REPORT

Holyhead Port Expansion
Environmental Statement Addendum

Client: Stena Line Ports Limited

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Acronyms

Acronym	Acronym Description
ADD	Acoustic Deterrent Device
aOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
BHD	Backhoe Dredger
CD	Chart Datum
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
EIA	Environmental Impact Assessment
ES	Environmental Statement
FTU	Formazin Turbidity Unit
FRA	Flood Risk Assessment
HMWB	Heavily Modified Water Body
HRA	Habitats Regulation Assessment
HRO	Harbour Revision Order
ICES	International Council for the Exploration of the Sea
INNS	Invasive Non Native Species
IoACC	Isle of Anglesey County Council
MCA	Maritime and Coastguard Agency
MHWS	Mean High Water Springs
MMO	Marine Mammal Observer
MDZ	Morlais Demonstration Zone
MW	Megawatt
NRW	Natural Resources Wales
OSPAR	Oslo-Paris Convention
RCP	Representative Concentration Pathway
SAC	Special Area of Conservation
SEL	Sound Exposure Level
SPA	Special Protection Area
SPL	Sound Pressure Level
SSC	Suspended Sediment Concentration
SSC	Suspended Sediments
SSSI	Site of Special Scientific Interest
TAN	Technical Advice Note
TSHD	Trailer Suction Hopper Dredger
TTS	Temporary Threshold Shift
PTS	Permanent Threshold Shift
UK	United Kingdom
UKTAG	UK Technical Advisory Group
UKCP18	United Kingdom Climate Projections
WADZ	West Anglesey Demonstration Zone
WG	Welsh Government
WFD	Water Framework Directive

1 Introduction

A Marine Licence application (ref CML1931) for the proposed Holyhead Port Expansion was submitted to Natural Resources Wales (NRW) on 17th July 2019, supported by an Environmental Statement (ES), Non-Technical Summary and Technical Appendices (Royal HaskoningDHV, 2019). Consultation responses were provided by NRW on 20th December 2019 (see **Appendix A**).

A Harbour Revision Order (HRO) was also submitted to the Welsh Government on 7th January 2020, supported by the same ES, with responses received on 27th March 2020. In addition to the technical comments received from stakeholders, which were effectively the same as those received from NRW on the Marine Licence application (see **Appendix B**).

1.1 Purpose of this document

This document forms an addendum to the ES issued in support of the Marine Licence and HRO applications. It sets out the stakeholder comments received by ES chapter and the required response to each comment. Supplementary information has been included where required and the locations provided within the table at start of each section of this document.

This document should be read alongside the ES submitted in July 2019.

1.2 Approach to the ES Addendum

Signposting to where NRW's and the Planning Inspectorate's comments have been addressed in the ES Addendum is presented in **Table 1-1** and **Table 1-2**, respectively.

Table 1-1 Comments received from NRW and where these have been addressed in this ES Addendum.

No	Topic	Section(s) in Addendum where addressed
1	Welsh National Marine Plan assessment	n/a – provided separately
2	Underwater noise assessment	**Section 4.5** and **4.6.**
3	Holyhead North Disposal Site	**Section 3.3.9**, **4.4** and **4.8.**
4	Maintenance dredging	**Section 4.2, 4.3** and **4.4.**
5	Shellfisheries	**Section 4.5.**
6	Fisheries	**Section 4.5** and **4.7.**
7	Cultural Heritage	**Section 4.10.**
8	Coastal Processes	**Section 4.2.**
9	Archaeology and Cultural Heritage	**Section 4.10.**
10	Invasive Non-Native Species	**Section 4.4, 4.14** and **4.15.**
11	Marine and Coastal Ecology	**Section 4.4.**
12	Marine Mammals	**Section 4.6.**
13	Ornithology	**Section 4.8.**
14	Coastal Defence and Flood Risk	**Section 4.12.**
15	Water Framework Directive (WFD) Assessment	**Section 4.14.**
16	Cumulative / in-combination assessment	**Section 4.13.**

Table 1-2 Comments received from the Planning Inspectorate and where these have been addressed in this ES Addendum.

No	Comment	Section in Addendum where addressed
1	Further information on the assumptions made to estimate the levels of noise generated by the piling operations and on how representative they are of the types of plant and equipment likely to be used.	**Section 4.5, 4.6** and **4.7.**
2	Further information on the period of time it has been assumed piling operations would take place each day and how this has been taken into account in assessing the impact of the piling operations noise on the various aquatic species.	**Section 4.5, 4.6** and **4.7.**
3	Assessment of the effect on the coastal processes (i.e. the movement of sediment around the coast as a result of sea currents and wave action) of removing a substantial quantity of sediment from the seabed by dredging. Effects on the stability of nearby beaches is to be included, both in terms of the quantity of sediment material and the type of material on the beaches.	**Section 4.2.**
4	Further analysis to extrapolate over the whole period of dredging the effects of modelling the sediment levels and deposition rates already carried out for a 3 months period.	**Section 3.2.3** and **4.2**.
5	Review of the cumulative and in-combination effects on the marine ecology to include the West Anglesey Demonstration Zone (WADZ, also known as the Morlais scheme).	**Section 4.13.**
6	Further information on the alternatives and mitigation measures considered to minimise effects on the Admiralty Pier and Lighthouse, both Grade II listed buildings, and their settings.	**Section 4.10.**
	Various policy and jurisdictional corrections	**Section 2**.

Following advice from NRW that all dredged material should be kept within the marine environment (related to Item 8 in **Table 1-1**), the proposed scheme has been revised so that all dredged material would now be disposed of offshore at Holyhead North disposal site. Consequently, the additional material required for the reclamations would be sourced from a licenced marine aggregate site. **Section 3** presents the changes to the proposed scheme and an environmental assessment of the potential effects of these changes on the environment.

1.3 Consultation

Consultation was undertaken with NRW and the IoACC to confirm the additional work required to inform the EIA. Specifically, this consultation was undertaken to confirm the approach to the following topics:

- Coastal Processes (see **Appendix C1**), comprising:
    - Holyhead Port Expansion – Response to NRW's comments on Coastal Processes (dated 21st July 2020), from Royal HaskoningDHV to NRW; and,
    - Teleconference with NRW, held on 20th August 2020, attended by Royal HaskoningDHV.
- Marine and Coastal Ecology (see **Appendix C2**), comprising:
    - Proposed Methodology for Supplementary Marine Ecology Video Survey of Holyhead Port note (dated 16th March 2020), from Royal HaskoningDHV to NRW; and,
    - Confirmation email from NRW (dated 1st April 2020), to Royal HaskoningDHV.

- Archaeology and Cultural Heritage (see **Appendix C3**), comprising:
  - Holyhead Port Expansion - Archaeology and Cultural Heritage Mitigation Options note (dated 18th February 2020), from Royal HaskoningDHV to Stena Line Ports, who issued to the IoACC; and,
  - Meeting with the IoACC, held on 5th March 2020, attended by Royal HaskoningDHV and Stena Line Ports.

1.4 Structure to this Document

This ES Addendum comprises of the following sections:

- This introductory section (**Section 1**);
- **Section 2** identifies the policy and jurisdiction corrections applicable to the ES;
- **Section 3** describes the changes to the proposed scheme to that presented in the ES. This section also provides an environmental assessment of the proposed changes;
- **Section 4** presents the responses to stakeholder comments received; and,
- **Section 5** presents the references used in this document.

2 Policy and Jurisdiction Corrections

The following policy and jurisdiction corrections apply to the ES:

1. *Paragraph 12.2.1, page 216 of the ES*: The Competent Authority under the Habitats Regulations is the Welsh Ministers and not the Secretary of State for Business, Energy and Industrial Strategy.
2. *Paragraph 17.2.2, page 349 of the ES*: Mention is made of Technical Advice Note (Wales) 11: Noise (TAN11) which it is said refers to out of date versions of British Standards. Whilst TAN11 is now quite old, it provides useful advice on the assessment of noise and it should be noted that it was updated by the Minister for Natural Resources' letter to Local Authorities in Wales dated 25 November 2015 (described as a clarification letter to factually update TAN11).
3. *Paragraph 17.2.2, pages 349 and 350 of the ES*: Reference is made to the National Planning Policy Framework (NPPF) and the National Planning Practice Guidance for Noise (NPPG) 2014, which it is said provide useful guidance even though it is acknowledged that they are not directly applicable to Wales. Care should be taken in applying such documents, which have no standing in Wales.
4. *Paragraph 18.2.2, page 396 of the ES*: Reference is made to the UK Government's Planning Practice Guidance (DCLG, 2014) in the context of providing guidance on the impact of new development on air quality. However, that document has no standing in Wales. Section 6.7 of Planning Policy Wales provides the basis for relevant policy in Wales and includes references to the Air Quality (Wales) Regulations 2000, as amended by the Air Quality (Wales) (Amendment) Regulations 2002, and to advice in the EPUK/IAQM guidance, Land Use Planning and Development Control: Planning for Air Quality.

3 Changes to the proposed scheme to that presented in the ES

3.1 Introduction

This chapter presents the changes to the proposed scheme for all dredged material to be deposited offshore (**Section 3.2)** and an environmental assessment of these changes on the following topics (see **Section 3.3**):

- Coastal processes;
- Marine water and sediment quality;
- Marine and coastal ecology;
- Fish and shellfish resource;
- Marine mammals;
- Commercial fisheries;
- Commercial and recreational navigation;
- Cumulative Impact Assessment (CIA);
- WFD Compliance Assessment; and,
- Shadow Habitats Regulations Assessment (HRA).

3.2 Changes to the proposed scheme

3.2.1 Dredge and disposal requirements

Given all dredged material would now be disposed offshore at Holyhead North disposal site, a revised estimation has been calculated for offshore disposal, as described in **Table 3-1**. The total is a slight variant on the volume shown in the *ES Table 3.2 (2,020,975m^3)*, due to application of a rounding factor.

Table 3-1 Total volume of sediment by type to be disposed at Holyhead North.

Sediment type	ES volume to be disposed offshore (m^3)	Revised volume to be disposed offshore (m^3)
Soft clay	630,000	831,958
Firm clay	430,000	675,270
Gravel	270,000	366,431
Rock	145,000	141,696
Total	1,475,000	2,015,354

As the material would be dredged and disposed of immediately, rather than a proportion being used in the reclamations, the anticipated dredging programme has been reduced from 39 weeks, as considered by the ES, to 15 weeks (see **Table 3-12**).

3.2.2 Reclamation activities

The estimated volume material required to be imported (with applied bulking factor) and the number vessel movements required (using a typical barge capacity of 8,000m^3) are shown in **Table 3-2**.

Table 3-2 Imported material and vessel movements for Salt Island Expansion and Pelham Patch Development reclamations.

Site	Imported material requirements (m^3)	Vessel movements (single trip)
Salt Island Expansion	830,000	149
Pelham Patch Development	180,000	33
Total volume	1,010,000	182

As a result of importing the fill material required for the reclamations, there would be no need to use cement to improve the geotechnical properties of the dredged material, as considered in the ES. Estimates of the revised volume of cement required for the reclamations is presented in **Table 3-3**.

Table 3-3 Revised volumes of cement required for Salt Island Expansion and Pelham Patch Development reclamations.

Site	ES volume of cement required (m^3)	Revised volume of cement required (m^3)
Salt Island Expansion	78,500	62,500
Pelham Patch Development	27,410	23,210
Total volume	105,910	85,710

3.2.3 Sediment Plume Dispersion Model

3.2.3.1 Introduction

The changes to the proposed scheme alters how sediment would be released into the marine environment compared to that considered by the ES, for three reasons:

1. The sediment plume modelling presented in *Appendix C3 of the ES* included a release of silt/clay material during the reclamation process (assumed to be 10% of the dredged material used). Given that dredged material would no longer be used in the reclamations, this release of silt/clay would no longer occur;
2. Additional dredged material would be disposed of at Holyhead North disposal site, as presented in **Table 3-1**; and,
3. The dredging is now anticipated to take 15 weeks to complete compared to the 39 weeks considered previously.

The 3D sediment plume dispersion model (built in MIKE3-MT and coupled with the 3D hydrodynamic model built in MIKE3-HD) has been repeated to take account of the changes listed above. In addition, wave effects have been included in the model as an additional force, simulated using a MIKE21-SW spectral wave model coupled with the MIKE3-MT model. A 1 in 1 year offshore wave condition was applied at model boundary, which is considered to be the limit of dredging operation.

The 3D model has also been extended to cover the offshore disposal site and run for entire dredging and disposal period (anticipated to be 15 weeks (see **Section 3.2.7**). The 3D sediment plume dispersion modelling has been repeated using the information described below.

3.2.3.2 Sediment composition

For the sediment plume dispersion modelling, the sediment composition outlined in **Table 3-4** was assumed.

Table 3-4 Quantity of sediment types input into the sediment plume dispersion model.

Type	Soft sediment	Hard sediment
Silt/Clay	70%	20%
Fine Sand	5%	5%
Medium Sand	5%	-
Coarse Sand	5%	-
Gravel/Cobble	15%	75%

3.2.4 Dredging equipment

It is expected that one medium sized Trailing Suction Hopper Dredger (TSHD) and one Backhoe Dredger (BHD) would carry out the dredging works. The TSHD would be deployed to dredge the soft sediment in the channel. The BHD could be deployed to remove the soil sediment near the quays and the hard sediment.

3.2.5 Dredging parameters of the TSHD

The specifications, dredging cycle estimate and dredging production parameters of the TSHD are described in **Table 3-5**, **Table 3-6** and **Table 3-7**, respectively.

Table 3-5 Main specifications of the TSHD.

Item	Value
Hopper capacity	5,000m^3
Sailing speed empty	12 knots
Sailing speed loaded	11 knots

Table 3-6 Estimated dredging cycle of the TSHD.

Dredging cycle component	Duration (minutes)
Sailing Empty	40
Loading	75
Sailing Full	45
Discharge	10
Total Cycle Time	170

Table 3-7 Dredging production parameters of the TSHD.

Parameter	Value
Weekly operational time	140 hours/week
Dredge cycles per week	49
Hopper load	3,429 situ m^3, 4,614 Ton Dry Solids
Weekly production	170,704 situ m^3/week
Sediment release rate (during disposal)	7.7 Ton Dry Solids/sec

3.2.6 Dredging parameters of the BHD

The specifications, dredging cycle estimate, barge cycle estimate and dredging production parameters of the BHD are described in **Table 3-8**, **Table 3-9**, **Table 3-10** and **Table 3-11**, respectively. It is expected that two barges will be used with the same carrying capacity as specified in **Table 3-8**.

Table 3-8 Main specifications of the BHD.

Item	Value
Bucket size	12m^3
Barge carrying capacity	2,000m^3
Barge sailing speed empty	11 knots
Barge sailing speed loaded	10 knots

Table 3-9 Estimated dredging cycle of the BHD.

Dredging cycle component	Duration – soft sediment (sec)	Duration – hard sediment (sec)
Lower bucket	5	7
Excavate	5	20
Hoist bucket	8	10
Slew 90 degree	7.5	7.5
Discharge	5	10
Slew 90 degree	7.5	7.5
Total dredge cycle	38	62

Table 3-10 Estimated barge cycle of the BHD.

Barge cycle component	Duration – soft sediment (minutes)	Duration – hard sediment (minutes)
Sailing empty	44	44
Loading	135	271
Sailing full	48	48
Discharge	10	10
Total cycle time	237	373

Table 3-11 Dredging production parameters of the BHD.

Parameter	Soft sediment	Hard sediment
Weekly operational time	120 hours/week	120 hours/week
Barge cycles per week	46	21
Hopper load	1,652 situ m^3, 2,223 Ton Dry Solids	1,520 situ m^3 2,948 Ton Dry Solids
Weekly production	88,197 situ m^3/week	40,351 situ m^3/week
Sediment release rate (during disposal)	3.7 Ton Dry Solids/sec	4.9 Ton Dry Solids/sec

3.2.7 Dredging programme

Table 3-12 provides an overview of the dredging scope, the expected deployment of dredging equipment and the estimated durations.

Table 3-12 Assumed dredging programme.

	BHD		TSHD		Total	
Sediment Type	Volume	Duration	Volume	Duration	Volume	Duration
Hard sediment	141,696	3.5	-	-	141,696	3.5
Soft sediment	82,629	0.9	1,791,029	10.5	1,873,658	11.4
Total	224,325	4.4	1,791,029	10.5	2,015,354	14.9

3.3 Environmental Assessment of changes to the Proposed Scheme

3.3.1 Coastal Processes

3.3.1.1 Changes in sea-bed level due to capital dredging of the approach channel and land-claim

The increased suspended sediment concentrations associated with capital dredging of the approach channel and land-claim have the potential to deposit sediment and raise the sea-bed elevation slightly.

Figure 3-1 describes the predicted changes in sea-bed elevation due to capital dredging of the approach channel over the simulation period. The largest change occurs as small patch adjacent to the land-claim where deposition up to 2m is predicted. Away from the land-claim, along the path of the dredger within the approach channel, deposition thicknesses reduce to less than 0.1m.

Analysis of the time series of predicted deposition from the plume over the simulation period at four selected points outside the boundary of the approach channel (Points 1 to 4 in **Figure 3-2**) describes the persistency of sediment thickness of the sea bed. These points were selected outside the dredged channel and not in the predicted highest deposition areas (adjacent to the land-claim and along the path of the dredger within the dredged area), as it is assumed that the channel will continue to be dredged until the required depth is achieved and sediment of this thickness would not persist.

Assessment of effect magnitude and/or impact significance

The changes in sea-bed levels due to capital dredging of the approach channel and land-claim are likely to have the magnitudes of effect shown in **Table 3-13**.

Table 3-13 Magnitude of effect on sea-bed level changes due to deposition under the worst-case scenario for sediment dispersal following capital dredging of the approach channel and land-claim.

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Effect
Near-field*	High	Negligible	Negligible	Negligible	Medium
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible

*The near-field effects are confined to a small area, likely to be several hundred metres up to a kilometre from the path of the dredger

Importantly, the deposition of sediment from the dredge plume would occur within the defined receptor group for coastal processes including the Anglesey Terns/Morwenoliaid Ynys Môn SPA and North Anglesey Marine/Gogledd Môn Forol SAC. The sensitivity and value of this receptor group with respect to deposition of sediment is presented in **Table 3-14**.

Table 3-14 Sensitivity and value assessment with respect to sediment deposition of the defined receptor group for coastal processes.

