### 1.2.1 Classification of surface waters

The ecological status of a surface water body is assessed according to the condition of biological elements (e.g. fish, benthic invertebrates and other aquatic flora), the condition of supporting physico-chemical elements (e.g. thermal conditions, salinity, and concentrations of oxygen, ammonia and nutrients), concentrations of specific pollutants (e.g. copper and other priority substances), and the condition of the hydromorphological quality elements (e.g. morphological conditions and hydrological regime). Ecological status is recorded on the scale of high, good, moderate, poor or bad, with "High" denoting largely undisturbed conditions and the other classes representing increasing deviation from this natural condition; the target for all water bodies is Good Ecological Status (GES). The ecological status classification for the water body is determined from the worst scoring quality element, which means that the condition of a single quality element can cause a water body to fail to reach its WFD classification objectives.

Where the hydromorphology of a surface water body has been significantly altered for anthropogenic purposes, it can be designated as an Artificial or Heavily Modified Water Body (A/HMWB). An alternative environmental objective, Good Ecological Potential (GEP) applies in these cases.

Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the EC Environmental Quality Standards Directive (2008/105/EC, as amended by Directive 2013/39/EU), a 'daughter' directive of the WFD. These chemicals include priority substances, priority hazardous substances, and eight other pollutants carried over from the Dangerous Substance Daughter Directives.

Chemical status is recorded as 'good' or 'fail'. The chemical status classification for the water body is determined by the worst scoring chemical.

In addition, some surface waters require special protection under other European legislation. The WFD therefore brings together the planning processes of a range of other European Directives, such as the revised Bathing Waters Directive (2006/44/EC) and the Habitats Directive (92/43/EEC). These Directives establish protected areas to manage water, nutrients, chemicals, economically significant species and wildlife, and have been brought in line with the planning timescales of the WFD.

### 1.2.2 Classification of groundwater

Groundwaters are assessed in a different way to surface waters. Instead of GES and GEP, groundwaters are classified as either Poor or Good in terms of quantitative status (groundwater levels, flow directions) and quality (chemical) status (pollutant concentrations and conductivity). UKTAG<sup>1</sup> have provided guidance on how groundwater quantity and quality is assessed (UKTAG, 2012a; UKTAG, 2012b).

## 1.3 Structure of this report

The remainder of this report is structured as follows:

- **Section 2** describes the standard WFD Methodology;
- **Section 3** contains a description of the proposed development;
- **Section 4** contains the WFD Compliance Assessment, including Stage 1: Screening, and Stage 2: Scoping;
- **Section 5** discusses any activities that have been taken forward to Detailed Assessment; and,
- **Section 6** discusses the conclusions of the assessment.

---

<sup>1</sup> UKTAG is a partnership of the UK environment and conservation agencies which was set up was created to provide coordinated advice on the science and technical aspects of the European Union's Water Framework Directive.

## 2 Methodology: the WFD Compliance Assessment Process

### 2.1 Overview

This assessment is carried out in line with the internal NRW guidance 'OGN 72'<sup>2</sup> which replaces the Environment Agency's guidance 'Clearing the Waters on dredging and disposal activity in coastal and estuarine environments' (Environment Agency, 2010). It is also supplemented by the Environment Agency's guidance 'Clearing the Waters For All' (Environment Agency, 2017) to ensure consistency of process. The OGN 72 guidance details a three-step process as follows:

- **Stage 1: Screening** – exclude any activities that do not need to go through the scoping and detailed compliance assessment stages;
- **Stage 2: Scoping** – identify the quality elements that are potentially at risk from the proposed activity and need further assessment; and,
- **Stage 3: Detailed Compliance Assessment** – consider the potential impacts of activities on surface and groundwater bodies, identify ways to minimise the effect and identify if an activity may prevent the water body achieving good status or cause deterioration.

### 2.2 Stage 1: Screening

This stage consists of an initial screening exercise to identify relevant water bodies in the study area. Water bodies will be selected for inclusion in the early stages of the compliance assessment using the following criteria, with reference to the River Basin Management Plan (RBMP):

- All surface water bodies (i.e. rivers, lakes, transitional and coastal waters) that could potentially be directly impacted by the project.
- Any surface water bodies that have direct connectivity (e.g. upstream and downstream) that could potentially be affected by the project.
- Any groundwater bodies that underlie the project.

### 2.3 Stage 2: Scoping

This stage identifies whether there is potential for deterioration in water body status or failure to comply with WFD objectives for any of the water bodies identified in Stage 1. This stage considers potential non-temporary impacts and impacts on critical or sensitive habitats for each water body and each activity. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there will be no impacts. If impacts are predicted, it will be necessary to undertake a detailed compliance assessment.

### 2.4 Stage 3: Detailed Compliance Assessment

This stage determines whether the activities and/or project components that have been put forward from Stage 2 will cause deterioration and whether this deterioration will have a significant non-temporary effect on the status of one or more WFD quality elements at water body level. If it is established that an activity and/or project component is likely to affect status at water body level (that is, by causing deterioration in status or by preventing achievement of WFD objectives and the implementation of mitigation measures for HMWBs), or that an opportunity may exist to contribute to improving status at a water body level, potential measures to avoid the effect or achieve improvement must be investigated. This stage considers such measures and, where necessary, evaluates them in terms of cost and proportionality.

---

<sup>2</sup> NRW (2018) OGN72: Guidance for assessing activities and projects for compliance with the Water Framework Directive. February 2018

### 3 Description of the Proposed Development

The proposed development is located in Holyhead on Holy Island, the Isle of Anglesey. The development has been awarded Outline Planning with Reserved Matters by the IoACC. A description of the proposed development is provided below.