Receptor group	Tolerance	Adaptability	Recoverability	Value	Sensitivity
Anglesey Terns/Morwenoliaid Ynys Môn SPA North Anglesey Marine/Gogledd Môn Forol SAC Beddmanarch-Cymyran SSSI	Negligible	Negligible	Negligible	High	Negligible

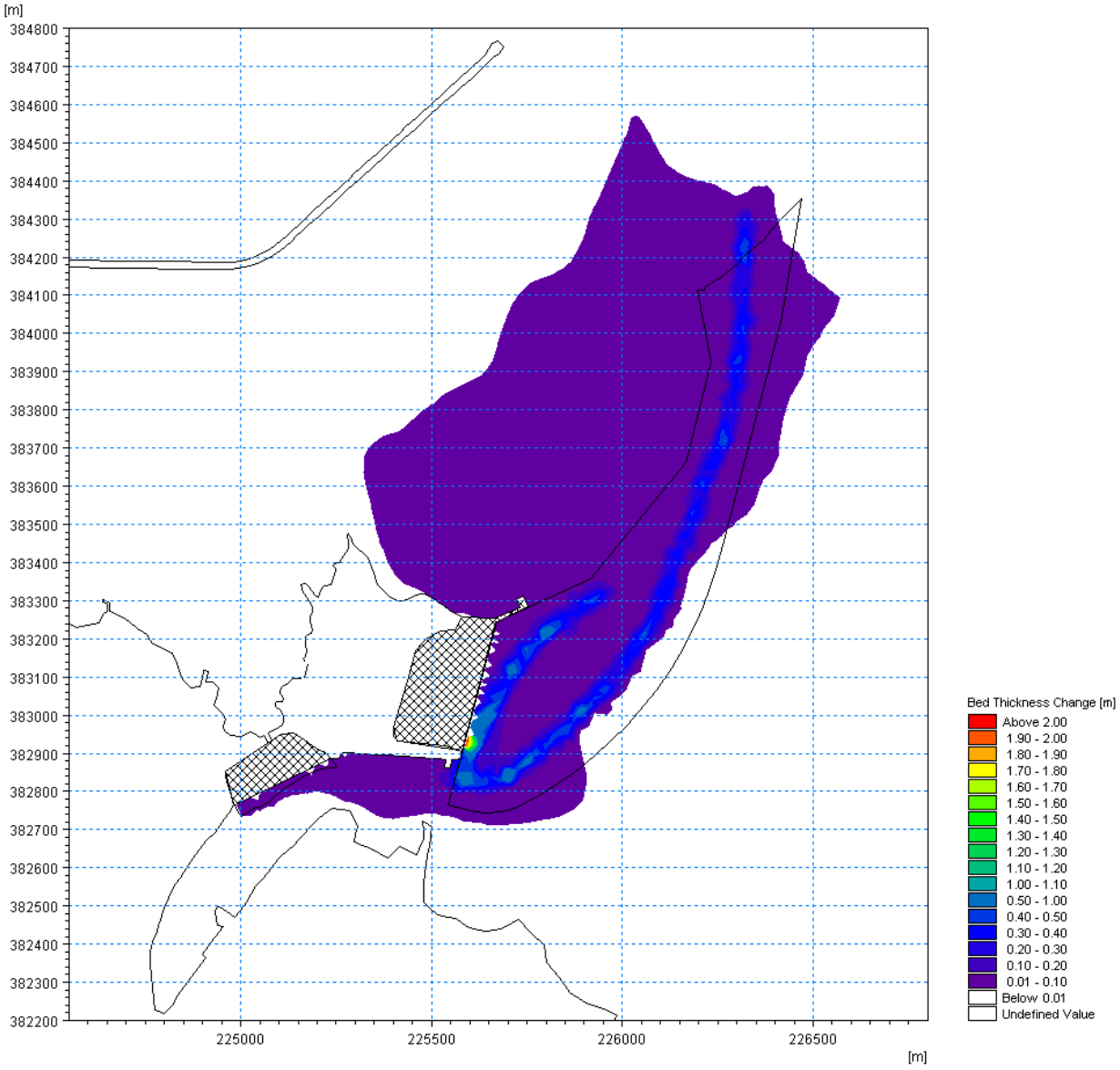


Figure 3-1 Predicted changes in sea bed elevation due to deposition from the plume caused by dredging activities and land claim.

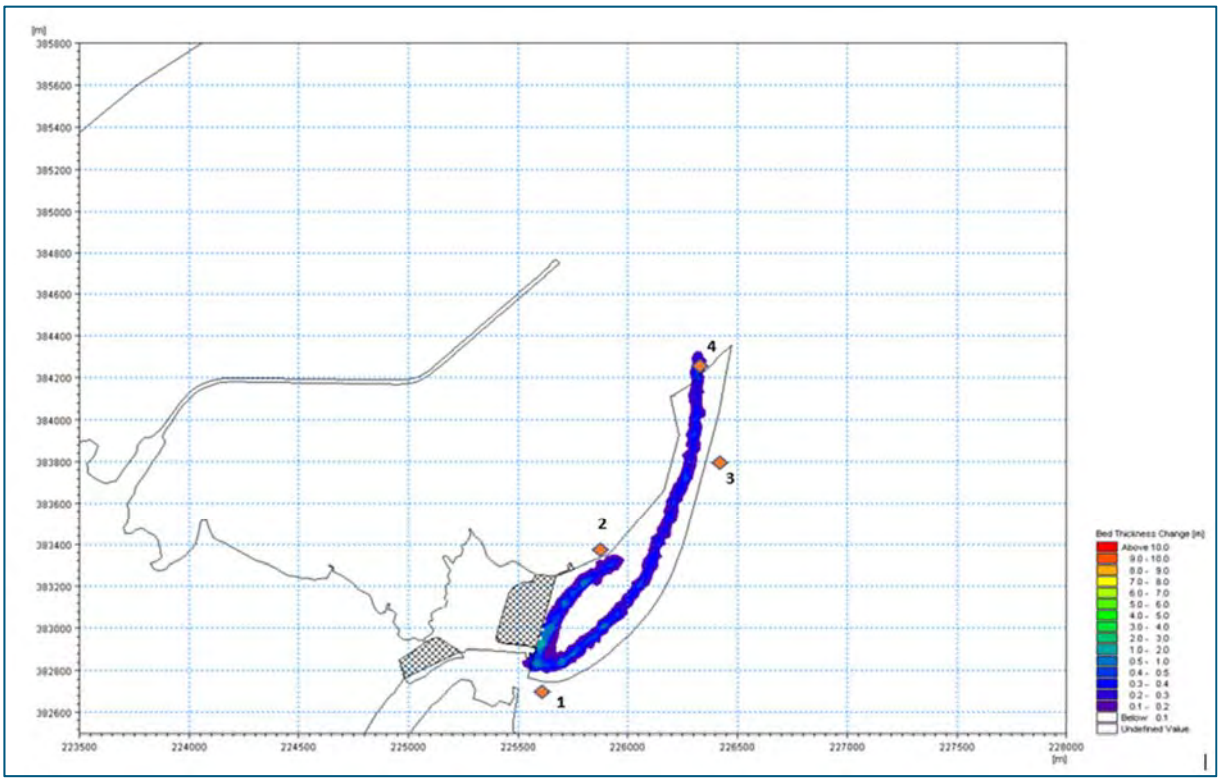


Figure 3-2 Location of points for time series analysis of deposition from the dredging activities and land claim.

Figure 3-3 shows the worst-case scenario for deposition of the four selected points is at Point 4, in a small area just north of the approach channel extent. Here, the maximum sediment deposition is just less than 0.35m (35cm). At the other selected points, predicted deposition is less than 0.04m (4cm).

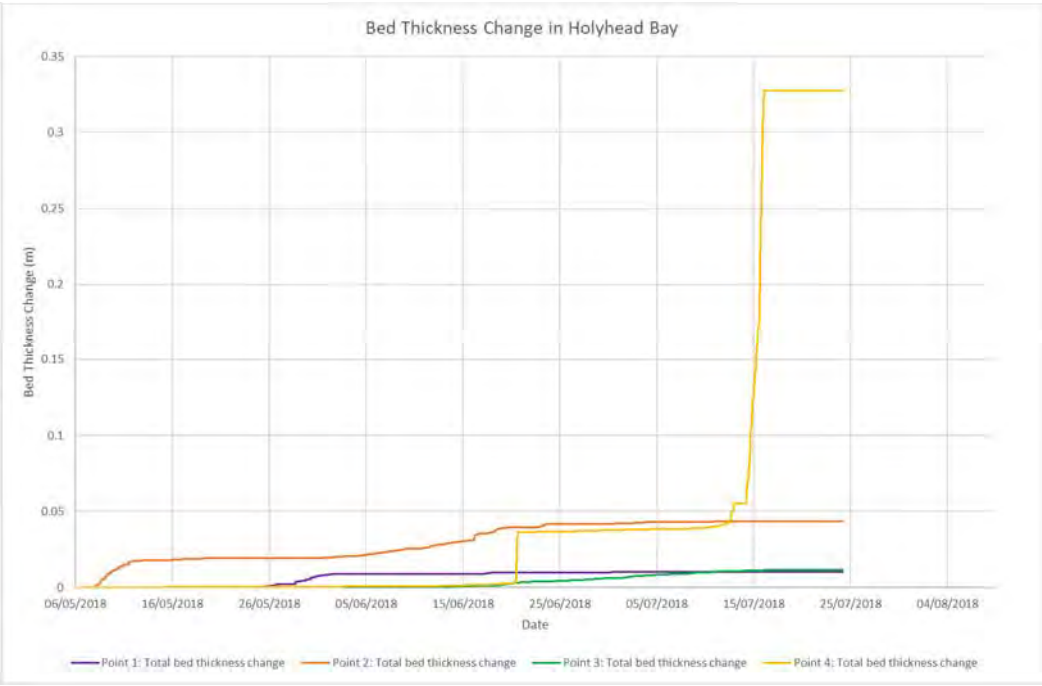


*Figure 3-3 Time series of bed thickness change at four selected points outside the dredged approach channel. Location of points is shown on **Figure 3-2.***

Based on the sediment plume dispersion modelling, predicted deposition from the plume generated from capital dredging would amount to a maximum of about 0.35m in a very small area to the north the channel. In most areas outside the boundary the predicted maximum deposition would be about 0.04m. After this initial deposition, this sediment would be continually re-suspended to reduce the thickness even further to a point where it will be effectively zero. This will be the longer-term outcome, once the sediment supply from dredging has ceased.

This means that given these very small magnitude changes in sea bed level arising from capital dredging, the impacts on the receptor group for coastal processes would not be significant. The overall impact of capital dredging for the project under a worst-case scenario on sea-bed level changes for the identified morphological receptor group is negligible impact.

3.3.1.2 Changes in sea-bed level due to disposal of dredge arisings at Holyhead North

Figure 3-4 describes the predicted changes in sea-bed elevation at Holyhead North disposal site due to capital dredging of the approach channel and land-claim. The results show that any predicted increase in bed thickness is within the boundary of the disposal site. It should be noted that the area predicted to be affected (6.5km^2) is significantly less than that presented in the ES (22km^2) (see *Section 8.7.2 of the ES*). This is a result of the more accurate 3D modelling used, including increased model mesh size at the disposal site and the reduced dredging programme.

Assessment of effect magnitude and/or impact significance

The changes in sea-bed levels due to disposal of sediments are likely to have the magnitudes of effect shown in **Table 3-15**.

Table 3-15 Magnitude of effect on sea-bed level changes due to deposition under the worst-case scenario for sediment disposal.

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Effect
Within disposal site	High	Negligible	Negligible	Negligible	Negligible
Outside Disposal site	Negligible	Negligible	Negligible	Negligible	Negligible

The overall impact of sediment disposal for the project under a worst-case scenario on sea-bed level changes for the identified morphological receptor group is negligible impact. This is because the predicted spatial distribution of the disposed sediment is confined to the disposal site. Hence, there is no impact on the identified receptor group for coastal processes associated with the suspended sediment generated by the disposal of sediment.

3.3.2 Marine and Sediment Water Quality

3.3.2.1 Reduction in water quality as a result of dredging activities

A reduction in water quality can occur when sediment is released into the water column due to sediment disturbance/re-suspension during dredging in front of the new quay walls and the approach channel. During dredging, sediment would be removed from the sea-bed and placed in a hopper for transportation to Holyhead North disposal site.

The softer surface sediment is proposed to be dredged using a TSHD. All sediment removed using this method would be disposed of to sea. The firm clay would be dredged using a back-hoe dredger and areas of rock would be dredged using a pecker attached to the back-hoe dredger. Whilst this method would cause an increase in suspended sediment concentration as the sediment is lifted through the water column to the hopper, the substrate to be dredged would be composed of firm clay and rock and as such the potential for resuspension is limited.

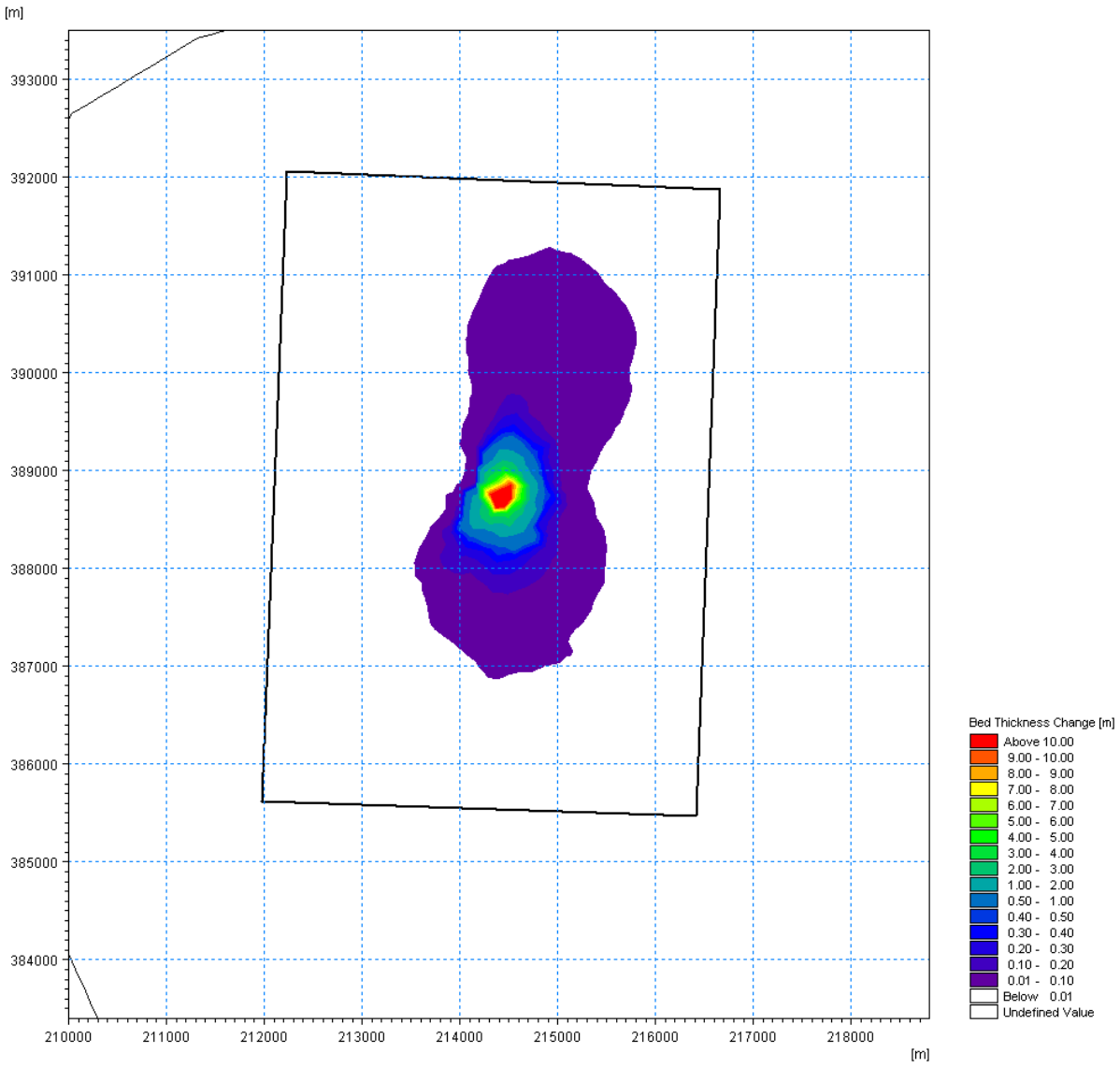


Figure 3-4 Predicted changes in sea bed elevation due to deposition from the plume created by disposal of dredged sediments.

These activities have the potential to adversely impact water quality, due to increased concentrations of suspended sediment and (if present) the potential release of contaminants, which are adsorbed to sediment particles, into the water column.

The results of the updated 3D sediment plume dispersion modelling are presented as maps showing predicted maximum suspended sediment concentrations at any time throughout the simulation in the bottom, mid and surface layers in Holyhead Harbour (**Figure 3-5**, **Figure 3-6**, **Figure 3-7** and **Figure 3-8**). The results show that predicted maximum suspended sediment concentrations are highest in the bottom to mid layers. Here, they are predicted to exceed 2,000mg/l adjacent to the land-claim. Maximum predicted concentrations rapidly decline away from the land-claim to values of about 500-1,500mg/l along the path of the dredger reducing further to less than 100mg/l about 250m from the dredger path.

The sediments suspended as a result of the dredging activities are predicted to disperse and decrease to within background levels within 2.5 hours of the dredging activities ceasing. Dredging will take place over approximately 15 weeks and will be non-continuous, with the dredging having to cease while the sediment

is transported to the disposal site, allowing suspended sediment concentration levels to dissipate to within background levels between dredging activities.

No contaminants within the dredged sediments were recorded above Cefas AL2, and contamination levels above Cefas AL1 only marginally exceed this value; therefore, potential impacts to water quality through contamination are considered to be negligible. Additionally, a significant component (82%) of the dredged sediment is soft and firm clay, and rock of glacial origin and as such does not contain any contamination.

It is expected that impacts to marine water quality as a result of increased suspended sediment concentration during the construction phase represents a short-term effect due to the rapid rate of dispersion. The receptor is considered to be of low sensitivity given the open nature of the water (i.e. ability to disperse) and medium magnitude given the medium-term duration of construction activity and the reversibility of the impact, as well as the low contamination levels within the substrate. Consequently, the potential impact is assessed as being of **minor adverse significance**.

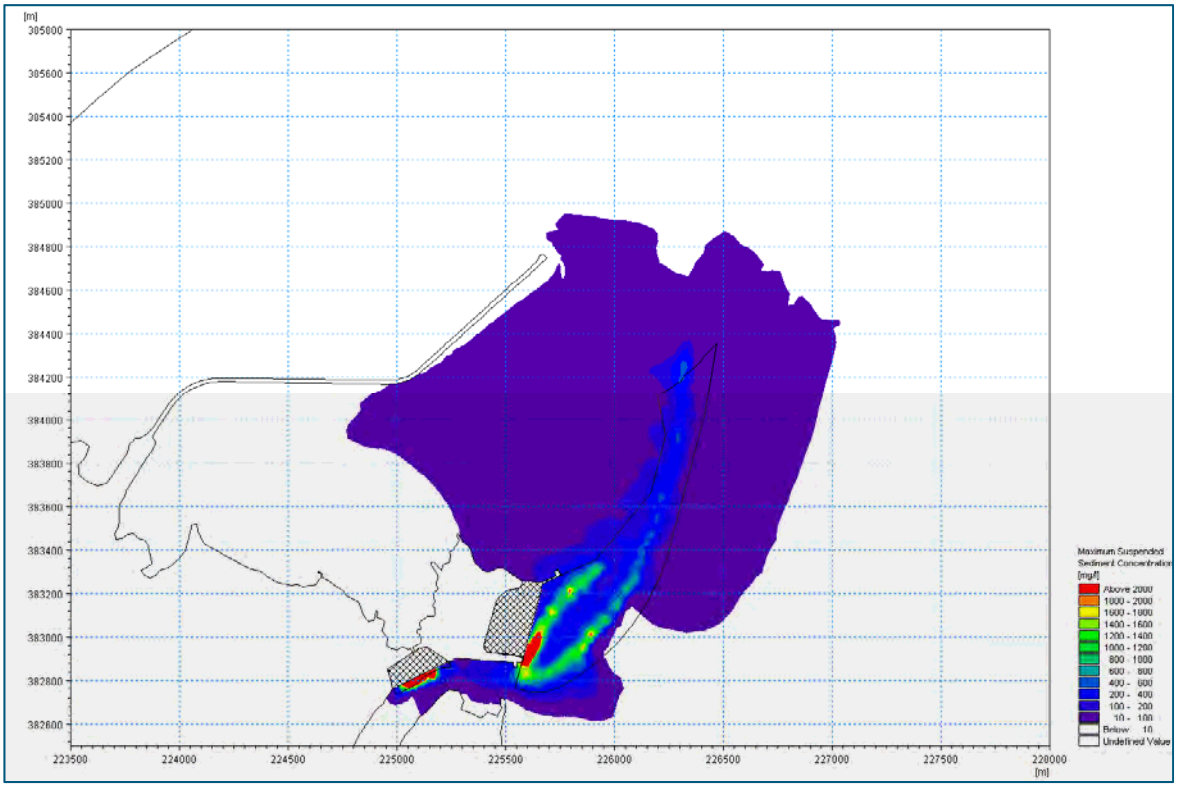


Figure 3-5 Maximum predicted suspended sediment concentrations for the bottom (bed) layer over the simulation period.

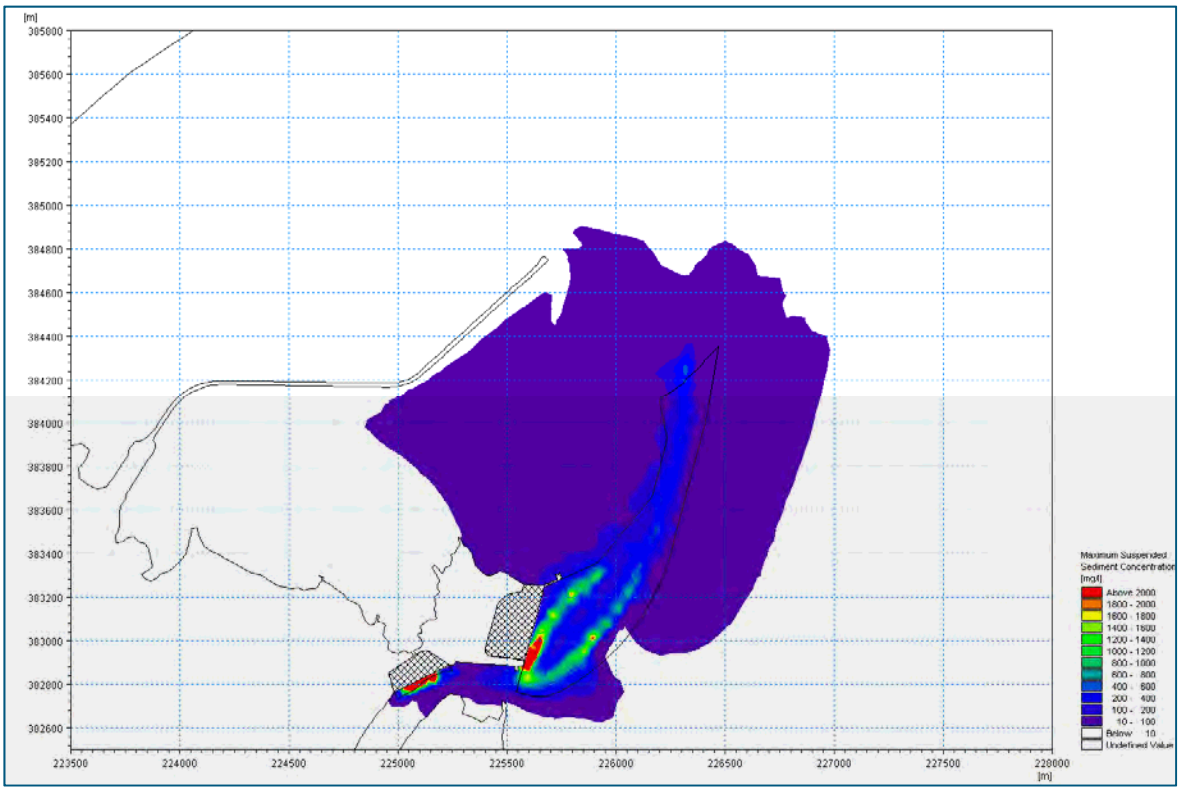


Figure 3-6 Maximum predicted suspended sediment concentrations for the mid layer over the simulation period.

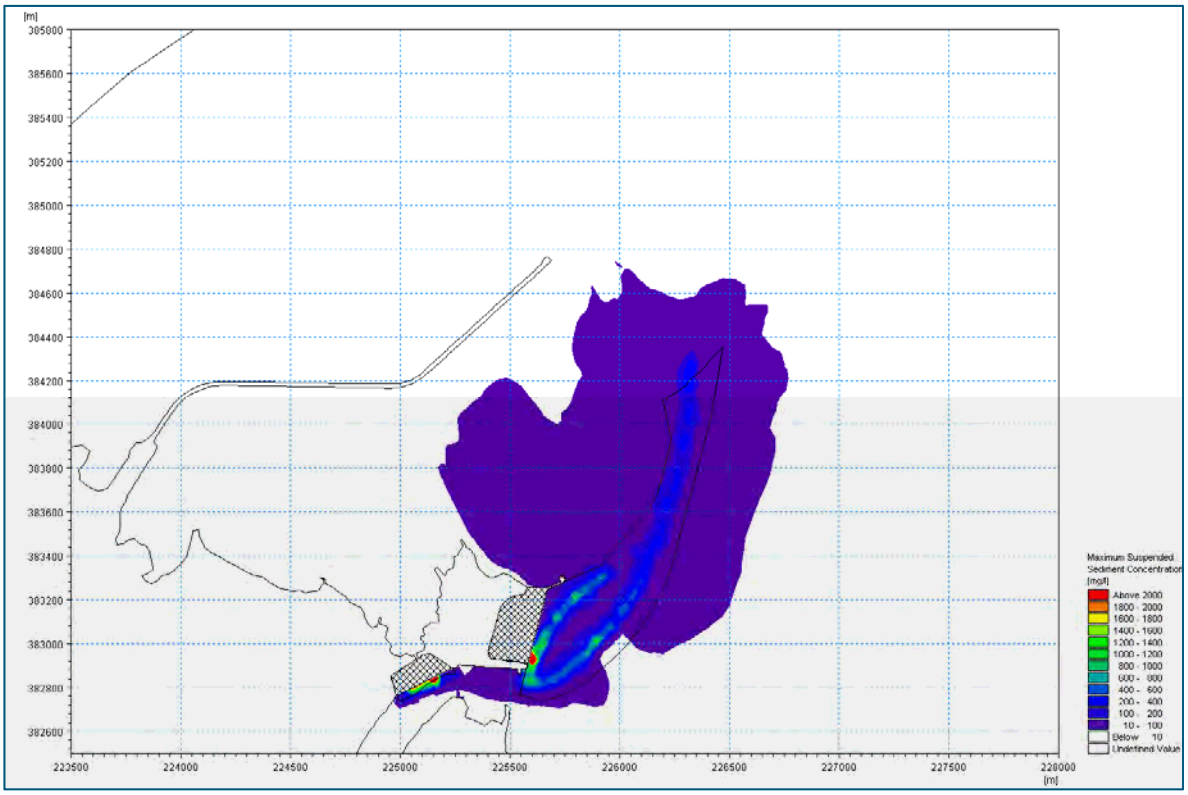


Figure 3-7 Maximum predicted suspended sediment concentrations for the surface layer over the simulation period.

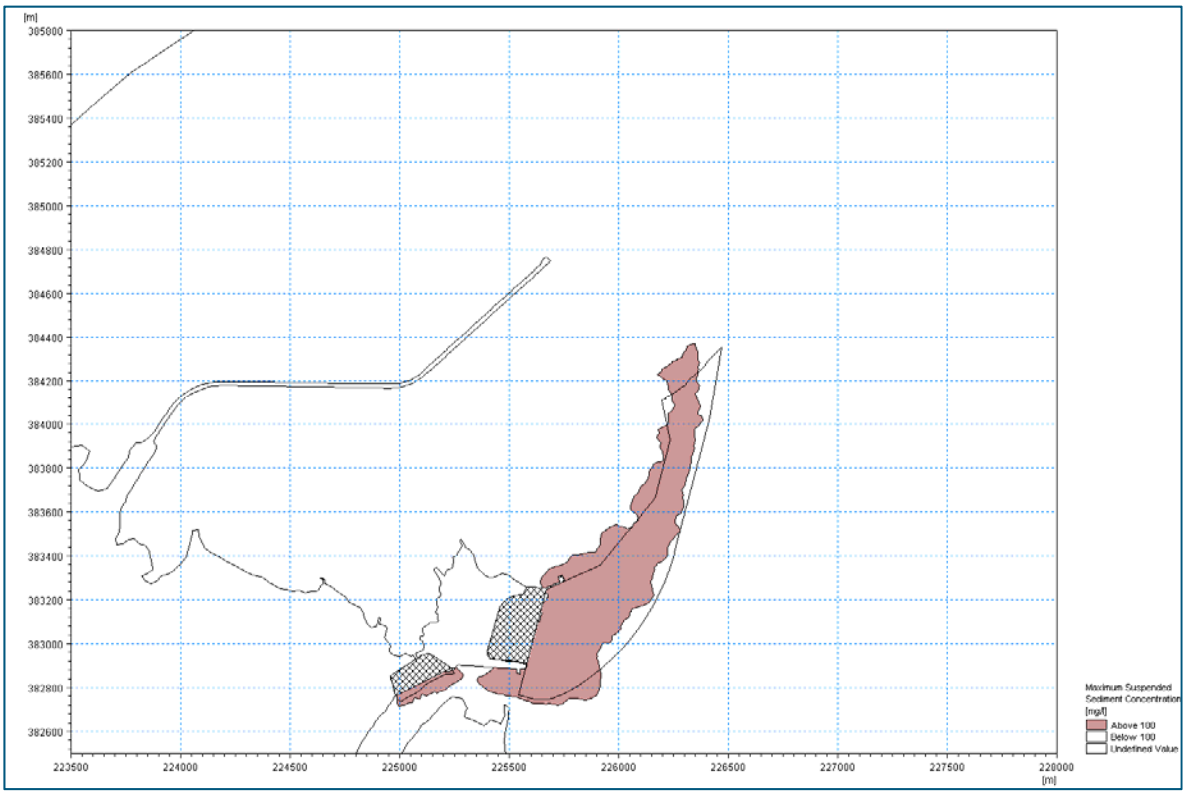


Figure 3-8 Maximum suspended sediment concentration above 100mg/l for the mid layer over the simulation period.

Mitigation measures and residual impact

No mitigation measures are considered necessary. The residual impact would be of **minor adverse significance**.

3.3.2.2 Reduction in water quality as a result of disposal activities

During the construction of the proposed scheme, dredged sediment would be disposed of at sea, at the Holyhead North (IS043) disposal site. The disposal of this sediment would result in increased suspended sediment concentration in the water column as the sediment travels through the water column to the sea-bed. Natural background levels of suspended sediment concentration at this site were recorded at 5.5mg/l.

Results from the sediment plume dispersion modelling showed that peak suspended sediment concentration values above 300mg/l would occur when the sediment is released from the hopper within a very localised area (**Figure 3-9**, **Figure 3-10** and **Figure 3-11**). Increased suspended sediment concentrations are predicted to occur predominantly within the area of the disposal site. Predicted maximum suspended sediment concentrations at the bed of up to 50mg/l do extend up to 2km beyond the boundary of the site.

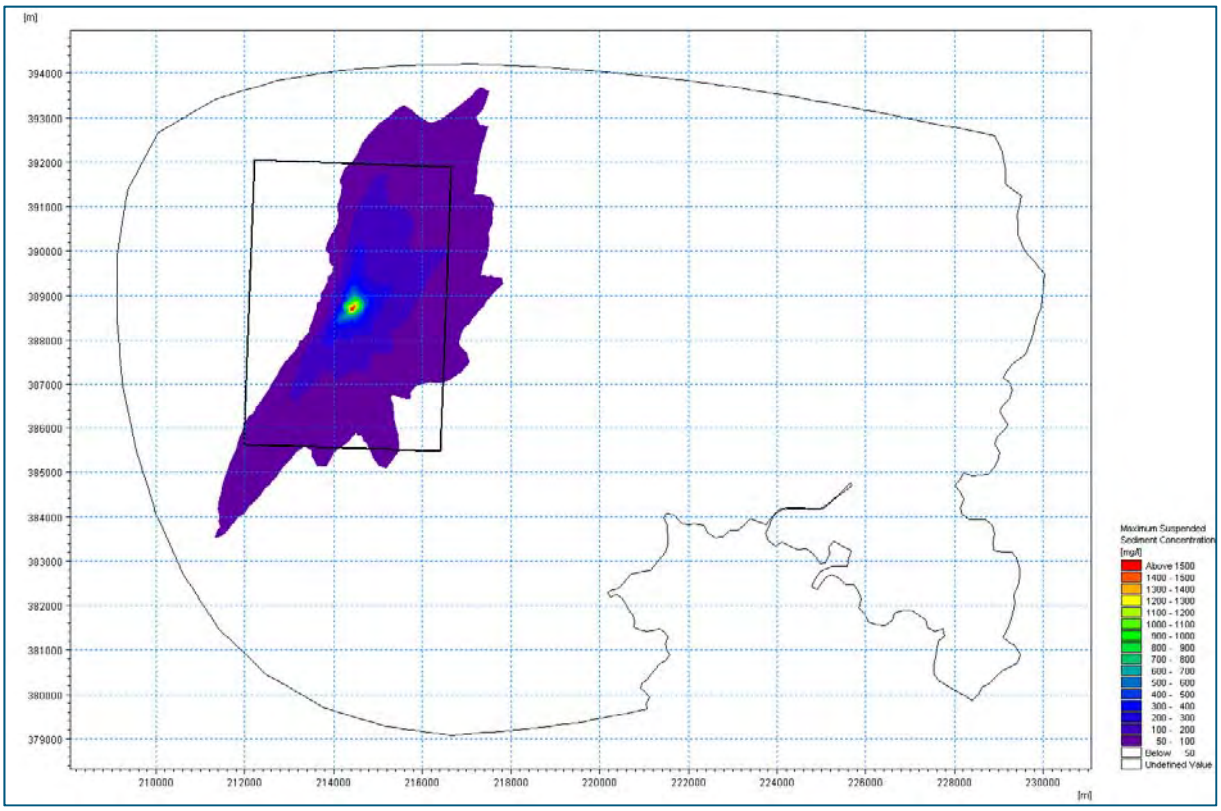


Figure 3-9 Maximum predicted suspended sediment concentrations for the bottom (bed) layer at the offshore disposal site.

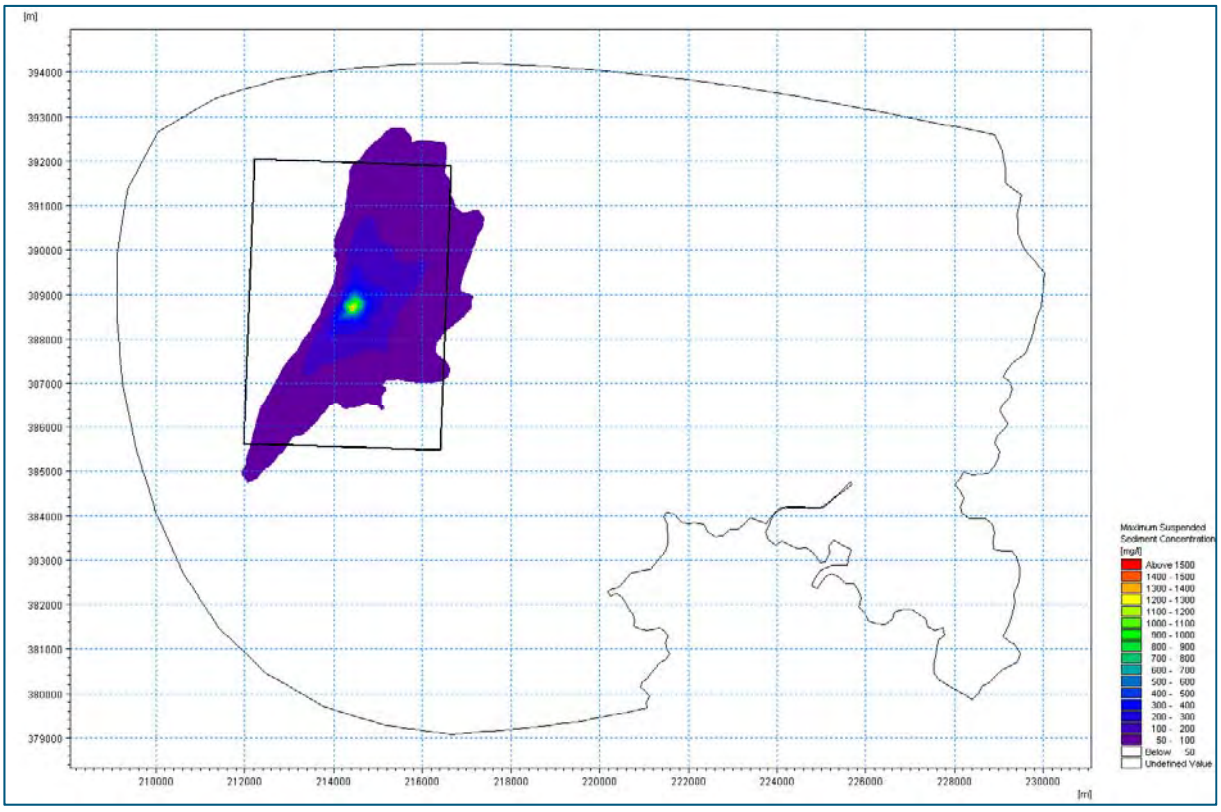


Figure 3-10 Maximum predicted suspended sediment concentrations for the mid layer at the offshore disposal site.

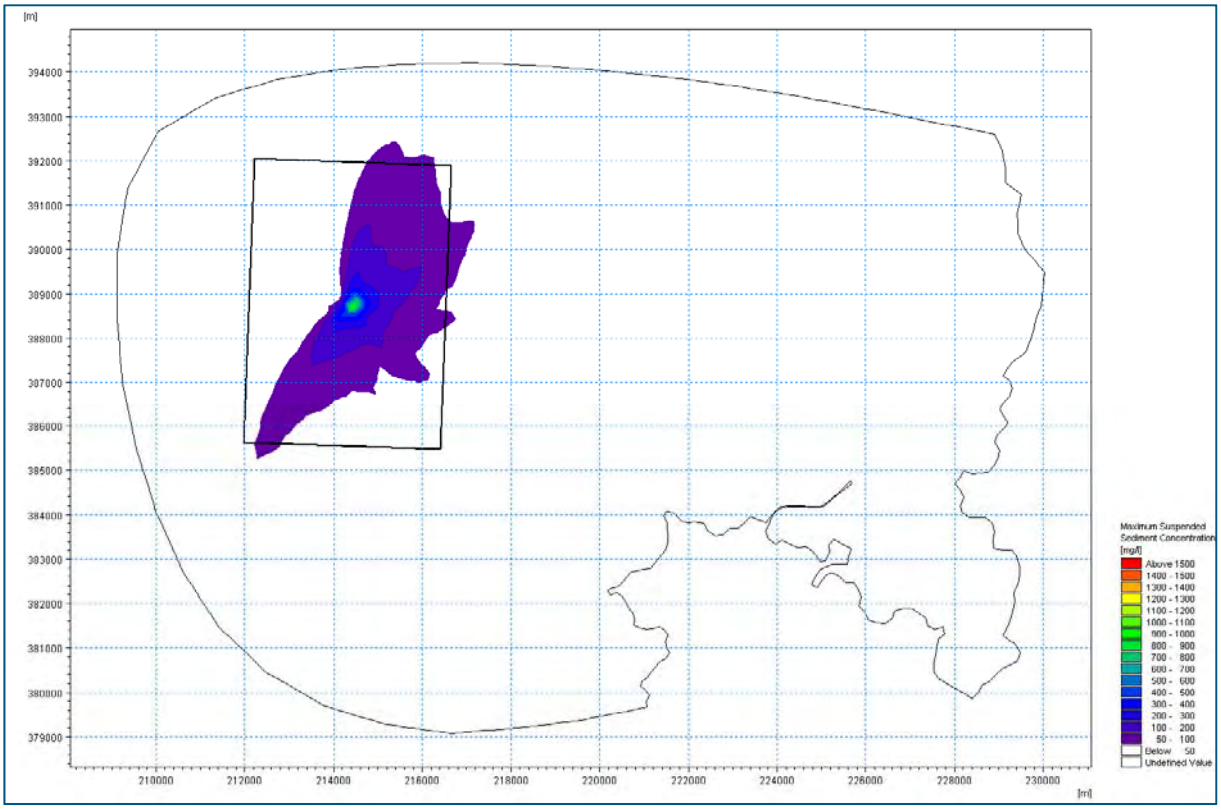


Figure 3-11 Maximum predicted suspended sediment concentrations for the surface layer at the offshore disposal site.

Following each disposal event, the suspended sediment is predicted to disperse to within background levels within 1.5 hours. Disposal will occur over a period of approximately 15 weeks and will be non-continuous, and so suspended sediment concentrations are predicted to disperse to within background levels between each disposal event.

Chemical testing of the sediment did not identify any contaminants at concentrations above Cefas AL2. Those contaminants found at levels above AL1 only slightly exceeded this threshold. As such, due to the low levels of contamination of the sediment to be disposed of, it is not considered that marine water quality would be significantly affected by chemical contamination as a result of the disposal of this material.

It is expected that impacts to marine water quality at the disposal site, as a result of increased suspended sediment concentration during the construction phase represents a reversible and short-term effect due to the rapid rate of dispersion. The receptor is considered to be of low sensitivity given the existing background environment and open nature of the water, and the impact is considered to be of medium magnitude given the medium duration of disposal activities and the reversibility of the impact, as well as the low contamination levels within the substrate. Consequently, the potential impact is assessed as being of **minor adverse significance**.

Mitigation measures and residual impact

No mitigation measures are considered necessary. The residual impact would be of **minor adverse significance**.

3.3.3 Marine and Coastal Ecology

3.3.3.1 Smothering of benthic habitats and species as a result of the dredging works

As described in in **Section 3.2.3**, the sediment plume dispersion model has been repeated to take account of the changes to the proposed scheme, namely the offshore disposal of all dredged material and importation of reclamation fill material.