The proposed development has been broken down into three zones and is illustrated in **Figure 3.1** Error! Reference source not found.:

#### Zone 1: The Marina and Promenade

This area of the development is located within the eastern section of the development boundary. The proposal seeks to integrate a new marina and complementary facilities alongside the existing marina and Holyhead Sailing Club. Development in this zone would comprise:

- 500 berth marina – including a new breakwater and floating pontoons;
- Relocation of the existing (circa 150) moorings;
- 191 No. 1 and 2 bed apartments housed within 3-5 storey blocks constructed along the new breakwater, with discrete surface parking;
- 8 No. 2-storey retail/leisure/commercial facilities on reclaimed land along the Newry Beach waterfront;
- Reinstatement of Victorian sunken gardens and model boating lake;
- Enhanced access and facilities to Newry Beach;
- Preservation of existing marina and yacht club with direct links to new marina;
- New area of accessible beach adjacent to Mackenzie Landing;
- New youth/sailing centre at the existing maritime museum (former lifeboat station); and,
- Improved linkage from the marina promenade through to the Great Breakwater Country Park.

#### Zone 2: Porth y Felin

The Porth y Felin zone is centred on the re-instatement of the currently derelict Listed Building: Porth y Felin House. Development in this zone would mostly be on land reclaimed from the sea and would predominantly comprise:

- Restoration and extension of the listed building 'Porth y Felin House' as an 80-bed hotel with business / conference facilities and foreground landscaping;
- 115 No 1 and 2-bed apartments housed within 3-4 storey apartment blocks along the newly reclaimed waterfront;
- 68 No 2 and 3-bed 2-3 storey townhouses;
- 6 No 4-bed detached properties; and
- Improved vehicular / pedestrian access to Soldier's Point and the Breakwater Country Park.

#### Zone 3: Soldier Point and the Great Breakwater

Development in this zone is focused on bringing the currently derelict Soldier's Point buildings back into beneficial use and comprises:

- Restoration of listed building 'Soldier's Point' as a tourist / leisure / training facility, to include the relocated maritime museum and workshop, together with new, subterranean visitor centre with dramatic views across the harbour;

- Improved pedestrian / vehicular access to the Great Breakwater;
- New marine engineering / boat maintenance facilities at the existing industrial buildings, adjacent to Soldier's Point.
- Enhanced public / overflow parking provision at the Great Breakwater;
- Enhanced physical linkages from Marine Square through to the Great Breakwater.



© Crown Copyright. All rights reserved. 2010 Licence number 0100031673

Figure 3.1 Holyhead Waterfront Development Masterplan. Zone 1 is highlighted in pink. Zone 2 is highlighted in yellow. Zone 3 is highlighted in blue.

## 4 WFD Compliance Assessment

### 4.1 Stage 1: Screening

#### 4.1.1 Screening of proposals

Within OGN 72 there are activities that NRW considers not at risk of causing deterioration or preventing a water body from achieving its objective when all criteria set out in Stage 1 Screening are met. This step includes screening for the low number of water bodies at high status or with high status morphology. The list of these activities can be found in Appendix 2 of OGN 72.

Comparison against these criteria indicates that the proposed development should be carried forward to the Scoping Stage as it does not fit into minor construction and repairs, deposit activities, removal activities or beach management activities.

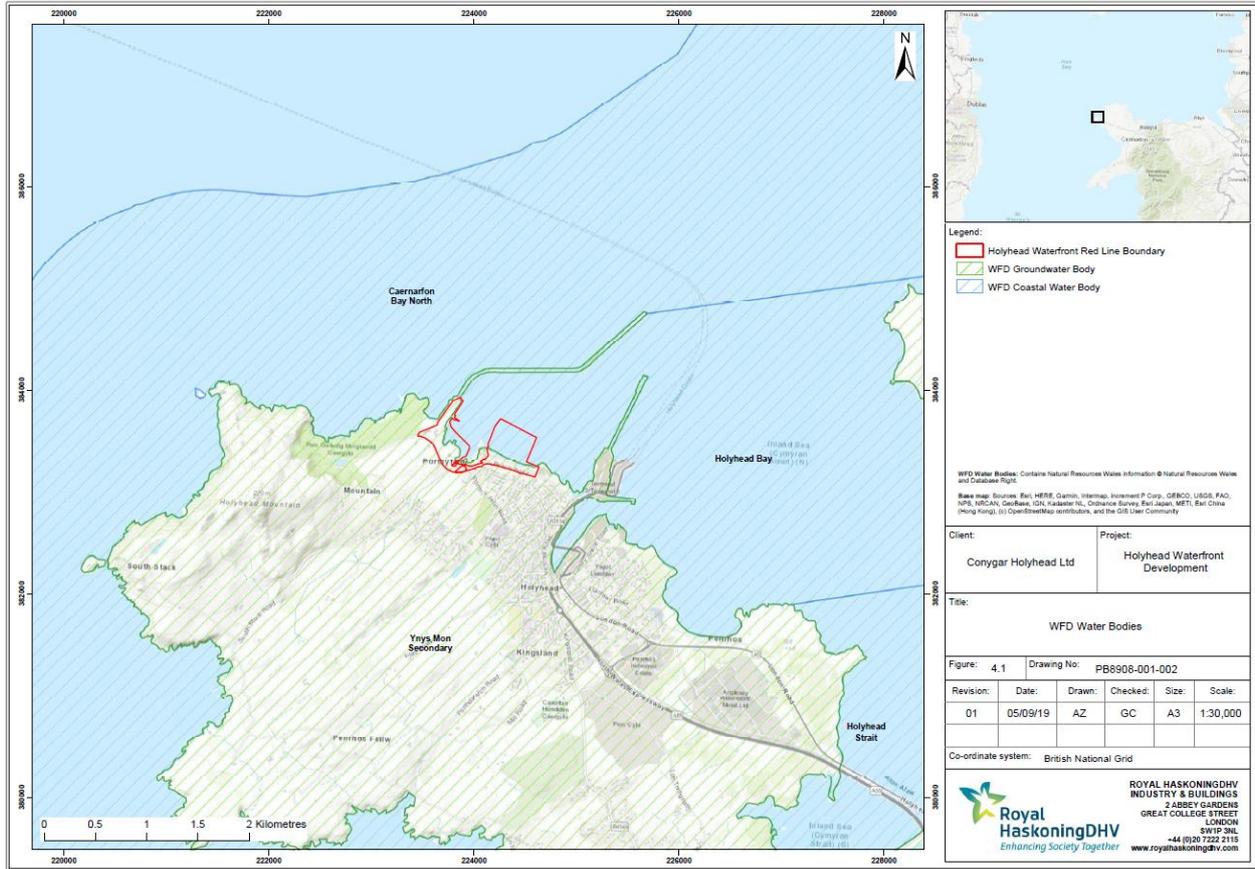
#### 4.1.2 Identification of WFD water bodies

The proposed development is located entirely within the Holyhead Bay coastal water body (GB681010360000) (**Figure 4.1**). The terrestrial components of the project are not included within the catchment of a river water body identified in the RBMP, because surface drainage features (including the Porth y Felin stream, which dissects the proposed development), are too small to be classified as a river water body in their own right (<5km<sup>2</sup>). The land area is therefore considered to form part of the nearest downstream water body (in this case Holyhead Bay coastal water body) for the purposes of this assessment. Holyhead Bay coastal water body has a current Overall Status of Moderate, an Ecological Status of Moderate and a Chemical Status of Fail due to levels of fluoranthene, benzo(a)pyrene and mercury and its compounds.

The Caernarfon Bay North water body (GB621010380000) is located approximately 1.5km from the proposed development, on the seaward side of the Great Breakwater (**Figure 4.1**), and has an Overall, Ecological and Chemical Status of Good. Holyhead Strait coastal water body (GB681010450000) is located approximately 3km to the east of the proposed development (**Figure 4.1**) and has an Overall and Chemical Status of Good, and an Ecological Status of Moderate.

The terrestrial elements of the proposed development are underlain by the Ynys Môn Secondary groundwater body (GB41002G204400) (**Figure 4.1**) which, although its quantitative status is Good, has an Overall Status of Poor due to its Poor Chemical Status. The aquifer is low productivity and composed of highly indurated rocks with limited groundwater in the near-surface weathered zone and secondary fractures.

Figure 4.1 WFD Water Bodies



## 4.2 Stage 2: Scoping

The first stage in the assessment is to break down the proposed development into activities that can be checked against scoping criteria and then determine which water bodies could potentially be impacted.

The scoping process will be carried out for the water body(s) in which the activities will occur (i.e. the Holyhead Bay coastal water body and the Ynys Môn Secondary groundwater body). If a potential risk is identified within a water body, then potential risks to the connecting water bodies (Holyhead Strait and Caernarfon Bay North) will be considered in Stage 3: Detailed Compliance Assessment. As such, details on the Holyhead Bay coastal water body are provided below in **Table 4.1** and on the Ynys Môn Secondary groundwater body in **Table 4.2**.

Table 4.1 WFD water body details - Holyhead Bay coastal water body

Parameter	Holyhead Bay
Water body ID	GB681010360000
River basin district name	Western Wales
Water body type (estuarine or coastal)	Coastal
Water body total area (km <sup>2</sup> )	11.71 km <sup>2</sup>
Overall water body status (2015)	Moderate
Ecological status	Moderate - Invertebrates
Chemical status	Fail (Fluoranthene, Benzo(a)pyrene, Mercury and its compounds)
Target water body status and deadline	Good Potential by 2027
Hydromorphology status of water body	Information not available
Heavily modified water body and for what use	Yes. Navigation, ports and harbours, and coastal protection.
Higher sensitivity habitats present	Mussel beds and subtidal kelp beds
Lower sensitivity habitats present	Gravel and cobbles, intertidal soft sediment, subtidal soft sediment, intertidal rocky shore,
Phytoplankton status	High
History of harmful algae	Information not available
WFD protected areas within 2km	Anglesey Terns/Morwenoliaid Ynys Môn SPA, North Anglesey Marine/Gogledd Môn Forol SAC and Beddmanarch Bay shellfish water

Table 4.2 WFD water body details - Ynys Môn Secondary groundwater body

Parameter	Ynys Môn Secondary
Water body ID	GB41002G204400
WFD Management Catchment	Ynys Môn
Water body type	Groundwater
Water body total area (km <sup>2</sup> )	623.22
Overall water body status (2015)	Poor
Quantitative status	Good
Chemical status	Poor
Reason for not achieving good status	Chemical GWDTes test

Parameter	Ynys Môn Secondary
Target water body status and deadline	Poor by 2015
Drinking water protected area	Chemical drinking water protected area
No technical solution known	x

#### 4.2.1 Construction activities

Development within the marine environment (i.e. below MHWS) is expected to comprise the following activities:

- Installation of a 500-berth marina (Zone 1);
- Construction of a breakwater around the marina (Zone 1);
- Reclamation of some intertidal habitat along Newry Beach (Zone 1); and,
- Reclamation of some intertidal and potentially some subtidal habitat at Porth y Felin (Zone 2).

Land-side development is expected to comprise the following activities:

- Construction of residential and commercial buildings (Zones 1, 2 and 3);
- Restoration/repurposing of existing buildings (Zones 2 and 3);
- Improved vehicular and pedestrian access to the Breakwater and Country Park (Zones 2 and 3); and,
- Provision of parking at the Breakwater (Zone 3).

At the time of writing, detailed construction methodologies for the activities outlined above are not yet available and as such this assessment has been undertaken based on some key assumptions. These are outlined in **Sections 4.2.1.1** and **4.2.1.2** below.

##### 4.2.1.1 Embedded control measures

There are numerous built-in control measures that are put in place during the construction of marine infrastructure which limit or prevent any risks to surface water quality. These are discussed below and would be adhered to during the construction of the proposed development.