Figure 3-1 illustrates the predicted changes in seabed elevation due to capital dredging of the approach channel over the simulation period. The deposition experienced within Holyhead Bay as a result of the methodology update has greatly decreased the deposition levels on areas outwith the approach channel footprint, due to the fact that dewatering of the reclamation areas would no longer occur. The largest change occurs as a small patch adjacent to the Salt Island Expansion where deposition of up to 2m is predicted. Away from the dredging deposition thicknesses reduce to approximately 1cm and no deposition on intertidal areas is predicted.

Figure 3-1 has been further refined to clearly show the areas which are predicted to be affected by between 1cm to 5cm deposition, and 5cm or more (**Figure 3-12**). The area outside of the proposed approach channel footprint that would be affected by more than 5cm of deposition is approximately 0.039km^2, of which 0.012km^2 is subject to existing maintenance dredge activities. A larger area (0.79km^2) is affected by deposition of between 1 and 5cm; however, this level of predicted sediment deposition is not considered to present a risk to biotopes present (*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment) within Holyhead Bay, as they are not sensitive to this level of sedimentation, and demonstrate high resilience to smothering (Tillin and Budd, 2016). Therefore, the previous conclusions drawn in the ES, that the indirect impact of smothering of benthic habitats and species during construction would be of **negligible significance**, is considered to remain valid.

3.3.3.2 Smothering of benthic habitats and species at the disposal site

The predicted changes in seabed elevation show that the increase in bed thickness is confined to within the boundary of the disposal site, totalling and estimated 6.5km^2 (see **Figure 3-4**), with a maximum change in elevation of approximately 10m. **Figure 3-13** shows the area predicted to be affected by between 1cm and 5cm deposition (3.79km^2), between 5cm and 30cm deposition (1.76km^2), and over 30cm deposition (0.95km^2).

It should be noted that the sediment plume dispersion model assumed that all of the dredged material would be disposed of at one location as a worst-case scenario. In reality material would be placed throughout the disposal site, resulting in a larger impacted area; however, at a far lower magnitude.

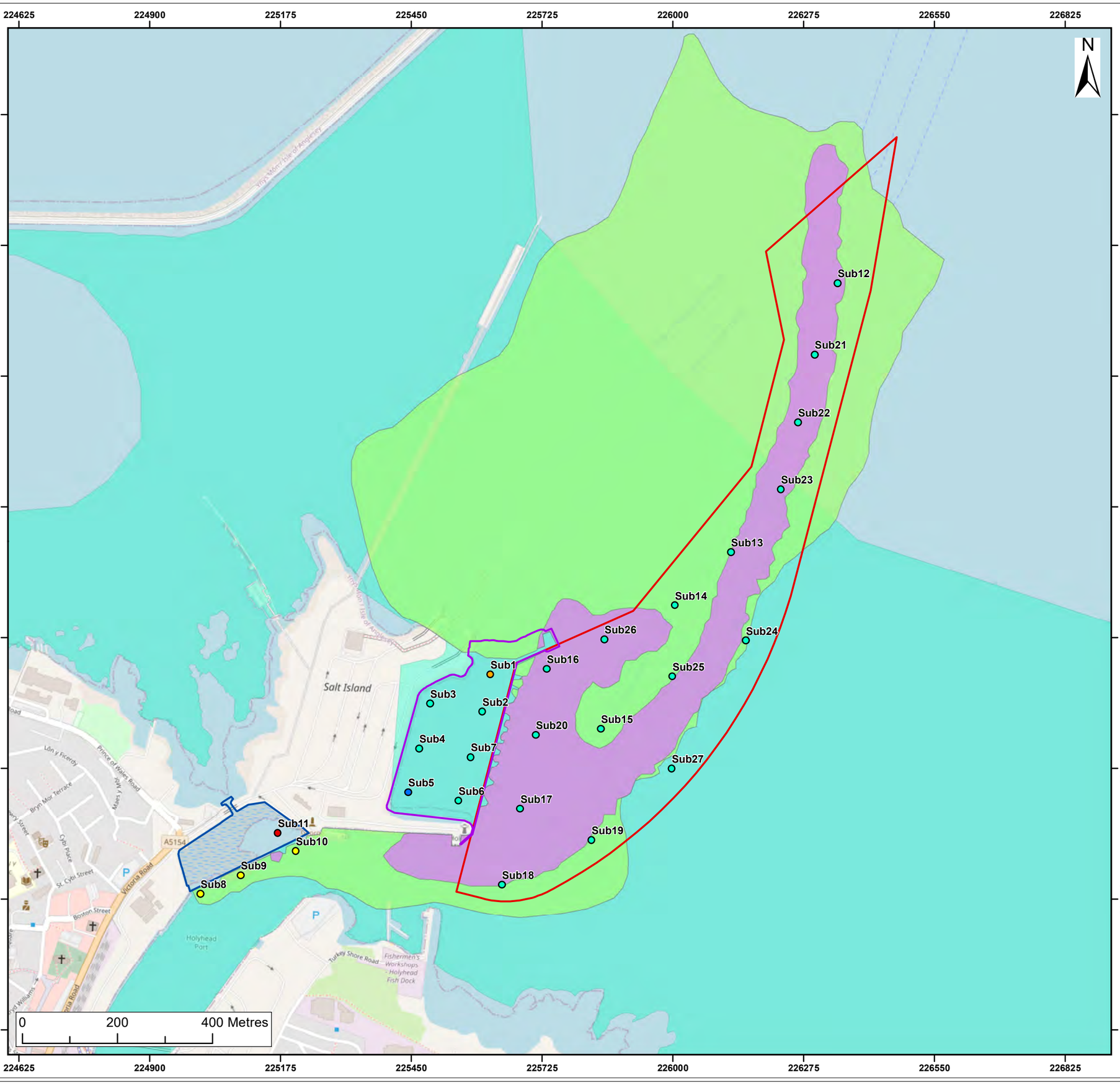
As described in the ES, the majority of the disposal site is characterised by the biotope *Flustra foliacea* and *Hydrallmania falcata* on tide swept circalittoral mixed sediment, which is characterised as 'not sensitive' to deposition of up to 5cm and 'low' sensitivity to deposition of up to 30cm of deposition (Readman, 2016). Two *Sabellaria* biotopes were also recorded within the disposal site - *Sabellaria spinulosa* on stable circalittoral mixed sediment and *Sabellaria spinulosa* encrusted circalittoral rock. These biotopes are characterised as 'not sensitive' to smothering of up to 5cm, and of 'medium' sensitivity to deposition of up to 30cm (Tillin, Marshal and Gibb, 2018 and Tillin *et al*., 2020). These biotopes occur in sand scoured areas with high water flow where the dispersion of sediments would be expected to be rapid, which will mitigate the magnitude of the effect of smothering by reducing the time exposed.

Given the above, and that the likely level of smothering would be below 30cm, the findings of the ES the biotope are considered to remain valid and a potential impact of **minor adverse significance** as a result of smothering of benthic habitats and species at the disposal site remains.

Mitigation and residual impact

In order to mitigate adverse effects to the Annex I *Sabellaria* biotopes from the disposal of rock, a pre-disposal survey to microsite specific disposal locations within the site is recommended. The pre-disposal survey should be undertaken within one year of disposal taking place and look to identify the extent of any benthic habitats of conservation importance and enable micro-siting of rock disposal to minimise impacts on these habitats.

Taking account of the above mitigation, the potential impact to Annex I *Sabellaria* biotopes is predicted to be of **negligible significance**; however, given the overall effect of the disposal activities on the site, the overall potential impact from the disposal activities is predicted to remain at **minor adverse significance**.



Legend:

Proposed Scheme

- Approach Channel

Reclamation Areas

- Salt Island Expansion
- Pelham Patch Development
- Predicted SS.SS.CMuSa.AalbNuc Biotope Region
- Bed thickness change greater than 1cm
- Bed thickness change greater than 5cm

Subtidal Grab Locations

Biotopes

- SS.SMX.CMx.MysThyMx
- SS.SMU.SMuVS.AphTubi/SS.SMU.ISaMu.MelMagThy
- LS.LMx.Mx.CirCer
- SS.SSA.CMuSa.AalbNuc
- SS.SMu.SMuVS.CapTubi/SS.SSA.CMuSa.AalbNuc

Client:	Project:
Stena Line Ports Ltd	Holyhead Port Expansion

Title: Deposition levels within Holyhead harbour compared to biotopes

Figure: 3-12 | Drawing No: PB6108-108-202

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	17/09/20	AB	SM	A3	1:8,000

Co-ordinate system: British National Grid

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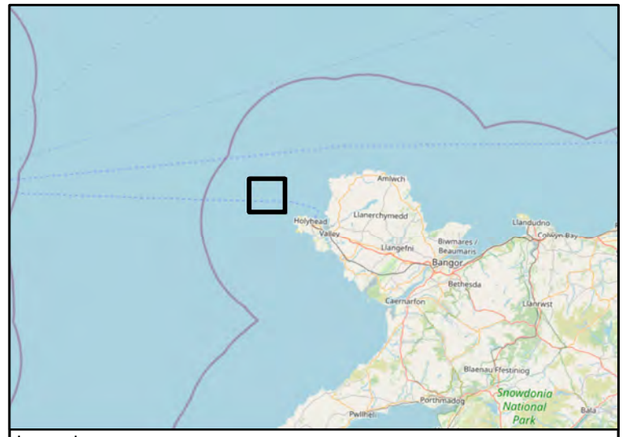

Legend:

- Holyhead North Disposal Site
- Bed Thickness Change 1cm 5cm
- Bed Thickness Change 1cm to 30cm
- Bed Thickness Change Above 30cm

Client:	Project:
Stena Line Ports Ltd	Holyhead Port Expansion

Title:

Deposition within the disposal site showing 1-5cm, 1-30cm and above 30cm change in bed thickness

Figure: 3-13 | Drawing No: PB6108-108-203

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/09/20	AB	SM	A3	1:30,000

Co-ordinate system: British National Grid

0 1 2 Kilometers

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3.3.4 Fish and Shellfish Resources

3.3.4.1 Potential impacts on fish/shellfish in Holyhead Bay

The updated sediment plume dispersion modelling predicts that increases in sediment suspension and deposition to be far less than that presented in the ES; therefore, potential impacts on fish and shellfish in Holyhead Bay as a result of the changes to the proposed scheme would also be less and the findings of the ES remain valid, and a potential impact of **negligible significance** remains.

3.3.4.2 Potential impacts on fish/shellfish due to changes in water quality at the disposal site

Due to the change in disposal volumes at Holyhead North, potential impacts on water quality at the disposal site has been re-assessed in **Section 3.3.2.2.** The potential impact on water quality was assessed as being of **minor adverse significance**.

The updated sediment plume dispersion modelling of the sediment plume shown in **Figure 3-11** indicated that, for the most part, increases in SSC are confined within the extent of the disposal site and are not significantly different from that assessed in the ES. In the context of the fish stocks around Holyhead and the Isle of Anglesey, the area affected is very limited. Given the relatively small spatial scale and the temporary nature of the predicted increases in SSC, plus the fact that changes to water quality are predicted to be minor adverse, the assessment presented in the ES (i.e. a **minor adverse** impact on fish/shellfish populations within the vicinity of the disposal site) is considered to remain valid.

3.3.4.3 Potential impacts on fish/shellfish due to sediment deposition at the disposal site

The updated sediment plume dispersion modelling predicted that while the extent of sediment deposition has increased to that assessed in the ES, it remains confined within the disposal site (see **Figure 3-4**). As described in the ES, the habitats within the disposal site are typical of the wider area and species of fish/shellfish would be able to adapt or relocate, if necessary. As such, the magnitude of supporting habitat alteration in the context of the wider Holyhead / Anglesey area is expected to be low.

As such, it is considered that the conclusion of the assessment presented in the ES (i.e. of **minor adverse significance**, at worst) remains valid.

3.3.5 Marine Mammals

3.3.5.1 Potential increased collision risk with construction vessels

Due to the change in the disposal requirements and the resultant increase in vessel numbers, the potential for an increase in collision risk for marine mammals has been considered. As stated in *Section 12.6.5 of the ES*, the number of marine mammals that could be at increased collision risk with vessels during construction of the proposed scheme has been assessed based on 5% to 10% of the number of individuals that could be present in the area.

As an area based approach has been used for the assessment, and there has been no change in the size of the disposal site or project areas, the number of animals that would potentially be impacted remains the same; therefore, the impact significance for any potential increase in collision risk with vessels during construction remains the same as that concluded by the ES, i.e. **negligible significance** (not significant) for harbour porpoise, common dolphin, minke whale and grey seal and **minor adverse** (not significant) for bottlenose dolphin.

3.3.5.2 Changes to water quality

Due to the change in disposal requirements, potential impacts to water quality have been re-assessed in **Section 3.3.2**, with a potential impact of **minor adverse significance** predicted.

The number of harbour porpoise, bottlenose dolphin, common dolphin, Risso's dolphin, minke whale and grey seal that are likely to be affected by re-suspended sediments and risk from contaminants during disposal, was previously assessed based on the whole dredge area (0.422km^2) (*Section 12.6.7 of the ES*), which remains unchanged. The magnitude of effect in all species remains as **negligible/very low**, with less than 1% of the reference population likely to be affected by the temporary effect. The overall potential impact significance remains the same as that predicted by the ES, i.e. **negligible significance** (not significant).

3.3.5.3 Changes in prey availability

The changes to the proposed scheme have a potential impact to the increased suspended sediment concentrations and sediment re-deposition causing smothering. The ES (*Section 11*) predicted the impacts as **minor adverse** and **negligible significance** respectively. As outlined in **Section 3.3.4** there has been no change in the impact assessment as a result of the changes to the proposed scheme.

As there has been no change to the potential impact to prey resource, the assessment for the potential impact on marine mammals remains as **minor adverse** (not significant) for Risso's dolphin and minke whale, and **negligible** (not significant) for harbour porpoise, bottlenose dolphin, common dolphin and grey seal.

3.3.6 Commercial Fisheries

3.3.6.1 Potential impacts on landings due to changes in stock availability

As described in **Section 3.3.4**, the revised disposal requirements do not alter the conclusions of the ES with regards to the significance of impacts on fish and shellfish resources. Consequently, the assessment presented in *Section 13.6.3 of the ES*, regarding potential impacts on commercial fisheries landings due to changes in stock availability, is considered to remain valid (i.e. **negligible significance**).

3.3.6.2 Potential impacts on fishing activity due to increased vessel traffic during construction

The predicted increase in vessel traffic, as a result of increased disposal at the offshore site and importation of reclamation material, has the potential to introduce additional navigational risk for commercial fishing vessels; however, potential impacts on navigational safety, see **Section 3.3.7**, concludes that the assessment presented in the ES remains valid, i.e. of **negligible significance**. Furthermore, the footprint of the proposed scheme would not change and therefore there the risk of displacement of fishing activity are the same as that considered in the ES. As such, the potential impacts to fishing activity remain the same as that predicted by the ES, i.e. of **negligible significance**.

3.3.7 Commercial and Recreational Navigation

As a result of the changes in construction methodology, the number of vessel movements have changed to that assessed within the ES, given the additional transportation of dredged material to the Holyhead North disposal site and importing material to fill the reclamation areas.

As presented in **Section 3.2**, the updated construction methodology will require approximately 2,015,354m^3 of dredged material to be disposed of at Holyhead North disposal site (an increase of approximately

500,000m^3). It would also require the importation of approximately 1,010,000m^3 of marine aggregate material as reclamation fill. In addition, less cement would be required to develop the reclamations

Dredging would be undertaken using two types of dredging technique – a TSHD for the soft sediment, and a BHD for firmer sediment and rock. The TSHD would transport the dredged material to the disposal site, with an estimated capacity of 3,429m^3. The BHD requires barges to transport the material to the disposal site, which would have an estimated capacity of 1,650m^3 for the firm sediment and 1,520m^3 for rock. Using the revised total volume of sediment types to be dredged (see **Table 3-1**), this would require the following number of vessel movements over the dredge and disposal campaign:

- TSHD – 523 vessel movements (an increase of 243 to that considered in the ES); and,
- BHD – 143 vessel movements (a decrease of 237 to that considered in the ES).

For the importation of the marine aggregate, the vessels are expected to have a maximum capacity of 8,000m^3, with a working capacity of 5,600m^3. As a result, the number of vessel movements required to import the aggregate fill material is estimated to be 182, an increase of 134 to that considered by the ES.

In addition, there would be a slight reduction in vessels required to support the reclamations, due to the volume of cement required for the reclamations (see **Table 3-3**). This would reduce the number of vessels required by eight.

Taking the above into account, there would be an increase in the overall number of vessel movements required for the proposed scheme of 132 vessel movements, from 791 to 931, which over a three month period equals approximately two per day which is not considered to be significant.

It is therefore considered that the potential impact to navigation arising from construction vessel movements remains of **minor adverse significance** which, with mitigation including the publication of Notice to Mariners, and frequent communication with the Harbour Master to ensure the vessel movements do not impede the progress of the ferries this will be reduced to a residual impact of **negligible significance**.

3.3.8 WFD, HRA and CIA

Given the findings of the assessments presented in **Sections 3.3.1** to **3.3.7** conclude no changes to those presented in the ES, the changes to the proposed scheme are not considered to affect the conclusions of the WFD Compliance Assessment, HRA and CIA presented in the ES, and therefore the conclusions of these assessments are considered to remain valid.

3.3.9 Disposal Options Study

The Disposal Options Study *(Appendix B of the ES)* was undertaken to support the EIA to ensure that the disposal site would be able to receive the volume and type of dredged arisings, which totalled approximately 1.58Mm^3 of gravel, clay and rock. The Disposal Options Study concluded that the disposal of the material would not result in an adverse effect on the disposal site and that it was considered suitable to accept the volume of dredged material proposed be deposed of.

Comments received from NRW, expressed the need to keep the material within the marine environment, preferably within the near shore environment or, if this was not possible due to environmental constraints, disposed of at the licenced disposal site. Reasons why the material cannot be kept within the nearshore environment are provided in **Section 4.2.1**. As such, all of the dredged material is proposed to be deposited at Holyhead North disposal site, totalling approximately 2.05Mm^3, an increase of approximately 0.5Mm^3.

The revised volume of material to be disposed of at Holyhead North according to sediment type is presented in **Table 3-1** and comprises the following percentage increases:

- 2.3% increase in rock;
- 24.2% increase in soft clay;
- 36.3% increase in firm clay; and,
- 26.3% increase in gravel.

The sediment plume dispersion model has been repeated as described in **Section 3.2.3**. Potential impacts from depositing the additional volume of dredged material on sea-bed level (**Section 3.3.1.2**), water quality (**Section 3.3.2.2**), benthic habitats and species (**Section 3.3.3.2**), fish and shellfish (**Section 3.3.4.2** and **3.3.4.3**), marine mammals (**Section 3.3.5**) are all predicted to be of **minor** to **negligible significance**.

Consequently, it is still considered that Holyhead North disposal site is suitable to receive the volume and type of material proposed to be disposed of.

4 Responses to Stakeholder Comments

4.1 Introduction

Section 4 presents the comments received from each stakeholder with a summary of the applicant response within each table. Where required, further information is presented to supplement the response in each table. The stakeholder comments can be seen in full in **Appendix A**.

4.2 Coastal Processes

4.2.1 Response to Stakeholder Comments

Table 4-1 presents the responses to each of the Coastal Processes stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-1 Responses to Coastal Processes comments.

Ref	Stakeholder	Comments received	Response
CP1	NRW	There has been no impact assessment of removing around 2 million m^3 of sediment from the application area. The impacts of removal of sediment from the nearshore area have not been considered.	In light of NRW's advice that the dredged arisings should be kept within the marine environment rather than being used as land-claim material, the design of the proposed scheme has been revised so that imported fill will be used within the land-claim areas rather than using sediment that has been dredged from the approach channel. Whilst we understand that keeping this sediment in the nearshore environment is preferred, in this case it is not considered viable for the following reasons: ■ There are sensitive habitats within Holyhead Bay such as the mussel beds at Beddmanarch Bay, a designated shellfish water, which could be smothered by the release of such a large volume of sediment within the harbour area. ■ The release of large volumes of sediment into the harbour would increase suspended sediment concentrations both during re-use (disposal) and post re-use. It is likely that bed sediment within the harbour is continually being re-suspended and redistributed with the greatest effect during storms. If more mobile fine sediment is placed in the harbour (and likely to be in more focussed areas) the effect on
CP2	NRW	640,000m^3 of dredged sediment is proposed to be used as sediment in-fill. Our previous advice stated that we would advise against taking the sediment out of the marine environment. We would always aim to encourage sediment to be retained within the nearshore sediment system and actively contributing to sediment budgets which isn't compatible with use of sediment infill as proposed here. The sediment needs to be considered a vital natural resource which requires careful management and safeguarding, rather than being considered a waste material. The Environmental Statement must include an assessment on the potential impact to the sediment budget in the area.	
CP3	NRW	Whilst we welcome the intent of Stena Line to make best use of this material and reduce disposal requirements in line with the Waste Framework Directive, we do not think it is appropriate to apply that approach in this instance. For marine material, within Wales, NRW confirms the sediment needs to be considered a vital natural resource	

Ref	Stakeholder	Comments received	Response
		which requires careful management and safeguarding, rather than being considered a waste material. NRW would encourage and advise (unless contaminants are found to be present) that marine derived material be kept in the nearshore active sediment zone or if not possible, due to other environmental constraints, disposed of offshore rather than locked up in a construction setting. NRW therefore disagree with the approach taken in Appendix B and wish to discuss this further. NRW do not consider using the sediment for construction purposes as 'beneficial re-use' or a positive action on the limited vital natural resource of marine sediments.	suspended sediment concentrations of wave stirring would be greater. The redistribution of this larger volume of sediment in the water column and its re-deposition on the bed could be detrimental to existing bed habitats. ■ There is a risk that if the sediment is placed in the harbour, some of it could be transported back into the approach channel. Hydrodynamic modelling shows that predicted tidal current velocities are strongest on the flood tide. During this state of the tide, on both neap and spring tides, a clockwise gyre is predicted to form. The currents flow south into the harbour before turning west and then north across the route of the approach channel. Ebb tidal currents also flow north from the harbour across the southern half of proposed location of the approach channel. This northward flow from the harbour to the approach channel on both flood and ebb tides would tend to transport some of the additional sediment back into the approach channel, which would be large sink for sediment, after placement in the harbour. This could create a hazard to navigation into the port and potentially cause an excessive requirement for further dredging. As such, it is proposed to dispose of all of the dredged sediment at Holyhead North disposal site. In light of the changes to the proposed scheme described above, the sediment plume dispersion model for the approach channel dredging and depositing at Holyhead North has been re-run. The modelling methodology is presented in **Section 3.2.3.1**, and the results are presented in **Section 3.2.3.2**.
CP4	NRW	Concerns that removing a large quantity of dredged sediment from the marine sediment budget could also have a negative impact on the sediment supply to coastal beaches down drift of the harbour. NRW cannot see an assessment of this potential impact.	
CP5	NRW	Impact one for the construction phase has only considered 3 months of sediment dispersion and thus the results need extrapolating to the whole construction program in which sediments will be released.	The new dredging schedule indicates that the dredging work can be completed within approximately 15 weeks, and so the entire dredging period is covered in the model runs.
CP6	NRW	The 3-month scenario of dredging induced increase in suspended sediments needs extrapolating up to the 24 month construction period to understand the full impact to changes in bed level and total suspended sediments.	
CP7	NRW	It is unclear from the analysis of impact two during construction on whether the suspended sediment could smother intertidal areas, changing the make-up of beaches particularly from storm events, no wave modelling is included in the suspended sediment analysis or a dredge spill scenario.	Impact 2 relates to disposal of sediment at Holyhead North and the extent of the deposition described in *Figure 8.23 of the ES* indicates that there is no deposition beyond the approximate limits of the disposal site and no effects of deposition at the coast. As such it is considered that disposed sediment would not reach intertidal areas. The revised sediment plume

Ref	Stakeholder	Comments received	Response
		Concern remains around the suspended sediment from dredging, the impact of the levels being so high above background (Near bed 5.9mg/l), that will end up in the intertidal area and smother beaches or change the sediment make-up of what is there currently. NRW believe this should be a construction impact that is investigated.	dispersion modelling results for disposal at Holyhead North are presented in **Section 3.2.3**. Impact 1 relates to the behaviour of sediment suspended as a result of the dredging activity and land claim. Analysis of the results shows that outside the dredged area changes in bed thickness are less than 1cm, as shown in *Figures 8.20 and 8.22 of the ES*. The extent of the plume and the deposition from the plume both extend seawards rather than towards the coast, and as such the sediment is moving away from the beaches. Furthermore, as the sediment on the beaches is much coarser than the fine sediment in the plume, there is no source-receptor pathway for the suspended sediment to settle on the beaches or change the sediment make-up. The revised sediment plume dispersion modelling results for dredging the approach channel and land-claim are presented in **Section 3.2.3**. Wave effects are now included in the sediment plume dispersion modelling as an additional force.
CP8	NRW	No maintenance dredging is discussed. We would expect maintenance dredging to be considered and quantified (worst case scenario of volume and frequency) during application.	A prediction of future maintenance dredge requirements has been completed using information on past maintenance dredging activities carried out at the port over the last 10 years in conjunction with the modelling results presented within the ES. An extrapolation of the port data using expert geomorphological assessment has been used to inform the likely maintenance dredge requirements of the new approach channel. The results of this assessment are presented in **Section 4.2.2**.
CP9	NRW	WADZ needs scoping into the cumulative impact assessment in Chapter 24.	The Morlais project has been added and is cumulatively assessed in **Section 4.13.2**.
CP10		WADZ has been scoped out due to the following reason 'This project is not yet consented, nor has a consent application been made. It is therefore assumed that any activity undertaken as part of the WADZ will occur after the proposed scheme has been constructed, and therefore there will be no potential for cumulative effects and this project is screened out of further assessment.' An application is currently in and therefore should be scoped in.	
CP11	NRW	Section 8.4.1. A map and quantification of both the near field and far field areas are needed with an explanation of the approach.	Sensitive sites within the wider sediment sub-cell such as the Cemlyn Bay SAC were scoped out of the assessment based on the geographical extent

Ref	Stakeholder	Comments received	Response
CP12	NRW	Section 8.4.3. Impact receptors Understanding of sites scoped out due to far field effects? The study area should be defined using evidence of potential impacts of the proposed activities, rather than the use of a standard figure for an area of study.	of change predicted by the modelling exercises. The modelling shows that effects arising from the dredging and disposal activities are limited in extent to the immediate, or near field areas, and no impacts to the SAC or wider far-field areas are predicted. TAN 14 guidance is general guidance for Local Planning Authorities and indicates that sediment cells should be the basis of understanding coastal issues for planning purposes accompanied by general statements on what to look for in terms of coastal processes impacts. These elements are covered in the chapter without specific reference to TAN 14. We have defined near-field and far-field as: ■ Near-field: the area within the immediate vicinity (tens or hundreds of metres) of the project; and, ■ Far-field: the wider area that might also be affected indirectly by the Project (e.g. due to disruption of waves, tidal currents or sediment pathways). So effectively, anything far-field is considered to be over 500m from the boundary of the approach channel. However, a distinction between near- and far- is not needed because wherever the sensitive areas are relative to the project, they are assessed accordingly.
CP13	NRW	Appendix M - HRA Screening Report TAN14 suggests working at the sediment sub-cell level and keeping all sensitive sites scoped in, until the area can be scaled down based on evidence. Until the far field effects can be agreed upon, we cannot scope out sites within the sediment sub-cell such as Cemlyn Bae SAC.	
CP14	NRW	Section 8.5.1. Study Area. NRW understand the study area is based on the primary littoral cell, Holyhead Harbour, which stretches from Holyhead Breakwater in the west to the headland at Twyn Cliperau in the east, and to Stanley Embankment in the south. NRW agree with this for near field affects however would look to a wider area for potential far field affects.	
CP15	NRW	There is currently no discussion of climate change within the ES chapter, it has been considered in the wave modelling but should be discussed more broadly.	A broader discussion on the effects of climate change is provided in **Section 4.2.3**.
CP16	NRW	Section 8.5.8. As raised previously, we note that wave data collected was only over a six-month period and over 10 years ago. It has been shown through the wave modelling however that at the worst-case scenario 330deg and for a 1:1000-year scenario with climate change there is still negligible impact on wave heights and therefore NRW Advisory still thinks this is an omission but one that can be resolved through the modelling and EGA.	The older wave data presented in *Section 8.5.8 of the ES* was only used as part of the baseline description of the area with no intent for use in the wave model. The wave model used is well-established and was initially developed for the Holyhead Breakwater PAR study (modelling completed in March 2017), where the offshore wave conditions were acquired from the Met office, provided as three-way frequency wave tables based on the 35 year remap" wave hindcast data.
CP17	NRW	The Environmental Statement must clarify the source of any additional material intended for infill. NRW Advisory have indicated that they would advise against taking any further sediment out of the marine environment.	Imported fill to be used in the land-claim areas will be from a certified construction source which will be suitable for use within the marine environment and for the construction purpose.

Ref	Stakeholder	Comments received	Response
			Section 3.2.2 includes details on imported fill to be sourced from marine licensed site, except for some concrete and tarmac to be imported by road to site.
CP18	NRW	C1 - Wave Modelling Report - The modelling approach seems appropriate for the study, however NRW Advisory would like these results to be pulled into the ES for completeness and then produce a conceptual understanding of changes to the receiving environment. The wave modelling should also be related to the suspended sediment analysis.	In deeper water, the effects of waves on transport of suspended sediment are negligible. Waves effects are mainly prevalent in shallower water and along the beach (i.e. in the surf zone). This is because the net movement of sediment by waves outside the surf zone is effectively zero. However, for completeness, wave effects are now included in the sediment plume dispersion modelling as an additional force (**Section 3.2.3**).
CP19	NRW	C2 - Hydrodynamic Modelling Report - Figure 3: Model extent covering the Irish Sea (yellow star indicates the study site) - the yellow star is in the Dee estuary, please amend. Difference plots don't show complete area of change – please revise spatial extent.	The position of the yellow star has been moved and shown in the new figure in **Section 4.2.4**. The expanded difference plots are provided in **Section 4.2.5**.
CP20	NRW	C3 – Sediment Plume Modelling Report As detailed in Appendix B Dredge Disposal Options Study, NRW does not support the application to use the sediment as infill. The total stated for land infill in previous reports is 640,000m^3. However, this report only measures an impact of 546,909m^3 around 100,000m^3 less. There is also a discrepancy between the Sediment Plume Modelling Report and the Environmental Statement for the following totals: a. ES (m^3) Modelling report (m^3) b. Sediment Infill 640,000 546,909 c. Offshore disposal 1,260.000 Backhoe: 233,600 TSHD: 1,318,626 Total: 1,552,226 d. Total removal 1,900,000 2,099,135 4. No typical wave modelling is included in the assessment or storm events to assess sediment fate. 5. No dredge spill event is considered as a worst case scenario, NRW recommend this is included.	**Section 3.2** describes the revised dredged sediment volumes, whilst the sediment plume dispersion modelling methodology is presented in **Section 3.2.3**. No dredged sediment would be used for land-claim. The results of the revised sediment plume dispersion modelling are presented in **Section 3.2.3.2**.
CP21	NRW	Appendix M - HRA Screening Report Section 2.2.3 Additional dredging Some dredging within the reclamation areas may be required to remove material that does not provide suitable bearing for the	The fate of the sediment from within the land-claim areas has been considered in the sediment plume modelling for the dredging and land-claim activities and the worst-case disposal activity. This has been reassessed as required in NRW Comment CP1 to model the movement of

Ref	Stakeholder	Comments received	Response
		reclamation works. It is anticipated that this dredging would be completed either prior to, or concurrent to, the installation of the quay walls, in which case the dredged soils may be reclaimed to land utilising conventional terrestrial earth moving equipment. If the dredged soils are surplus or unsuitable for re-use on site it would be dredged and taken for offshore disposal. NRW request further information on the above point and confirmation this has been considered within the ES.	all dredged sediment when it is disposed of at the disposal site (**Section 3.2.7**). This reduces the amount of sediment released during land-claim given the material would be disposed of offshore.

4.2.2 Maintenance Dredging

4.2.2.1 Existing maintenance dredging

To estimate potential future maintenance dredging requirements in the proposed approach channel and Pelham Patch Development berth pocket (worst case scenario of volume and frequency), information on maintenance dredging activities carried out at the port over the last nine years has been used. Four areas of the port have been regularly dredged. These are the Inner Harbour, Orthios Pocket, Orthios Approach and Ferry Berths T3 and T5. (**Figure 4-1**, **Table 4-2** and **Table 4-3**).

Table 4-2 Plan areas and dredge depths of the existing maintenance dredge areas and the approach channel.

Dredge location	Plan area (m^2)	Dredge Depth (m below CD)
Ferry Berths T3 and T5	274,022	8
Inner Harbour	104,860	5.5
Orthios Pocket	15,367	12
Orthios Approach	5,279	10.5

Table 4-3 Total tonnages extracted over the past nine years and volumes extracted for each area in April 2017 (from data supplied by Holyhead Port).

Date Dredged	Total Tonnage	Volume (m^3)				
May 2011	87,568					
July 2013	41,678					
August/September 2015	84,320					
April 2017	29,709	14,000	2,800	3,500	2,800	23,100
June 2019	34,070					

4.2.2.2 Future maintenance dredging

The data shows that the largest existing maintenance dredge area is Ferry Berths T3 and T5, but the largest volume of extraction was from the Inner Harbour, about 2.5 times smaller in area than Ferry Berths T3 and T5. This is likely due to the more sheltered nature of the Inner Harbour compared to Ferry Berths T3 and T5. This means that the Inner Harbour would be subject to less resuspension of deposited sediment by waves and tidal currents than the more open environment of the ferry berths.

Given the location of the ferry berths dredging area is in a similar environment to the proposed approach channel, being adjacent and with similar physical driving forces, the historical maintenance dredge tonnages/volumes from the ferry berths have been used to estimate potential maintenance dredge requirements in the proposed approach channel. For the proposed Pelham Patch Development berth pocket, the analogous existing maintenance dredge area is the Inner Harbour, and so the Inner Harbour data have been used to estimate potential maintenance dredge requirements.

Legend:

Proposed Scheme

- Approach Channel
- Dredge Areas
- Pelham Patch Development Berth Pocket

Reclamation Areas

- Salt Island Expansion
- Pelham Patch Development

Client:	Project:
Stena Line Ports Ltd	Holyhead Port Expansion

Title: Existing maintenance dredge areas in relation to the approach channel and Pelham Patch Development berth pocket

Figure:	Drawing No:
4-1	PB6108-108-201

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	15/09/20	AB	DB	A3	1:8,000

Co-ordinate system: British National Grid

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The following assumptions have been made to estimate future maintenance dredging:

- no maintenance dredging took place between the extraction dates shown in **Table 4-3**;
- the tonnage to cubic metres conversion is 1.3 tonnes is equivalent to 1m^3 of sediment (based on the April 2017 data); and,
- the proportion of extraction from each maintenance dredge area compared to the total extraction has remained constant between 2011 and 2019 (only data from April 2017 described the break-down of extraction volumes in each dredge zone).

Future maintenance dredging requirement in the proposed approach channel

The estimated volumes of sediment extracted from Ferry Berths T3 and T5 between 2011 and 2019 and the associated annual accumulation rates are shown in **Table 4-4**. To estimate the potential future requirement for maintenance dredging in the proposed approach channel, the historic annual deposition volumes in Ferry Berths T3 and T5 have been translated in to potential annual volumes by adjusting them first by the ratio of the two dredge areas (424,422 divided by 274,022 = 1.55) and then by the ratio of the dredge depths (ten divided by eight = 1.25) shown in **Table 4-2**.

Table 4-4 Historic sediment deposition rates in Ferry Berths T3 and T5 and estimates of potential maintenance dredging requirements in the proposed approach channel.

Dredge Date	Accumulation Period (months)	Ferry Berths T3 & T5		Proposed Approach Channel
July 2013	25	3,928	1,885	3,650
August 2013	24	7,947	3,973	7,693
April 2017	19	2,800	1,768	3,424
June 2019	25	3,211	1,541	2,984

The estimated annual deposition rates in the proposed approach channel varies from 2,984m^3/year to 7,693m^3/year. Hence, the worst-case scenario maintenance dredge requirement is estimated to be 8,000m^3/year. If the entire volume was deposited evenly over the whole area of the proposed approach channel, this would equate to about 20mm of deposition each year or 0.2m every 10 years. However, the distribution of deposition would not be uniform, and it is likely to be higher in deeper central areas and lower across the flanks. As a worst case scenario, it has been assumed that the deposition in the base of the channel would be about 40mm/year (0.4m every 10 years). Allowing for a tolerance of 0.2m in water depth, the frequency of maintenance dredging is estimated to be about five years, with removal of up to approximately 40,000m^3 of sediment each time.

Future maintenance dredging requirement in the proposed Pelham Patch Development berth pocket

A similar calculation has been completed for proposed Pelham Patch Development berth pocket using data from the Inner Harbour (**Table 4-5**). The ratio of the two dredge areas is about 0.11 (12,000 divided by 104,860) and the ratio of the dredge depths is one (both are 5.5).

Table 4-5 Historic sediment deposition rates in the Inner Harbour estimated from the maintenance dredge volumes and estimates of potential maintenance dredging requirements in Pelham Patch Development berth pocket.

Dredge Date	Accumulation Period (months)	Inner Harbour		Berth Pocket
		Dredge Volume (m^3)	Historic Deposition Volume/Year (m^3/year)	Estimated Deposition Volume/Year (m^3/year)
July 2013	25	19,640	9,427	1,079
August 2013	24	39,735	19,867	2,274
April 2017	19	29,709	8,842	1,012
June 2019	25	16,055	7,706	882

The estimated annual deposition rates in Pelham Patch Development berth pocket vary from 882m^3/year to 2,274m^3/year. Hence, the worst-case scenario maintenance dredge requirement in the berth pocket would be about 2,300m^3/year. This equates to about 200mm (0.2m) of deposition each year over the entire berth pocket (12,000m^2 and assuming even distribution of deposition from suspension). To maintain a berthing pocket at 5.5m below CD and allowing for a tolerance of 0.2m in water depth, maintenance dredging is estimated to be required once a year, with removal of up to approximately 24,000m^3 of sediment each year.

4.2.3 Climate Change

Historic data shows that the global temperature has risen since the beginning of the 20th century, and predictions are for an accelerated rise, the magnitude of which is dependent on the magnitude of future emissions of greenhouse gases and aerosols. To determine projected sea-level rise for Holyhead Harbour, this assessment uses the data of the UK Climate Projections (UKCP18) user interface for the model grid cell that covers the harbour.

The UK Climate Projections (UKCP18) user interface for the model grid cell that covers Holyhead Harbour is shown in **Figure 4-2**. UKCP18 relative sea-level rise estimates use 1990 as their starting year and are based on the IPCC 5th Assessment Report. They are available for low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenarios and presented by UKCP18 as central estimates of change (50% confidence level, 50%ile) in each scenario with an upper 95% confidence level (95%ile) and a lower 5% confidence level (5%ile).

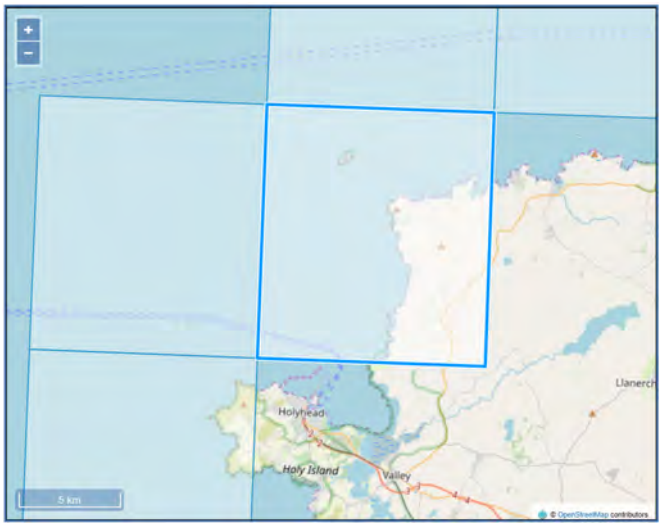

Figure 4-2 UKCP18 model grid used to derive sea-level rise projections for Holyhead.