#### Surface water quality

During the various activities there is the potential for pollution from spills or leaks of fuel and oil. The risk of this arising can be minimised by following standard good practice with regard to pollution prevention guidance. Construction works will be undertaken in accordance with NRW's Guidelines for Pollution Prevention No. 5 (GPP5) (NRW, NIEA and SEPA, 2018) on works in, near and liable to affect watercourses.

A Construction Environmental Management Plan (CEMP) would be put in place by the successful contractor and include organisational structure, planning activities, responsibilities, processes, procedures and resources. It would detail measures against spills and leakages; impacts on sediment and water quality and benthic habitats; re-suspension of contaminated sediment; marine pollution. In the unlikely event of a spill, Stena Line Ports Ltd have an Oil Spill Contingency Plan in place which would be followed in time of a pollution event.

Appropriate spill kits will be available on board any vessels associated with the works to install the breakwater and marina and all crew will be trained to use them. In addition, all vessels will ensure that

suitable bunding and storage facilities are employed to prevent the release of fuel oils, lubricating fluids associated with the plant and equipment into the marine environment. Any risks to water quality in terms of accidental spills or leaks will therefore be reduced as far as possible and therefore this issue is not considered further within this assessment.

In the event of a collision at sea all vessels used for dredge operations shall comply with the International Regulations for Preventing Collision at Sea with respect to the display of lights, shapes and signals. Furthermore, a Local Notice to Mariners (NtM) will be issued prior to the commencement of any marine works activities.

The International Convention for the Control and Management of Ships Ballast Water and Sediments (BWM Convention) was adopted in 2004 and was implemented in 2017. This introduces global regulations to control the transfer of potentially invasive species. With the treaty now in force ships are required to manage their ballast water.

With regards to terrestrial activities, the Porth y Felin stream will not undergo physical modification and will not be directly impacted by the proposed development. Construction best practice control measures will be included during construction to minimise impacts resulting from the potential supply of fine sediments and contaminants (e.g. from construction materials) to the surface water body (e.g. pollution prevention and control measures set out in CIRIA's Environmental Good Practice on Site, 3rd Edition (2010); and Construction Industry Publication (CIP) Construction Environmental Manual (2010)). These measures will prevent changes to the physico-chemistry or chemistry of surface waters and prevent deterioration in water body status.

Best practice control measures include sediment management measures such as:

- Minimising subsoil exposure and retaining strips of undisturbed vegetation along the edge of the working area where possible;
- Maximising retention of sediment on site by routing all drainage through the site drainage system which will include measures to intercept sediment runoff at source. Suitable filters will be used to remove sediment from any water discharged into the surface drainage network;
- Minimising soil and sediment accumulation on road surfaces as far as reasonably practicable by cleaning the wheels of vehicles leaving site and, where required, clearance of the road surface. Traffic movement should be restricted to minimise potential for surface disturbance; and
- Avoiding water resources and flood risk receptors during works where possible.

In addition, specific measures should be employed for pollution prevention such as:

- Ensuring that concrete and cement mixing and washing areas are situated at least 10m away from the nearest watercourse, and that they incorporate a settlement and recirculation system to allow water to be re-used. All washing out of equipment should occur in a contained area, and all water collected for off-site disposal;
- Storing all fuels, oils, lubricants and other chemicals in an impermeable bund with at least 110% of the stored capacity. Damaged containers should be removed from site, and all refuelling should take place in a dedicated impermeable area using a bunded bowser. The refuelling and fuel storage area should be located at least 10m from the nearest watercourse and biodegradable oils should be used where possible;
- Spill kits should be available on site at all times and sand bags or stop logs also available for deployment on the outlets from the site drainage system in case of emergency spillages; and

- Collecting all foul drainage (e.g. from construction welfare facilities) through a mains connection to an existing mains sewer (if a suitable connection is available), or in a septic tank located within the development boundary and transported off site for disposal at a licensed facility.

#### 4.2.1.2 Construction methodology assumptions

The following assumptions have been made regarding the construction of the proposed development in order to allow an assessment of the potential impacts on the waterbodies

##### Marine construction methodology

From the information available it has been assumed for this assessment that no dredging is required for the installation of any of the marine elements of the proposed development. It has also been assumed that the reclamation of Newry Beach and Porth y Felin will be undertaken by constructing the wall first and then infilling the area behind once the wall is complete. Therefore, risks to water quality arising from the construction of the proposed development are not considered to be of concern as they would be will be small and localised in nature in comparison to the total area of the coastal water body (11.71 km<sup>2</sup>) and will be only for the duration of the construction works.

Although the construction activities themselves are not considered to cause a deterioration in water quality, they will result in the loss of intertidal and subtidal habitat within the footprint. Therefore, the construction of the marine side elements of the proposed development will be considered further in this assessment.

##### Groundwater Body

From the information available it is not expected that the land-side construction elements, which will overlie the Ynys Môn Secondary groundwater body, will involve significant piling or removal of earth such that the groundwater would be affected. However, the proposal currently includes the installation of a new drainage system and the construction of a subterranean visitor centre at Soldier's Point. This will introduce below-ground infrastructure which could disrupt groundwater flows and therefore impact on the quantity of groundwater in the development area.

Piling and significant groundworks can create a pathway for contaminants to enter groundwater from construction machinery and works. However, if any affects relating to construction occur, these will be small and localised in nature in comparison to the total area of the groundwater body (623.22 km<sup>2</sup>) and will be only for the duration of the construction works.

In addition, specific measures relating to pollution prevention can be employed, to be captured in a construction method statement (CMS) to eliminate the risk of contaminants entering the groundwater during construction following construction best practice. These would be detailed at a later date during additional consent applications such as the marine licence.

Furthermore, British Geological Survey borehole records show three boreholes (SH28SW 1-3) drilled approximately 0.5km southeast of the eastern edge of the site boundary. The borehole data suggests a bedrock composed of fractured schist. Groundwater was struck at depths of 6.5m, 9m and 7m below the surface respectively. It is expected that groundwater at the site would be at a similar level to that observed in the boreholes. The risk of saline intrusion as a result of construction works and the intended end use is very low given the expected depth of the groundwater and the greater density of saline water compared to freshwater. As water is not due to be abstracted and pumped to the surface, it is highly unlikely that saline waters would intrude into freshwater groundwater.