Relative sea-level rise projections using the 50%ile of the medium (RCP4.5) emissions scenario and the 95% of the high (RCP8.5) emissions scenario from the UKCP18 user interface are used in this assessment. Using 2020 as the baseline for the start of operation, and an assumption that the 30 years of relative sea-level rise between 1990 and 2020 has already taken place, then the projected relative sea-level rises using

a 2020 baseline are shown in **Figure 4-3**. Relative sea-level rise in 2070 for medium (RCP4.5) emissions 50%ile is estimated to be approximately 0.22m. This equates to an average sea-level rise of 4.4mm/year over 50 years. For high emissions 95%ile, relative sea level rise in 2070 is estimated to be approximately 0.47m. This equates to average sea-level rises of 9.4mm/year over 50 years.

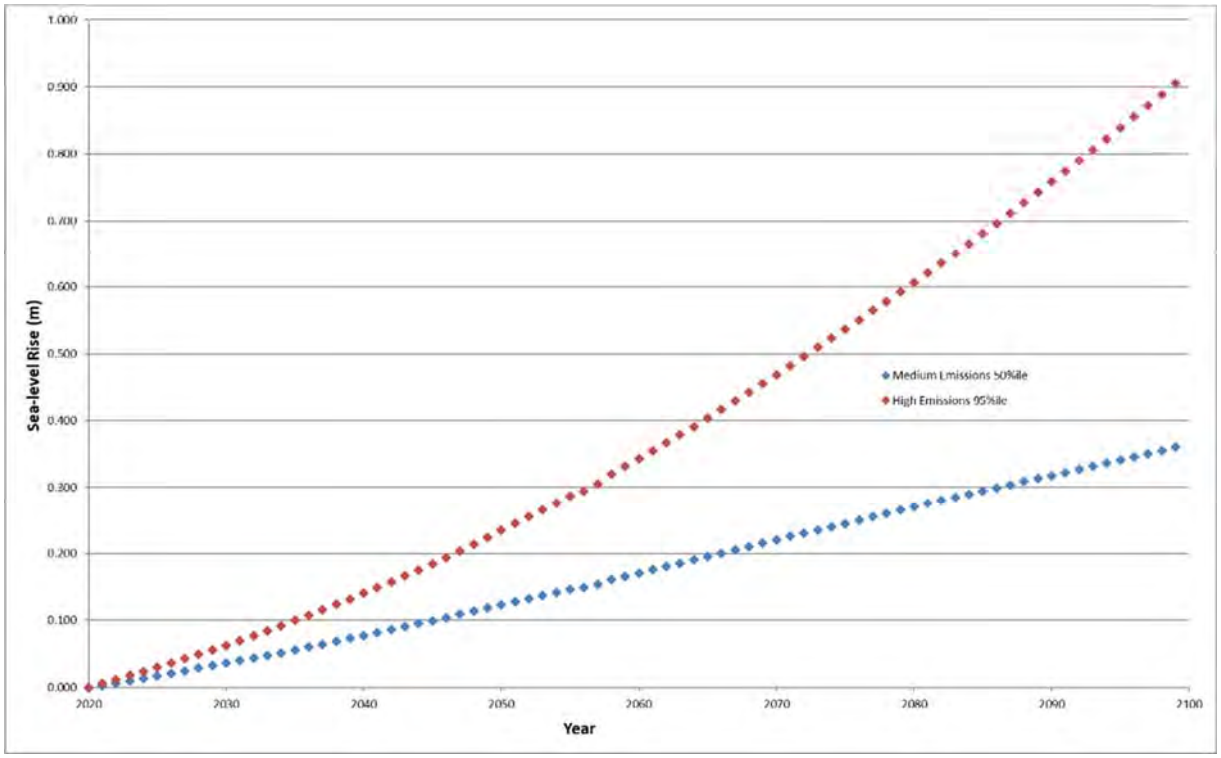

Figure 4-3 Changes in relative sea level (m) under the 50%ile medium and 95%ile high emissions scenario using a 2020 baseline.

4.2.4 Model Extent Figure

Figure 3 from the original hydrodynamic modelling report (*Appendix C1 of the ES*) is reproduced here (**Figure 4-4**) with the yellow star indicating the study site in the correct place.

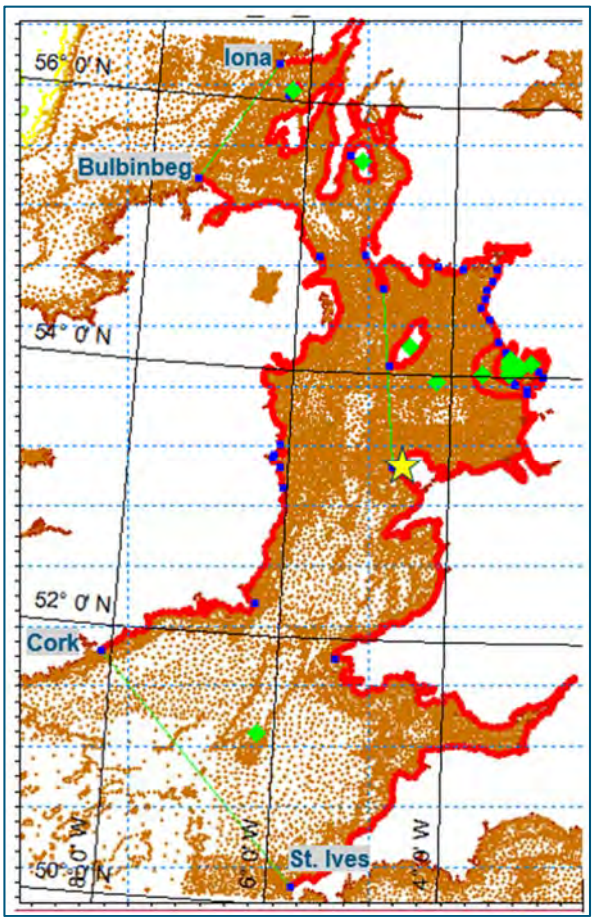

Figure 4-4 Model extent covering the Irish Sea (yellow star indicates the study site); brown dots showing bathymetry data points.

4.2.5 Difference Plots

Figures 30 to 33 from the original hydrodynamic modelling report (*Appendix C1 of the ES*) are reproduced here (**Figure 4-5**, **Figure 4-6**, **Figure 4-7** and **Figure 4-8**) with their spatial extents revised to show the complete areas of change.

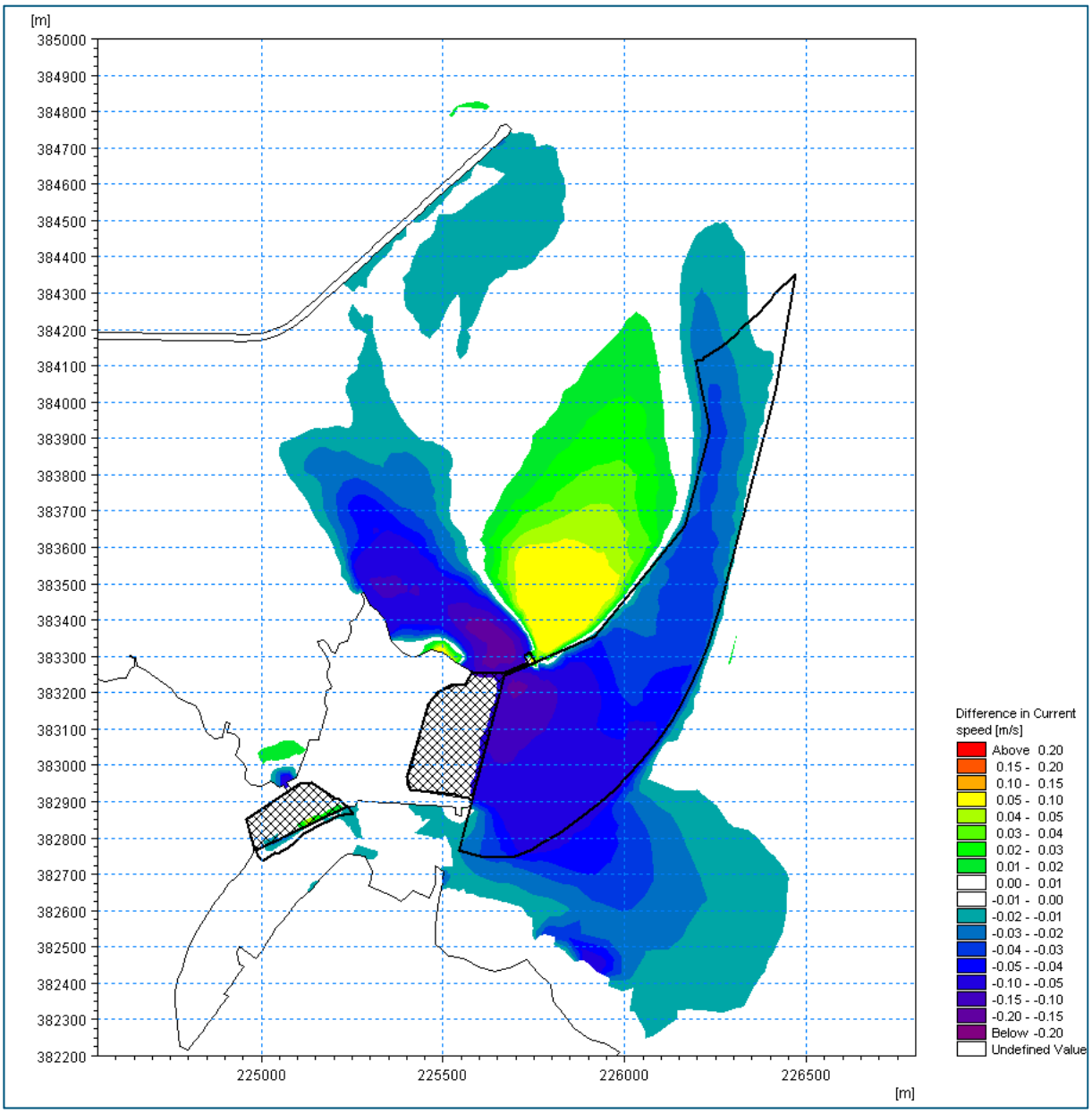

Figure 4-5 Difference in current speed between baseline and with scheme scenarios during spring tide two hours before high tide.

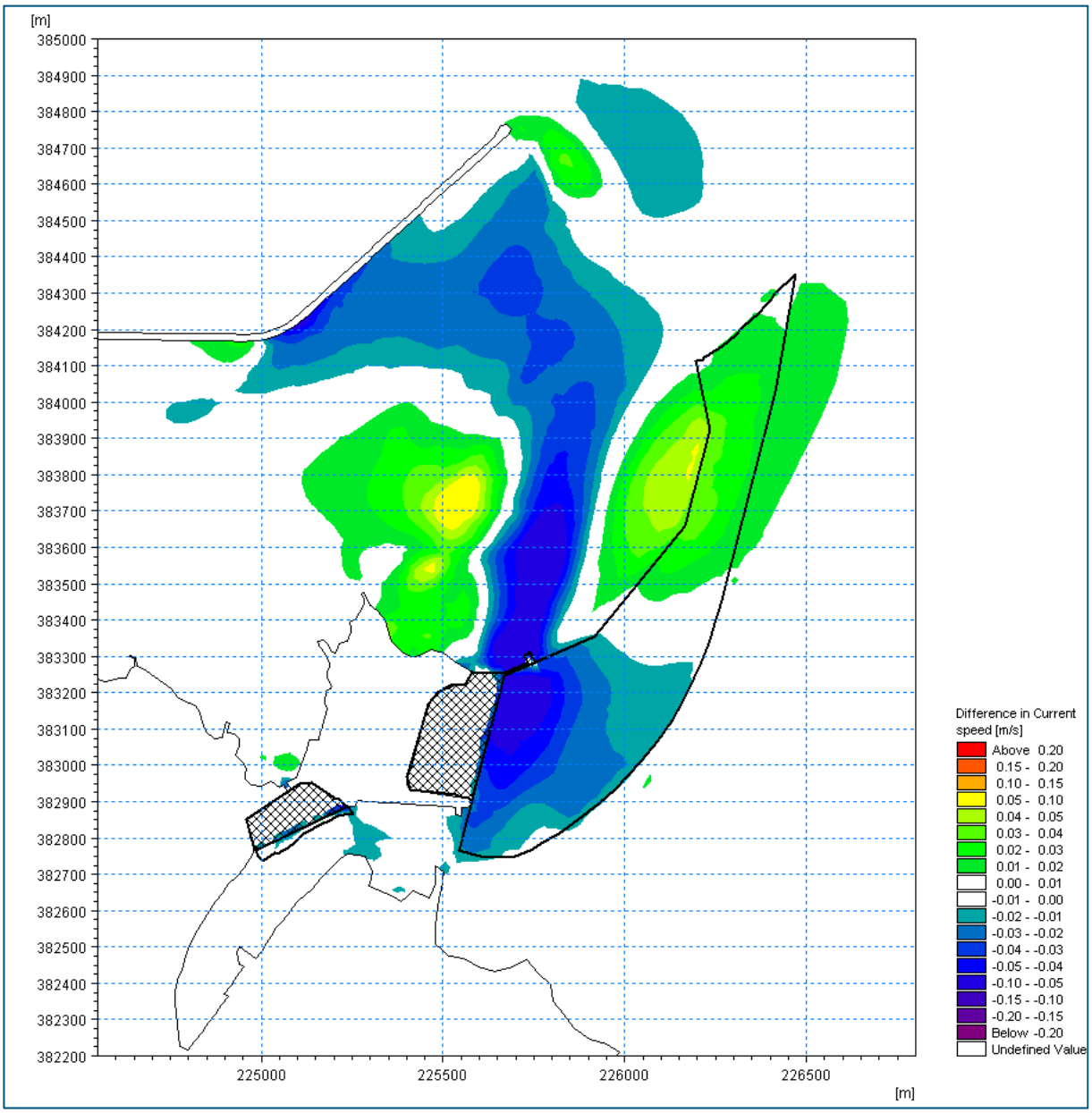

Figure 4-6 Difference in current speed between baseline and with scheme scenarios during spring tide two hours after high tide.

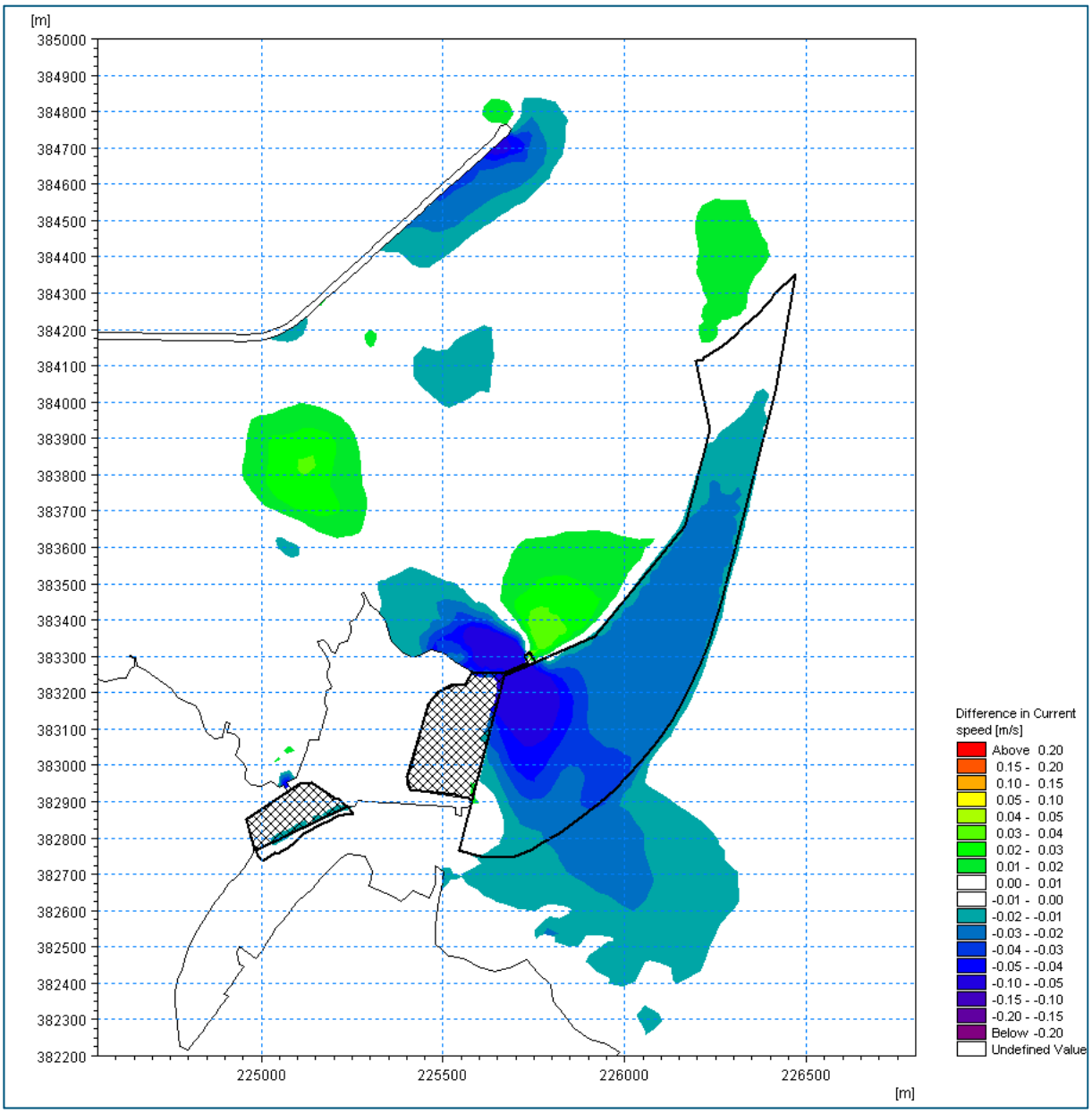

Figure 4-7 Difference in current speed between baseline and with scheme scenarios during neap tide two hours before high tide.

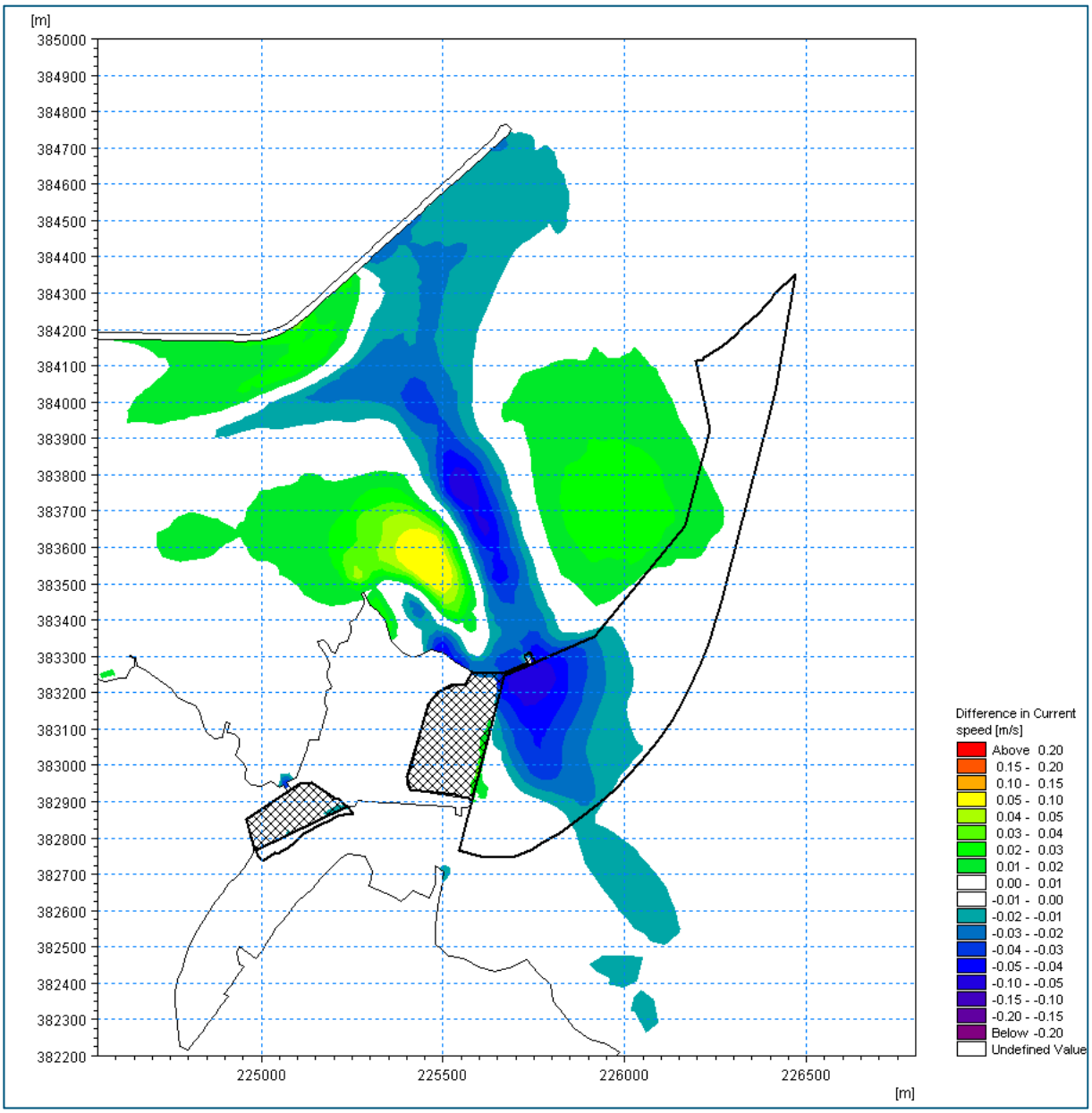

Figure 4-8 Difference in current speed between baseline and with scheme scenarios during neap tide two hours after high tide.