It is therefore proposed that the Ynys Môn Secondary groundwater body will not be considered further within the assessment.

#### 4.2.2 Operational activities

Activities which may cause a risk to water quality during the operation of the proposed development will include:

- The general use of the marina;
- Surface water discharges from the onshore development; and,
- The presence of the marine structures and the potential effects on hydrodynamics.

Operational activities are unlikely to impact on the groundwater body as a drainage system will be put in place as detailed in the embedded control measures below, therefore minimising the risk of any reduction in quality of groundwater. Therefore, groundwater bodies are not considered further for operational impacts.

##### 4.2.2.1 Embedded control measures

There are several in-built control measures listed below and discussed within the ES (see **Chapter 12, Water Quality and Flood Risk**) that will be put in place to manage risks to water quality during the operational phase of the proposed development.

#### Surface water discharges

The proposed development will include the following measures to minimise impacts associated with surface water discharges:

- The proposed development will benefit from separate foul and surface water drainage systems and will therefore avoid these potential problems;
- Surface water runoff from the proposed development will be discharged into the harbour at various locations along the water frontage, through free-draining discharge outfalls;
- In accordance with NRW guidelines, all drainage systems serving car parks which provide in excess of 50 spaces will be fitted with appropriately designed petrol/oil interception facilities, prior to free discharge into the harbour area; and,
- All foul effluent would be collected by a new dedicated below-ground system and drained to Welsh Water's main foul network and would not, therefore, discharge into the area of the proposed marina or elsewhere in Holyhead Harbour.

As such risks to water quality in terms of surface water discharges during operation will be reduced as far as possible and therefore this issue is not considered further within this assessment.

#### Marina water quality management

Impacts to water quality arising from the operation of the marina will be managed by the enforcement of simple housekeeping rules. These would include:

- No pump-out of bilge water or holding tanks;
- No use of "sea toilets" within the marina;
- No discharge of solid waste; and
- No filling of fuel tanks except at the designated fuel berth.

These practices would be supported by the provision of:

- Accessible onshore toilets connected to the main drainage network;
- Holding tank pump-out facilities;
- Waste disposal facilities;
- The regular maintenance of oil interceptors;
- The removal of floating debris or rubbish, should it collect in the corners of the proposed marina; and,
- An emergency action procedure to deal with oil spills, in conjunction with existing port facilities and procedures, such as those set out in Stena Line Port Ltd.'s Oil Spill Contingency Plan<sup>3</sup>.

The tidal prism (the volume difference between high water spring and low water spring excluding any contribution from freshwater inflow) for the development site is 5.9Mm<sup>3</sup> for the spring tide, and 2.9Mm<sup>3</sup> for the neap. The nearest Admiralty tidal stream is located outside the entrance to Holyhead Harbour where flows are generally to the east on the flood tide and to the west on the ebb tide. Velocities range between 0.1 and 0.7m/s during spring tides, and 0.1 to 0.4m/s during neap tides.

It is considered that in light of the large difference in tidal prism in Holyhead Bay between spring and neap tides (also discussed in **ES Chapter 6, Hydrodynamics Wave Climate and Sediment Transport** and **ES Chapter 12, Water Quality and Flood Risk**) the marina will have good flushing ability with a small risk of the potential for 'dead zones' (hypoxic areas) which can be caused by a lack of circulation and replenishing of oxygen.

As such risks to water quality in terms of pollution or contamination during the operation of the marina will therefore be reduced as far as possible and therefore this issue is not considered further within this assessment.

The presence of new marine structures could interrupt the existing hydrodynamic regime, wave climate and sediment transport within Holyhead Bay. It is therefore considered that impacts to hydrodynamics within the Holyhead Bay coastal water body caused by the presence of the marine structures cannot be ruled out at this stage.

### **Invasive species management**

Control measures to prevent spread of the carpet sea-squirt (*Didemnum vexillum*), a known invasive species within Holyhead Harbour, would be implemented subject to consultation with and approval by NRW and would incorporate knowledge gained from the programme of control measures implemented by Holyhead Marina. Marine Invasive Species Management Plans would be formulated to cover the operational phase, when marina users would be required to follow a code of practice to prevent and control infestation, and periodic checking and eradication from structures would need to be considered.

#### **4.2.2.2 Summary**

As outlined above, the following construction activity has been taken forward to Stage 2: Scoping as impacts to the coastal water body cannot be ruled out at this stage:

- Construction of marine structures (i.e. development below the level of MHWS).

Given the operational measures embedded into the scheme design, it is considered that the general use of the marina and surface water discharges associated with the proposed development will not result in a non-

<sup>3</sup> Stena Line Ports Ltd (2017) Port of Holyhead Oil Spill Contingency Plan. April 2017

temporary effect on the Holyhead Bay coastal water body and will not cause a deterioration in the status of this water body or connected water bodies such as the Ynys Môn Secondary groundwater body.

The following operational activity has been taken forward to Stage 2: Scoping as impacts on the coastal water body cannot be ruled out at this stage:

- Presence of marine structures.

It should be noted that this activity will not be considered for the groundwater body as no significant pathway for impacts to occur has been identified.

The information relevant to considering the requirements of the WFD for the construction and operational phase activities are summarised in **Table 4.3** to **Table 4.8** below (taken from Clearing the Waters for All; Environment Agency, 2016). Note that although the answer to the question is “yes” in some instances, the evidence provided in the notes column allows the issue to be scoped out of requiring further assessment.