4.3 Marine and Sediment Water Quality

4.3.1 Response to Stakeholder Comments

Table 4-6 presents the responses to each of the Marine and Sediment Water Quality stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-6 Responses to Marine and Sediment Water Quality comments.

Ref	Stakeholder	Comments received	Response
WQ1	Cefas	(NTS, 4.3.3) Given that the arisings from any dredge operation will need to be managed in line with the Waste Framework Hierarchy and be assessed if disposal to sea (including beneficial use below MHWS) is the preferred option, I recommend a condition on the licence to state that no maintenance dredging is to be undertaken until a full assessment has been submitted to and approved by NRW.	Comment is noted.
WQ2	Cefas	(NTS, 5.2) Whilst the number of sediment samples from the proposed approach channel is not in line with OSPAR guidelines, the distribution of samples appears to be representative of the area to be dredged.	Comment is noted.
WQ3	Cefas	(ES, Chapter 24) I would expect this chapter to cumulatively assess the disposal operations at the disposal site to ensure the site can accept this volume of material and to ensure the volume of material will not have an adverse impact on the marine environment	Given it has recently been confirmed that Wylfa Newydd will no longer go ahead, the only disposal activities that could act cumulatively with the proposed scheme are those associated with Stena Line Ports' maintenance dredge activities (see **Section 4.2.2.1)**. Given the low volumes of material disposed of at the site during the maintenance dredging campaigns, significant cumulative effects with the proposed scheme are not considered likely. A Disposal Options Study was undertaken on the suitability of the Holyhead North disposal site to receive the volume of material to be disposed of (approximately 1.58Mm^3 of material). The study concluded that the disposal of the material would not result in an adverse effect on the disposal site and that it was considered suitable to accept the volume of dredged material proposed be deposed of. This formed *Appendix B of the ES*. Given the changes to the proposed scheme, the Disposal Options Study has been updated see **Section 3.3.9**.
WQ4	Cefas	There appears to be no assessment made for the use of Holyhead North (IS043) disposal site to ensure the disposal site can accept this volume of material (Outstanding comment from previous advice on the scoping report (SC1704) dated 26th June 2017).	

Ref	Stakeholder	Comments received	Response
WQ5	NRW	The methodology for calibrating the turbidity sensor to suspended sediment concentration has not been provided.	This was provided in *Appendix D of the ES*: Geophysical, Bathymetric and Oceanographic Survey Report, Chapter 5.
WQ6	NRW	The total deposition of material for the full period of construction has not been provided and should be related to shellfish waters and other receptors mentioned in chapter 10.	The revised dredging schedule (see **Table 3-12**) estimates that the dredging activities would be completed within 15 weeks. The sediment plume dispersion model has been rerun for this entire period. An updated assessment of the potential impacts to marine ecology and fish and shellfish are presented in **Sections 3.3.3** and **3.3.4**, respectively.
WQ7	NRW	No evidence is provided showing that SSC has returned to background levels after 2.5 hrs and there is no assessment of the impact of repeat visits to the area (every 3.25 hrs).	Time series data are provided in Section 4.3.2 below.
WQ8	NRW	ES Page 172 - There is no evidence provided that SSC levels drop to background levels within 2.5 hours. It would be useful to see evidence for different stages of the tide. It would appear from appendix C3 that each dredge cycle takes 3.25 hours. Thus it would be useful to get an understanding of how much time SSC is above background each day.	
WQ9	NRW	The long term impact of the new port structure on SSC has not been assessed. However, hydrodynamic changes are very localised and therefore the impact on the waterbody is likely to be small.	*Chapter 8 of the ES* determined that any long-term changes to currents as a result of the proposed scheme to be of **minor** (in the near-field) to **negligible** (in the far-field) **significance** due to the small increases in current speed of up to 0.1m/s, as such changes in water quality would also be minor to negligible.
WQ10	NRW	There is no assessment of pollution risk, during commissioning and operation, within the marine water quality chapter. ES Page 176 - There is no mention of pollution risk during commissioning or operation of the reclaimed harbour area. These should be included in this section, along with potential impacts, to make an assessment of marine water quality.	Page 10 of Chapter 9 of the ES states the following: The Port has an Oil Spill Contingency Plan (Stena Line Ports Ltd, 2017) which will be followed in times of a pollution event. As sufficient measures are in place to respond to a pollution event during the construction and operation of the proposed scheme, the risk of a significant effect is low. Given the control measures to be put in place this is not considered further in this section.
WQ11	NRW	With respect to modelling, there is no assessment of the impact of using 2D modelling at the disposal site to provide evidence on spatial area of elevated SSC and deposition of material.	The model of the disposal activities has now been re-run in 3D (see **Section 3.2.3**). Results are discussed in **Sections 2.3.1** and **2.3.2**.
WQ12	NRW	There is no mention of dewatering impacts on the marine environment	The reclamation areas would be reclaimed as the quay walls are being constructed. As such, the areas remain connected to the sea and there would be no requirement to de-water. Given the

Ref	Stakeholder	Comments received	Response
			dredged material that was going to be used included a lot of fines, this was included in the sediment plume dispersion modelling presented in the ES. However, as material will now be imported, this has greatly reduced the volume of fines that would be released into the water (see **Section 3.2.3.2**).
WQ13	NRW	ES Page 35 - There is no mention of foul water drainage for cruise ships. Do we assume that this service will not be provided by the Port?	Foul water services for the cruise ships is not currently provided by the port and would not be provided as part of the proposed scheme.
WQ14	NRW	ES Page 44 - Please note that the 2010 Directions have been superseded by "The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015". These provide updated Annual Average and Maximum Allowable Concentration values compared with the 2010 Directive.	Comment has been noted.
WQ15	NRW	ES Pages 162-165 - While sediment samples only marginally exceed CEFAS action level (AL) 1 in some instances, we note there are multiple marginal exceedances across various determinants and question the in-combination impact of this. However, we note that CEFAS have advised they agree with the minor adverse significance on water quality for disposal at the disposal site. Does this comment also apply to the reclaim area where "during the reclamation process sediments released through dewatering process may contain contaminates" (Appendix L pg 5/12)?	Yes. Please refer to the *WFD Compliance Assessment of the ES (Chapter 25)*. The assessment of potential effects arising from dredging and reclamation activities concluded that the potential impact on water quality during land reclamation (i.e. dewatering) and dredge activities through release of contaminants would not have a significant adverse effect on water quality. Due to the change in construction methodology, where all of the reclamation material will be imported marine aggregate, there is no longer any risk from the release of contaminates during reclamation.
WQ16	NRW	ES Page 170 - Holyhead Bay: Trichlorobenzene is missing from the list of failing chemicals. See the 2018 interim classification on Water Watch Wales.	Comment has been noted.
WQ17	NRW	ES Pages 170-171 - While Turbidity has been measured and equivalent SSC described, no methodology has been described, either in this chapter or the appendices, as to the conversion.	See **Appendix D** of this ES Addendum.
WQ18	NRW	ES Page 171 - The designated waterbody of Beddmanarch Bay is highlighted within the text and the reader directed to Chapter 10 (C10) and figure 10.1. Note that Fig 10.1 shows Pelham patch. Further searching within the document shows that Beddmanarch Bay is accounted for in C11 and fig 11.2.	Comment has been noted.
WQ19	NRW	ES Pages 188 (C10) and 206 (C11) - Note that deposition calculations, for both C10 and C11, should be completed using the total build time, not simply the 3 month model run.	The sediment plume dispersion model has been re-run for the entire dredge and disposal activities, now anticipated to last

Ref	Stakeholder	Comments received	Response
			approximately 15 weeks. Total build time has therefore now been used to determine total sediment deposition.
WQ20	NRW	ES Page 188 - The text in 10.6.3 para 3 suggests that a continuous load is being added to the model to represent dredging. It is understood that dredge schedules have been included in the sediment modelling (appendix C3) and therefore this has been taken into account. Clarification is sought.	It is confirmed that sediment release according to the dredging schedule is built into the sediment plume dispersion model.
WQ.21	NRW	ES Page 189 - Given that the disposal site model is only 2D, NRW cannot agree the accuracy of the size of the impacted site or depth of sediment.	The sediment plume dispersion modelling has been repeated and the 3D model has been extended to include the disposal site. Predicted changes in bed level at the disposal site are described in **Section 3.3.1.2**.
WQ22	NRW	ES Page 596 - While maintenance dredging is mentioned under water quality, there is no assessment of the long term impacts of changes to water quality as a result of altered currents.	*Chapter 8 of the ES* determined that any long-term changes to currents as a result of the proposed scheme to be of **minor** (in the near-field) to **negligible** (in the far-field) **significance** due to the small increases in current speed of up to 0.1m/s, as such changes in water quality would also be minor to negligible.
WQ23	NRW	Appendix D1 Page 12 - Referring to the comment “Sediment sampling for suspended sediment post mooring deployment calibrations” on this page, are NRW to understand that in-situ SSC was collected once the moorings had been recovered and therefore has not been used to calibrate the turbidity sensor? Yet the information of page 35 suggests that in-situ samples were used in calibration. Clarification is sought.	See **Appendix D** of this ES Addendum.
WQ24	NRW	Appendix D1 Page 35 - Information for calibration of turbidity to SSC is said, in Appendix D1, to be located within Appendix B.8. Clicking the link provided, takes the reader to Appendix B.8 Aquadopp compass calibration. Scrolling to B.10 we find the title Suspended sediment conversion methodology and the text “to be delivered with final report”. The same comment is made for Appendix D.4 Turbidity SSC “To be delivered with the final report”.	See **Appendix D** of this ES Addendum
WQ25	NRW	Appendix C3 Page 11 - The sediment has been uniformly distributed in the water column at the Harbour and the disposal site. What impact does this have on the deposition and plume calculations when, in reality, sediment is released at the surface?	*Page 11 of Appendix C3 of the ES* states the following: To simulate the sediment release in the 3D sediment dispersion model the material released by the barge at the offshore disposal site and at the two landfill locations was spilled near the water surface.
WQ26	NRW	Appendix C3 Page 12 - It would be useful to understand the background SSC level to compare against the case presented. This is not presented. However,	See **Appendix D** of this ES Addendum

Ref	Stakeholder	Comments received	Response
		NRW note that background SSC is described in the main ES, though how this has been obtained has not yet been verified.	
WQ27	NRW	Appendices C2 (hydro modelling report) Page 7 and C3 Pages 12 -16 - Whilst it appears the Holyhead Harbour area has been modelled in 3D, the disposal site has not, for what is a 3D process. What impact will this have on the disposal site results?	The sediment plume dispersion modelling has been repeated and the 3D model has been extended to include the disposal site. Model set up and findings can be seen in **Section 3.2.3**, **3.3.1** and **3.3.2**.
WQ28	NRW	Appendix L - The applicant has not assessed the long-term impacts on water transparency as a result of altered currents within the Waterbody.	*Chapter 8 of the ES* determined that any long-term changes to currents as a result of the proposed scheme to be of **minor** (in the near-field) to **negligible** (in the far-field) **significance** due to the small increases in current speed of up to 0.1m/s, as such changes in water quality would also be minor to negligible.

4.3.2 Time Series Plots

Time series plots have been produced to illustrate the dissipation of SSC following the cessation of dredging and disposal activities. These are presented below in **Figure 4-9** to **Figure 4-11** and show that within the harbour SSC concentrations dissipate to within background levels within 30 minutes of dredging ceasing. At the disposal site SSC moves to the south of the disposal site over the time period while dissipating to within background levels 150 minutes following disposal.

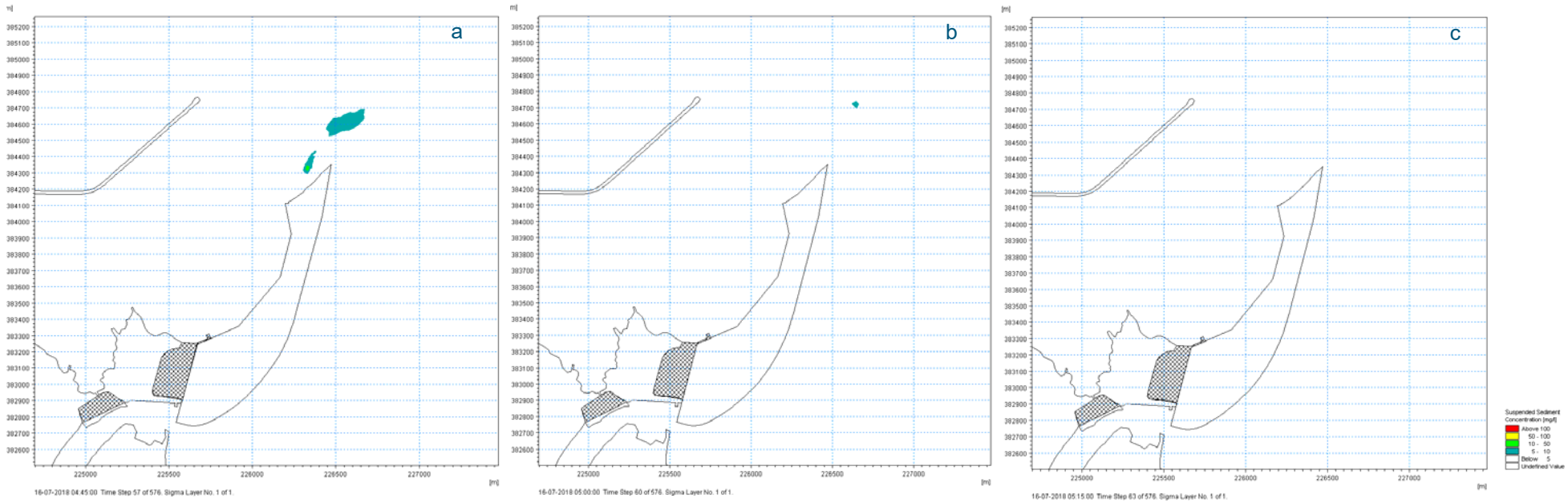

Figure 4-9 Time series plots showing the dissipation of SSC in the mid-layer within Holyhead Harbour once dredging has ceased (a), 15 mins after last release (b) and 30 minutes after last release (c)

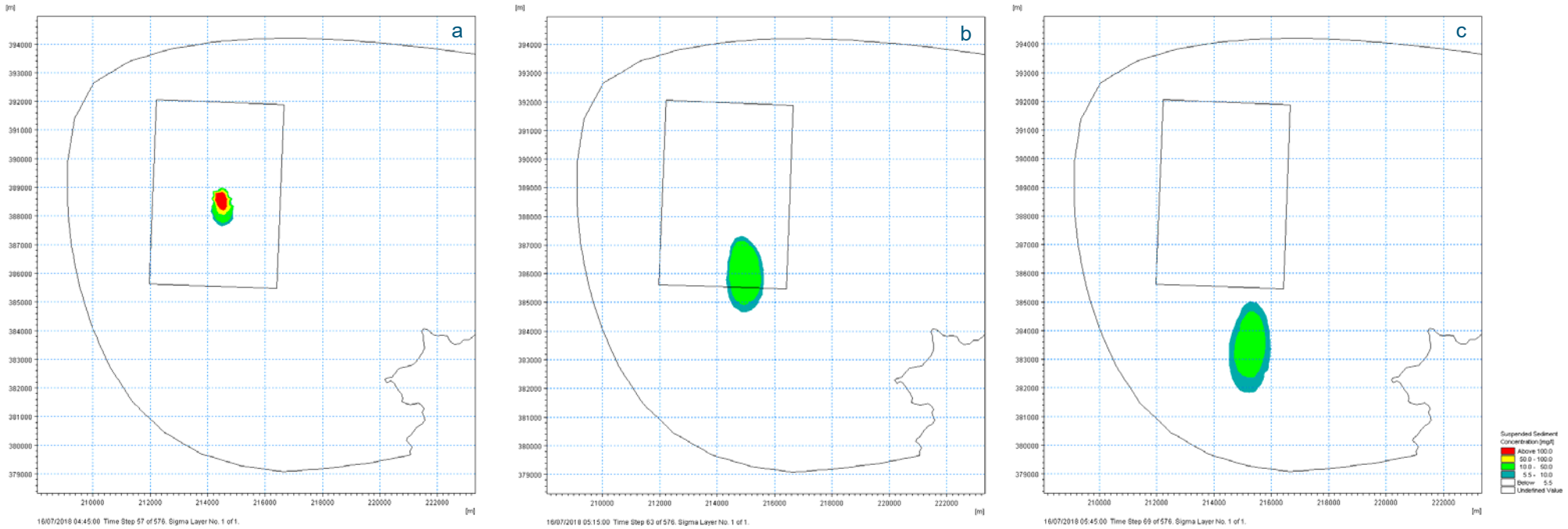

Figure 4-10 Time series plots showing the dissipation of SSC in the mid-layer within Holyhead North once dredging has ceased (a), 30 mins after last release (b) and 60 minutes after last release (c).

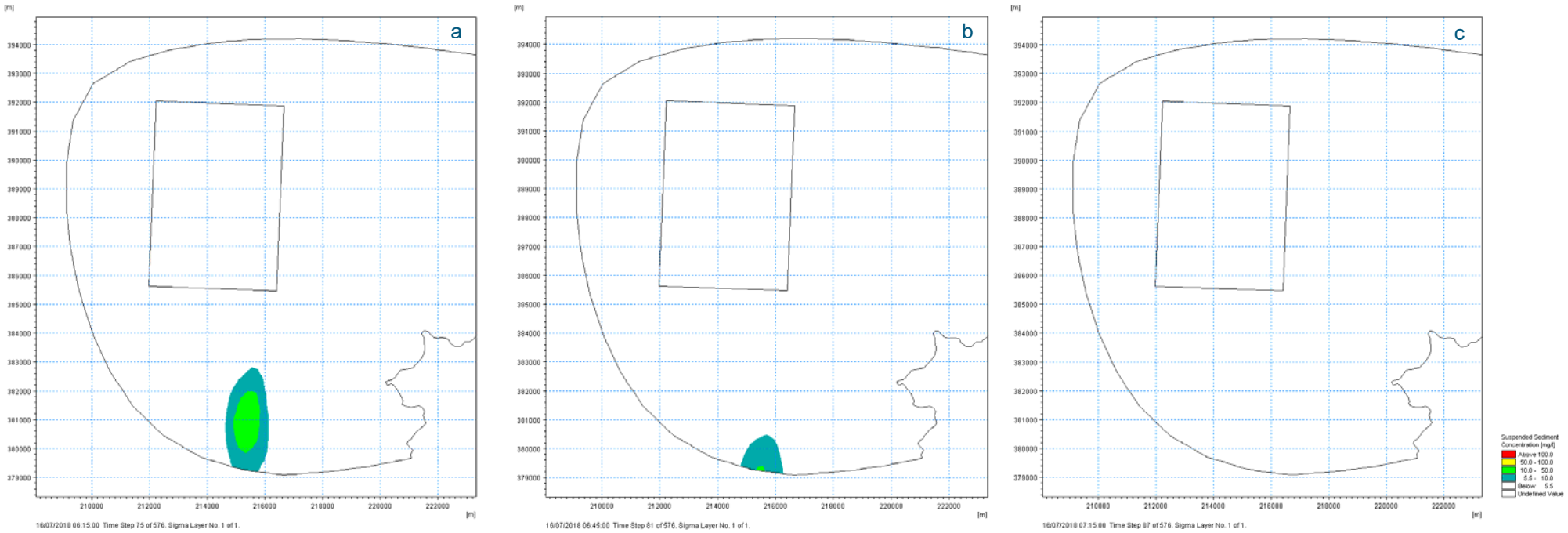

Figure 4-11 Time series plots showing the dissipation of SSC in the mid-layer within Holyhead North 90 minutes after last release (a), 120 mins after last release (b) and 150 minutes after last release (c).