Table 4.3 Construction activity description

	Description, notes or more information
Applicant name	Conygar Holyhead Ltd
Name of activity	Construction of marine structures including the marina and breakwater, and the newly reclaimed areas
Brief description of activity	The proposed development includes the installation of a new breakwater (of approximately 16,000m <sup>2</sup> ) to protect the new 500 berth marina, an area of reclaimed land within the Newry Beach area (of approximately 27,000 m <sup>2</sup> ) which will form part of Zone 1 of the proposed development, an area of reclaimed land within the Porth y Felin area (of approximately 30,000 m <sup>2</sup> ) which will form part of Zone 2 of the proposed development and a small quay or jetty associated with the existing Soldiers Point Quay on the Great Breakwater (Zone 3 of the proposed development)
Location of activity	See <b>Figure 4.1</b> Error! Reference source not found.
Footprint of activity	Approximately 73,000 m <sup>2</sup>
Timings of activity	Details of the construction methods for these marine elements are not yet known and as such the detail of the construction programme is not yet available.
Extent of activity	See <b>Figure 4.1</b>
Use or release of chemicals	None

Table 4.4 Analysis of surface water compliance criteria for construction activity

WFD compliance parameter	Consider if the activity is	Further assessment required?		Presence of marine structures
		Yes	No	
Hydromorphology	Capable of impacting on the hydromorphology of a water body with high status		✓	No, the water body is not at high status
	Capable of significantly impacting on the hydromorphology of any water body		✓	No, this is considered within the operational activity.
	Located in a water body that is heavily modified for the same purpose	✓		<b>Yes</b> , the water body is heavily modified for Navigation, ports and harbours, however impacts to hydromorphology elements are fully considered within the operational activity and as such are not considered further here.
Biology (Habitats)	0.5 km <sup>2</sup> or larger		✓	No, the footprint of the marine structures is approximately 73,000 m <sup>2</sup> .
	1% or more of a water body's area		✓	No, this represents approximately 0.4% of Holyhead Bay coastal water body area.
	Within 500m of any higher sensitivity habitat		✓	<b>Yes</b> , the marine structures are within 500m of the subtidal kelp beds higher sensitivity habitat. However, the area of this habitat, as shown on Defra's MAGiC Map <sup>4</sup> which could be affected is very small in comparison to its extent throughout the water body and as such this is not considered further.
	1% or more of any lower sensitivity habitat	✓		<b>Yes</b> . The following areas of lower sensitivity habitats will be lost within the reclamation areas:  Subtidal rocky reef = 4,203m <sup>2</sup> = 0.058% of its area within the waterbody; Intertidal rocky shore = 40,044m <sup>2</sup> = 5.45% of its area within the waterbody; and, Intertidal soft sediment = 17,889m <sup>2</sup> = 0.915% of its area within the waterbody.  Consequently, the loss of subtidal rocky reef and intertidal soft sediment will be considered further within this assessment.

<sup>4</sup> <https://magic.defra.gov.uk/MagicMap.aspx>

## Project related



WFD compliance parameter	Consider if the activity is	Further assessment required?		Presence of marine structures
		Yes	No	
Biology (Fish)	In an estuary and could affect fish in the estuary, or outside the estuary but could delay or prevent fish entering it or affect migration		✓	No, the construction of these marine structures will not require the use of dredging and therefore will not produce significant sediment plumes which could impact fish species.
	Capable of impacting on normal fish behaviour like movement, migration or spawning		✓	
	Capable of causing entrainment or impingement of fish		✓	
Water Quality	Capable of affecting water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring-neap tidal cycle		✓	No, no dredging is required during construction and therefore sediments will not be significantly disturbed.
	Located in a water body with a phytoplankton status of moderate, poor or bad		✓	No, the phytoplankton status of the water body is High.
	Located in a water body with a history of harmful algae		✓	No, there is no history of harmful algae in the water body.
Chemical Contamination	The chemicals are on the Environmental Quality Standards Directive (EQSD) list		✓	No, no dredging is required during construction and therefore sediments will not be significantly disturbed.
	It disturbs sediment with contaminants above Cefas Action Level 1			
Protected Areas	Located within 2 km of any WFD protected area (SAC, SPA, shellfish waters, bathing waters, nutrient sensitive areas)		✓	<b>Yes</b> , the proposed development is within the North Anglesey Marine SAC/Gogledd Mon Forol SAC and the Anglesey Terns/Morwenoliaid Ynys Mon SPA, and is within 2km of the Holy Island Coast/Glannau Ynys Gybi SPA and SAC. An assessment of potential impact to these European sites is provided within the HRA ( <b>Chapter 8/Appendix 8-8</b> ) and so are not considered further here.
Invasive Non-native Species (INNS)	Capable of spreading INNS		✓	No, as discussed in <b>Section 4.2.2.1</b> the construction of the proposed development will be undertaken following procedures, in consultation with NRW, to prevent the spread of INNS, particularly carpet sea-squirt <i>D. vexillum</i> .

Table 4.5 Summary of construction activity analysis of surface water criteria

Receptor	Construction of the marine structures
Hydromorphology	No, impacts to hydromorphology are considered within the scoping of the operational activity
Biology – habitats	<b>Yes</b> , the construction of the breakwater and reclamation areas will impact more than 1% of a lower sensitivity habitat.
Biology – fish	No, construction activity will not impact fish.
Water quality	No, no dredging is required and as such water quality will not be impacted.
Chemical	
Protected areas	Yes, however an assessment of potential impacts on European designated sites is provided within the HRA ( <b>Chapter 8/Appendix 8-8</b> ) and so are not considered further here.
INNS	No, construction will be undertaken following procedures, in consultation with NRW, to prevent the spread of INNS.

## Project related

Table 4.6 Operation Activity Description

Your activity	Description, notes or more information
Applicant name	Conygar Holyhead Ltd
Name of activity	Presence of marine structures including the marina and breakwater, and the newly reclaimed areas
Brief description of activity	The proposed development includes numerous marine structures that may impact the hydrodynamics, wave climate and sediment transport in the development site. The operation of each of these structures also has the potential to affect sedimentation patterns through impacts on tidal currents and waves. This is discussed below.
Location of activity	See <b>Figure 4.1</b>
Footprint of activity	Approximately 73,000m <sup>2</sup>
Timings of activity	It is not yet known when construction of the proposed scheme would be completed. However once completed the proposed development would be a permanent presence in Holyhead Bay.
Extent of activity	See <b>Figure 4.1</b>
Use or release of chemicals	None

Table 4.7 Analysis of surface water compliance criteria for operational activity

WFD compliance parameter	Consider if the activity is	Further assessment required?		Presence of marine structures
		Yes	No	
Hydromorphology	Capable of impacting on the hydromorphology of a water body with high status		✓	No, the water body is not at high status
	Capable of significantly impacting on the hydromorphology of any water body	✓		<b>Yes</b> , the presence of the marine structures is capable of affecting hydrodynamics, wave climate, sediment transport and sedimentation within the Holyhead Bay coastal water body.
	Located in a water body that is heavily modified for the same purpose	✓		<b>Yes</b> , the water body is heavily modified for Navigation, ports and harbours.
Biology (Habitats)	0.5 km <sup>2</sup> or larger		✓	No, the loss of intertidal and subtidal habitats is considered within the scoping assessment of the construction activities.
	1% or more of a water body's area		✓	
	Within 500m of any higher sensitivity habitat		✓	
	1% or more of any lower sensitivity habitat		✓	
Biology (Fish)	In an estuary and could affect fish in the estuary, or outside the estuary but could delay or prevent fish entering it or affect migration		✓	No, the presence and use of the marine structures will not adversely affect fish movements as Holyhead Bay is not an estuary. There are no spawning grounds within Holyhead Bay and no entrainment or impingement of fish will occur.
	Capable of impacting on normal fish behaviour like movement, migration or spawning		✓	
	Capable of causing entrainment or impingement of fish		✓	
Water Quality	Capable of affecting water clarity, temperature, salinity, oxygen levels,		✓	No, the presence of the marine structures will not impact on water quality as discussed in <b>Section 4.2.2.1</b> .



## Project related

WFD compliance parameter	Consider if the activity is	Further assessment required?		Presence of marine structures
		Yes	No	
	nutrients or microbial patterns continuously for longer than a spring-neap tidal cycle			
	Located in a water body with a phytoplankton status of moderate, poor or bad		✓	No, the phytoplankton status of the water body is High.
	Located in a water body with a history of harmful algae		✓	No, there is no history of harmful algae in the water body.
Chemical Contamination	The chemicals are on the Environmental Quality Standards Directive (EQSD) list		✓	No, the presence of the reclaimed areas will not impact on water quality.
	It disturbs sediment with contaminants above Cefas Action Level 1			
Protected Areas	Located within 2 km of any WFD protected area (SAC, SPA, shellfish waters, bathing waters, nutrient sensitive areas)		✓	<b>Yes</b> , the proposed development is within the North Anglesey Marine SAC/Gogledd Mon Forol SAC and the Anglesey Terns/Morwenoliaid Ynys Mon SPA, and is within 2km of the Holy Island Coast/Glannau Ynys Gybi SPA and SAC. An assessment of potential impact to these European sites is provided within the HRA ( <b>Chapter 8/Appendix 8-8</b> ) and so are not considered further here.
Invasive Non-native Species	Capable of spreading INNS		✓	No, as discussed in <b>Section 4.2.2.1</b> the proposed development will put in place management procedures, in consultation with NRW, to prevent the spread of INNS, particularly carpet sea-quirt <i>D. vexillum</i> .

Table 4.8 Surface water summary for the operational activity

Receptor	Presence of the marine structures
Hydromorphology	<b>Yes</b> , the presence of the marine structures are capable of affecting hydrodynamics within the development site. The development is also within a water body which is designated as heavily modified for navigation, ports and harbours.
Biology – habitats	No, the potential impacts arising from the installation of the marine structures on habitats will be assessed on the construction activities.
Biology – fish	No, the presence of the marine structures will not have an adverse effect on fish movement, nursery or spawning grounds.
Water quality	No, the presence of the marine structures will not affect water quality, as discussed in <b>Section 4.2.2.1</b>
Chemical	No, the presence of the marine structures will not cause the release of chemical contamination.
Protected areas	Yes, however the potential impacts to protected European sites is assessed within <b>Chapter 8/Appendix 8-8</b> and is not considered further here.
INNS	No, as discussed in <b>Section 4.2.2.1</b> sufficient management measures will be put in place, in consultation with NRW to prevent the spread of INNS.

## 5 Stage 3 – Detailed Assessment

As set out above, the construction and the operational presence of the marine structures were taken forward to the scoping stage. The Stage 2 Scoping process has identified the following WFD compliance parameters that could be at risk from the activity identified as requiring further assessment:

- During construction:
  - Biology (habitats):
    - The construction of the marine structures is:
      - Within 1% or more of a lower sensitivity habitat.
- During operation:
  - Hydromorphology:
    - The presence of the marine structures is:
      - Capable of significantly impacting on the hydromorphology of the water body; and;
      - Located in a water body that is heavily modified for the same purpose.

### 5.1 Construction activities

#### 5.1.1 Construction of the marine structures – Biology (habitats)

##### 5.1.1.1 Potential impacts to lower sensitivity habitats

The construction of the new breakwater, and the reclamation of the two areas at Newry Beach and Porth y Felin will cause the direct loss of intertidal and subtidal habitats within the Holyhead Bay coastal water body, amounting to approximately 73,000m<sup>2</sup>. This can be broken down as follows:

- New breakwater footprint = 16,000m<sup>2</sup> of subtidal habitat.
- Newry Beach reclamation area footprint = 27,000m<sup>2</sup> of which:
  - 10,500m<sup>2</sup> is intertidal; and,
  - 16,500m<sup>2</sup> is subtidal.
- Porth y Felin reclamation area footprint = 30,000m<sup>2</sup> of which:
  - 17,000m<sup>2</sup> is intertidal; and,
  - 13,000m<sup>2</sup> is subtidal.

As such, the total area of intertidal habitat that will be lost is approximately 27,500m<sup>2</sup>, and the total area of subtidal habitat that will be lost is approximately 45,500m<sup>2</sup>.

The construction of these elements will cause the loss of the following lower sensitivity habitats:

- Intertidal soft sediment (sand mud and mixed);
- Rocky shore (intertidal rock); and,
- Subtidal rocky reef (infralittoral and circalittoral rock).

The table below (**Table 5.1**) indicates the area of these habitats within the Holyhead Bay coastal waterbody and the total area of these habitats which will be lost within the footprint of the proposed development.

Table 5.1 Area of WFD lower sensitivity habitats within the Holyhead Bay water body lost within the reclamation area and breakwater footprints

WFD Habitat	Area of habitat in waterbody (m <sup>2</sup> )	Porth y Felin		Newry Beach and Breakwater	
		Area of habitat	% of habitat lost	Area of habitat	% of habitat lost
Subtidal rocky reef	7,305,664	0	0	4,203	0.0575
Rocky shore	733,824	25,503	3.48	14,541	1.98
Intertidal soft sediment	1,955,268	91	0.00465	17,798	0.91

These calculations show that the areas of intertidal rocky shore and intertidal soft sediment are over the 1% threshold for the area of a WFD waterbody habitat lost.

However, the data presented on Defra's MAGiC Map shows that these habitats are present extensively throughout the water body and along the north Welsh coastline. It is also considered that the loss of intertidal rocky shore will be compensated by the presence of the new concrete or rock revetments associated with the reclamation areas and the breakwater, which will provide new hard substrate for intertidal species to colonise.

The loss of these small areas of habitat are therefore not considered to be significant and are not considered to cause a deterioration in the biology characteristics of the water body.

## 5.2 Operational activities

### 5.2.1 Presence of the marine structures – Hydromorphology

#### 5.2.1.1 Hydrodynamics

The assessment of potential impacts on hydromorphology is presented in full in **ES Chapter 6, Hydrodynamics, Wave Climate and Sediment Transport**, however the main discussion points and conclusions are provided here for ease of reference.

During operation, the reduction in space for water created by the scheme structures would decrease the tidal prism of the development site. This could potentially decrease tidal current velocities across the site, which may increase the potential for additional deposition across the intertidal and subtidal areas.

The two areas of land-claim have a plan area of approximately 50,000m<sup>2</sup> and would reduce the mean tidal prism by about 190,000m<sup>3</sup>. The new breakwater and integral development platform would further reduce the mean tidal prism by approximately 60,000m<sup>3</sup>. The combined reduction in tidal prism due to both elements would be about 250,000m<sup>3</sup> and represents a reduction of approximately 5% in the tidal prism of the development site. This is a small reduction and would have a negligible impact on already very low tidal currents.

The presence of the new breakwater would be expected to disrupt the clockwise circulation of water within Holyhead Bay and could increase the current velocities between the new breakwater and the Great Breakwater. However, the scale of these changes is not expected to be significant.

The presence of the proposed development is not considered to cause a sufficient change in hydrodynamics to then result in a deterioration in the status of the hydromorphological quality elements.

### 5.2.2 Wave climate

The proposed development has the potential to alter the baseline wave regime. It is expected that the presence of the new breakwater will alter wave reflection and would also lead to a reduction in wave energy on the shoreline. However, given the existing low wave heights in the area these changes are considered to be insignificant.

Therefore, the presence of the proposed development is not considered to have the potential to cause a sufficient change in the wave climate to then result in a deterioration in hydromorphological quality elements.

### 5.2.3 Sediment transport

The potential changes in hydrodynamics and wave regime are negligible and considered to have little impact upon sedimentation patterns and are therefore considered unlikely to lead to a deterioration in hydromorphological quality elements.

## 5.3 Located within a Heavily Modified Water Body

The proposed development will construct a new marina and breakwater within a water body which is designated as a HMWB for 'navigation, ports and harbours', and 'coast protection use'. The following mitigation measures are in place for the Holyhead Bay coastal water body:

- Modify vessel design;
- Vessel Management;
- Dredging disposal strategy;
- Reduce impact of dredging;
- Reduce sediment resuspension;
- Sediment management;
- Manage disturbance; and,
- Modify channel.

The following measures have been identified however, they are not yet in place:

- Enhance ecology;
- Realign flood defence; and,
- Remove or soften hard bank.

Dredging is not required for the proposed scheme and the evidence provided above concludes that the presence of the marine structures will not have a significant adverse impact on hydrodynamics, the wave climate or the movement of sediment within Holyhead Bay and will not therefore result in the deterioration in the ecological potential of the water body. Furthermore, the proposed scheme will not affect the mitigation measures that are identified for the water body in the River Basin Management Plan, nor will they prevent the implementation of the mitigation measures which are not currently in place. As such it is considered that further assessment is not required.

## 6 Conclusion

Comparison of the construction and operation activities against the WFD scoping criteria identified that the following parameters could be at risk within the Holyhead Bay coastal water body:

- Construction – construction of the new marine structures (breakwater and two reclamation areas);

- Biology (habitats) – loss of habitats within the footprint of the structures; and,
- Operation – presence of the marine structures;
  - Hydromorphology – interruption of hydrodynamics, wave climate and sediment transport.

However, detailed assessment (**Section 5**) concludes that for the parameters scoped in, non-temporary effects are not anticipated. As a result, the scheme is considered to be compliant with WFD requirements.

## 7 References

UKTAG (2012a). Paper 11b(i) Groundwater Chemical Classification March 2012. Available at: <https://www.wfduk.org/resources%20/paper-11bi-groundwater-chemical-classification-march-2012>

UKTAG (2012b). Paper 11b(ii) Groundwater Quantitative Classification March 2012. Available at: <https://www.wfduk.org/resources%20/paper-11bii-groundwater-quantitative-classification-march-2012>