4.4 Marine and Coastal Ecology

4.4.1 Response to Stakeholder Comments

Table 4-7 presents the responses to each of the Marine and Coastal Ecology stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-7 Responses to Marine and Coastal Ecology comments.

Ref	Stakeholder	Comments Received	Response
MCE1	IoACC	Marine Ecology: Figures 10.1 10.2; Tables 10.2 and 10.3; also Table 27.1 at end of report The loss of habitats within the footprint areas to be reclaimed is deemed in the report to be of minor significance with no mitigation suggested. Habitat loss means there would be an overall loss of biodiversity associated with the proposal and, rather than nothing, the IoACC would advise some kind of proportional mitigation should be implemented to benefit a range of marine/shore habitats and species. This could be elsewhere around Ynys Cybi and/or Anglesey. One or more choices for such mitigation should be suggested and an appropriate scheme should be agreed.	Comment is noted. It is proposed that this would be agreed prior to construction.
MCE2	NRW	Page 192 and 195. With regards to Didemnum vexillum: Has a Biosecurity Risk Assessment been completed in addition to the port biosecurity plan? This was requested at the scoping stage (See Appendix I, pages 11&33).	Not at this stage. It is proposed that the construction Biosecurity Risk Assessment would be produced by the chosen contractor and therefore this should be a condition of the licence. Stena Line's Biosecurity Plan would be updated to include the operation of the proposed scheme.
MCE3	NRW	Page 192 and 195. “Probability of construction activities contributing to the spread of D. vexillum is very low” In the sentence above the risk of it spreading to the Port is “Low”, if this were to happen then the risk to the marine habitats would be high and therefore the probability would end up also being “Low”. Has a Biosecurity Risk Assessment been completed in addition to the port biosecurity plan? This was requested at the scoping stage (See Appendix I, pages 11&33).	
MCE4	NRW	Page 192. It is not clear if the applicant is planning to consider maintenance dredging as part of this application? NRW considers that maintenance dredging should be considered in the current application as the recovery of habitats in the channel is dependent upon the maintenance dredging routine.	A prediction of future maintenance dredge requirements has been completed using information on past maintenance dredging activities carried out at the port over the last 10 years in conjunction with the modelling results presented within the ES. An extrapolation of the port data using expert geomorphological assessment has been used to inform the likely maintenance

Ref	Stakeholder	Comments Received	Response
			dredge requirements of the new approach channel. The results of this assessment are presented in **Section 4.2.2**. It has been predicted that dredging of the approach channel would be required approximately every five years. Given that the dredged area is considered to be recolonised rapidly (see **Section 3.3.3.2**), this provides sufficient recovery time between dredging campaigns.
MCE5	NRW	Page 191. There are areas of Annex I and Section 7 habitat within the Holyhead North disposal site. The disposal site is a dispersive site for fine sediment but is not designated for rock disposal. We advise that pre-disposal surveys should be undertaken in order to microsite specific disposal locations within the site.	A pre-disposal survey has now been included as a mitigation measure to avoid impacting upon Annex I and Section 7 habitats within the Holyhead North disposal site, see **Section 3.3.3.2**.
MCE6	NRW	Page 191. “the footprint of this is considered to be low in comparison to the total area affected by the deposition of sediment” it is still however a significant volume of rock (141,690m^3), which is predicted to cover a large area (8km^2). There are areas of Annex I biogenic reef within the Holyhead North disposal site. The disposal site is a dispersive site for fine sediment but is not designated for rock disposal. We advise that pre-disposal surveys should be undertaken in order to microsite specific disposal locations within the site. This is to ensure that reef communities present within the area are avoided where possible. The detailed mitigation will need to include pre-commencement benthic surveys (pre-disposal) to be undertaken within 1 year of disposal taking place. This is to identify the extent of any benthic habitats of conservation importance and enable micro-siting of rock disposal to minimise impacts on these. N.B. It may be possible to use the similar surveys from Wylfa Newydd to determine if this micro-siting is possible with the stated volume of rock. Page 191. “As Sabellariidae reef, if present within the sediment disposal footprint, would not represent an isolated feature in the wider region, it anticipated that the short to medium term loss of this habitat would not have a noticeable effect on the integrity of this receptor.” Sabellaria (Annex I biogenic reef) is known to be present in the disposal area - see comment above.	
MCE7	NRW	Page 195. Table 10.6. Smothering of benthic habitats and species at the disposal site is “Minor” – as per the comments above, Sabellaria is present and NRW does consider loss of this Annex I biogenic reef to be “minor”.	

Ref	Stakeholder	Comments Received	Response
MCE8	NRW	Page 182. NRW uphold previous comments that the area adjacent to the dredge channel has not been adequately characterised (See Appendix I, page 51).	An updated assessment on potential impact of smothering habitats and species as a result of sediment deposition is presented in **Section 3.3.3.1**, which takes account of the repeated sediment plume dispersion modelling. This has been compared to MarLIN/MarESA benchmark levels to for the habitats identified. Based on previous survey data, the species predicted to be present in the adjacent areas are also burrowing bivalves and polychaete species, typical of mixed mobile sediments and of low sensitivity to smothering. The presence of *Arctica islandica* would only be of concern within the direct impact area as it would be sensitive to physical impacts from the dredging activity but not to smothering as it often burrows into sediments for days at a time, respiring anaerobically. Consequently, habitats and species adjacent to the dredge area are not considered vulnerable smothering. In NRW's email, dated the 1st April 2020, Ben Wray, Specialist Marine Ecology Advisor, agreed that most of the habitats and species likely present in the area will be resilient to smothering (**Appendix C2**).
MCE9	NRW	Page 182. Did any grab samples get taken adjacent to the dredge area? This area is also vulnerable to sedimentation during dredging and we believe this was originally requested in the survey scope (See Appendix I, page 51). There is no evidence that our previous comment (K. Robinson, August 2017) on defining primary and secondary impact zones for the dredging activity was taken on board. This is particularly relevant considering Arctica islandica present in the area and this needs clarification.	
MCE10	NRW	It should be noted that HABMAP data is only predictive and shouldn't be relied upon in the absence of survey data. The confidence level associated with the HABMAP prediction is "low" and this should be discussed. This reinforces the request for species/habitat characterisation outside the immediate dredge footprint.	
MCE11	NRW	Page 188-189. "Dredging and reclamation activities would occur over the short to medium-term and smothering of biotopes outside the dredge footprint is considered to be reversible through the resilience of the species present and the remobilisation and redistribution of sediment. As such the magnitude of this potential impact is considered to be low. Therefore, an impact of negligible significance is predicted". If surveys have not occurred in the areas adjacent to the dredge channel, then the species are unknown and this assessment is not backed up by evidence.	
MCE12	NRW	Other comments: Page 179, Paragraph 1: In relation to D. vexillum: "Targeted surveys to identify this species within the proposed scheme area and the wider port infrastructure were undertaken and are described below in Section 10.5.4." This section (10.5.4) does not seem to exist, perhaps this should be 10.5.3?.	Agreed, this should be referenced to Section 10.5.3, the last paragraph on Page 184 of the ES.
MCE13	NRW	Page 187, "Subtidal habitat surveys within these areas indicate that, as with the intertidal zones, the biotopes present are typical of the local area and the coastal habitats of North Wales and as such are considered to be of local, or low value". Here it should be noted that there are nationally important Section 7 Mudflat habitats present within the impacted area.	See Section 4.4.2.

Ref	Stakeholder	Comments Received	Response
MCE14	NRW	Page 188, With regard to the Section 7 species *A. islandica* "these individuals can potentially be substituted or replaced and are therefore considered to be of low sensitivity". Is this referring to natural substitution/replacement or otherwise? More detail on this is required in order to denote 'low sensitivity'. It should be noted that this species is noted as being particularity sensitive to dredging (Ragnarsson et al. (2005)).	This assessment is based on natural substitution, as, given their reported abundance in the area (MarLIN and NBN Gateway) it is likely that larval recruitment is successful and replacement of any individuals that may be lost during the dredge is considered to be likely. Further assessment is presented in **Section 4.4.2**.
MCE15	NRW	Aside from *Arctica islandica* there is no mention of Section 7 Species and Habitats in the potentially impacted areas. These should be highlighted and discussed as they are in the other chapters.	See Section 4.4.2.
MCE16	NRW	Page 193. 10.7.3. Whilst we agree with the logic of this section, it would merit further discussion (or a close examination of the modelling) as a change in sedimentation regime could lead to increased deposition on the intertidal area. It should be noted that in this area there are Section 7 Intertidal mudflats present in the potential area of influence, and the impact on these should be discussed.	See response to comment CP7 in **Section 4.2** and figures provided in **Section 3.3.1.1**). The deposition plots show that deposition, as a result of dredging is not predicted to affect intertidal areas. *Section 8.8.3 of the ES* also concluded that changes to sediment transport and erosion/accretion patterns due to the presence of the approach channel and land claims are negligible, with any change resulting in increased accretion within the approach channel.
MCE17	NRW	Page 192. Section 10.6.6. "In addition, the sediment to be disposed of consist largely of firm clay, soft clay and rock, further minimising the potential for contaminants to be present." Whilst hard clay and rock may minimise potential for contaminants this is not the case for soft clay, which should be noted.	The changes to the proposed scheme means that all of the dredged material would be deposited at the offshore disposal site; however, contaminant levels within the dredged sediment is considered suitable for offshore disposal. This has been confirmed by Cefas.
MCE18	NRW	Page 583. The cumulative impacts chapter is welcomed, however the section on marine ecology is very brief and should be expanded to include impacts other than those solely associated with disposal activities. "The habitats within the disposal site are considered to be common throughout the subtidal environment of North Wales". Whilst this may be true this would result in loss of Annex I biogenic reef. It should also be noted that the final decision on Wylfa Newydd is still to be announced and therefore this should be considered here along with other developments such as Morlais MDZ and Minesto.	Hitachi officially announced they are withdrawing from the Wylfa Newydd project on the 16th September 2020 and as such this project is considered to no longer have the potential be developed, or if it does, the construction works would not overlap with the proposed scheme and cumulative impacts would not occur. As such, it has not been included in the CIA. **Section 4.13** provides a cumulative assessment with the Morlais project.
MCE19	NRW	As detailed sedimentation modelling has occurred, it would be a worthy addition to determine the area loss of the biotopes in the area due to smothering where deposition rates are greater than 5cm. As there is low confidence in these biotopes from HABMAP, this further highlights the request	**Section 3.3.1.1** presents and updated assessment of deposition and smothering on adjacent habitats and species. Given that dredged sediment would no longer be used in the reclamations,

Ref	Stakeholder	Comments Received	Response
		for more detailed habitat characterisation of the area outside the immediate footprint. Further from the above comment, the deposition rates expected on the Kelp bed/biotope should be discussed, and what proportion of this habitat would be lost. It should also be noted that the Kelp has a 'high' intolerance to smothering (White and Marshall, 2007).	the release of fines into the marine environment has been greatly reduced. See response to comment WFD7 regarding the potential loss of kelp habitat.

4.4.2 Direct effects on Section 7 habitats and species

4.4.2.1 Direct effects on *Arctica islandica*

In *Section 10.6.2 of the ES* it was identified that *A. islandica* was considered to be of low sensitivity to dredging. An assignment of sensitivity should consider its sensitivity to an impact in combination with local information of the species which would inform its recoverability. As stated in the ES, records of *A. islandica* held on the NBN Gateway show that this species is present in relatively high numbers along the north-west coast of Wales, with 117 records around the coast of Anglesey and 10 records of the species within Holyhead Bay itself. The species spawns over a protracted period, peaking in late summer and autumn. In addition, it has long-lived planktonic larvae (Tyler-Walters and Sabatini, 2017) and therefore has the potential for widespread dispersal throughout the Irish Sea and the Atlantic. Due to the density of individuals in the area, larval recruitment is likely to be high and therefore recoverability is also considered to be high. As such, although the species is identified as being sensitive to direct impacts of dredging, its recoverability from a direct impact in this case is considered to be high and therefore supports the '**low'** sensitivity assigned within the ES and subsequent impact of **minor adverse significance**.

4.4.2.2 Direct effects on Section 7 mud habitats

The marine ecology survey undertaken to inform the ES identified intertidal and subtidal mixed sediment habitats throughout the reclamation areas and the footprint of the capital dredge. An assignment of sensitivity should consider local information and data on the abundance of habitats as well as their national or international importance. The reclamation areas would result in the loss of 0.01km^2 of intertidal habitat; however, the majority of which is assigned as artificial littoral rock biotope. The intertidal sediment was identified as either "*Aphelochaeta marioni* and *Tubificoides* spp. in variable salinity infralittoral mud" (SS.SMu.SMuVS.AphTubi) or "*Melinna palmata* with *Magelona* spp. and *Thyasira* spp. in infralittoral sandy mud" (SS.SMu.ISaMu.MelMagThy) and is therefore not considered to be a representation of the Section 7 intertidal mudflat habitat. The loss of the artificial littoral rock habitat would be offset by the creation of a rock revetment along the north wave wall of the Salt Island Expansion.

The loss of subtidal sediments within the reclamation and the capital dredge areas represents a loss of 0.52km^2 of subtidal muddy sand or slightly mixed sediment. The uniformity of the subtidal habitats identified (18 of the 27 samples taken were assigned the biotope *Abra alba* and *Nucula nitidosa* in circa-littoral muddy sand or slightly mixed sediment (SS.SSa.CMuSa.AalbNuc)) suggest that this biotope is abundant throughout Holyhead Bay. This correlates with the HABMAP data for Holyhead Bay.

The proposed approach channel dredge would involve dredging of some rock in order to achieve the required dredge depth. This is considered to represent a permanent loss of habitat as the substrate would be changed to rock from the overlying sediment. The area of rock to be dredged is approximately 68,000m^2, which represents 1.2% of the area of subtidal sediment within Holyhead Bay (calculated to be 5.8km^2 of the area of the Holyhead Bay coastal water body (11.71km^2) and used here to accurately reflect the area of Holyhead Bay). However, there would be sedimentation between maintenance dredge campaigns (assumed to be every five years, see **Section 4.2.2**). The prevalence of one subtidal sediment biotope (*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment) within Holyhead Bay (**Figure 3-12**) means that as sediment accumulates within the approach channel, the species present would be able to recolonise this area. The bivalves and polychaete worms, which are characteristic of this biotope, typically have an 'r' type life-cycle strategy, characteristics of which are high fecundity and rapid development, that allow rapid exploitation of available habitat (Tillin and Budd, 2016).

The remainder of the approach channel area would remain as subtidal soft sediment, as sediment from within Holyhead Bay would settle in the area that, as discussed above, can be recolonised to an extent by

the fauna in the surrounding soft sediment habitats. is therefore considered that this will result in a change to a disturbed habitat capable of rapid recolonisation, rather than permanent loss of habitat. The habitats present are considered to be of national or **medium** value, but as they are abundant within Holyhead Bay and capable of rapid recolonisation they are considered to be of **low** sensitivity. Consequently, as concluded within the ES, the capital dredge would result in an impact of **minor adverse significance** to the subtidal benthic habitats.

4.5 Fish and Shellfish Resources

4.5.1 Response to Stakeholder comments

Table 4-8 sets out the responses to each of the Fish and Shellfish Resources stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-8 Responses to Fish and Shellfish Resources comments.

Ref	Stakeholder	Comments received	Response
FSR1	Cefas	In Section 11.6.2 and 11.6.3 it should be noted that increases in suspended sediment concentrations may lead to a higher risk of the pathogen E.coli for nearby shellfish beds as this pathogen is known to survive for longer periods when attached to suspended particulate than when free-floating within the water column. This therefore has the potential to affect any classification of harvesting areas. Given that the plume is not modelled to reach the nearby mussel beds, the likelihood of this occurrence is low, however due consideration should be made within the ES for this potential impact (including the planned oyster/clam/mussel area).	See Section 4.5.2.
FSR2	Cefas	In Section 11.6.5 of the ES I would expect to see reference to the vulnerability of berried female edible crab (*Cancer pagurus*) to smothering due to their largely sedentary overwintering stage whilst brooding eggs. During this stage they are known to recess into the sediment and remain effectively sessile; they are therefore less able to move away from disturbed areas. During this time, they may also suffer population losses through inadvertent removal during dredging.	See Section 4.5.3.
FSR3	Cefas	The ES includes most of the expected information for fish and commercial fisheries, though the descriptions are brief and some of the assessments are not supported by references, literature or data evidence. No site-specific fish surveys have been undertaken.	*Table 11.2 of the ES* provides a list of the data sources used for the assessment.
FSR4	Cefas	The potential entrainment of fish (both egg and larval as well as adult stages) during dredging operations has not been considered or acknowledged in the ES. Early life stages and smaller bodied fish species may be vulnerable to entrainment by dredging and this has not been specifically considered in the ES assessment. In my opinion the impact level is likely to be low.	See Section 4.5.4.
FSR5	Cefas	Underwater noise from dredging vessels could potentially cause masking and temporary threshold shift (TTS, i.e. temporary hearing loss) to fish receptors (Popper *et al*., 2014; Wenger *et al*., 2017).	The assessment represents a worst-case scenario of multiple sources of underwater noise. Impact ranges for TTS and PTS are provided in *Table 11.7 of the ES*. Impacts of minor adverse and negligible were predicted.

Ref	Stakeholder	Comments received	Response
FSR6	Cefas	In my opinion the impact piling underwater noise modelling may not be representative of the piles and associated piling energy which will be potentially installed for the project. Section 3.1.3.1 of Appendix F states that the impact piling source level chosen for the modelling was an IHC S-280 hammer operating at 280 kJ driving a 610 mm, however the ES defines that the applicant is anticipating 900, 1270 and 1829 mm diameter tubular steel piles (walls and reclamation). I recognise that 600 mm sheet piles will also be installed, and the modelling may be more characteristic for these. I recommend that the applicant clarify and justify the representativeness of the modelling for the ES proposed project pile design.	See the response to comment MM4 (Table 4-9).
FSR7	Cefas	It is my understanding that it has been estimated 10.5 hours of drill piling and 3 hours of impact piling are required to install 1 steel tubular and 3 sheet piles per day (12-hour working day). I am in agreement with my colleague from the Noise and Bioacoustics team that the cumulative exposure scenario should reflect the number of piles to be installed per day and that the Marine Licence should include this.	See the response to comment MM5 (Table 4-9).
FSR8	Cefas	Potentially there are fish spawning in the vicinity of the project (as illustrated by ichthyoplankton and egg production surveys; paragraph 22). Bolle *et al*. (2016) highlights that information is lacking with regard to the sound levels at which mortality or injury will occur is limited for juvenile and adult fish and virtually non-existent for fish eggs and larvae. As planktonic larvae are passively transported by currents, they have limited capabilities of avoiding sound exposure and as a result, fish larvae may suffer more from underwater sound than older life stages. Research to date has mainly focused on injury and mortality assessments, whereas sound exposure may also affect physiology or behaviour and hence predation and starvation risks. Potential noise impacts on developing eggs and larvae needs to be considered and therefore I would recommend that the assessment includes consideration of potential noise impacts to fish egg and larval stages. This should be based on the Popper criteria mortality and potential mortal injury threshold of >210 dB SELcum dB re 1 µPa2·s or >207 dB peak dB re 1 µPa. As acknowledged in the ES, sandeels spawn on the seabed and therefore their demersal eggs may be subjected to any underwater noise generated in their proximity.	See Section 4.5.5.
FSR9	Cefas	The scientific name for small-spotted catshark or lesser-spotted dogfish should be *Scyliorhinus canicula* instead of *S. canicular*,	Comment is noted.
FSR10	Welsh Government Fisheries	The Breakwater is popular with recreational anglers for its species diversity. Increased turbidity caused by dredging may extend as far as the breakwater and could impact on recreational angling as could underwater noise.	See Section 4.5.6.

4.5.2 SSC and classified bivalve harvest areas

The updated sediment plume dispersion modelling (see **Section 3.2.3**) predicts that an SSC excess of 100mg/l or more would be restricted to the general area of the capital dredge footprint, and that at a distance of approximately 500m east from the dredge footprint the SSC excess is reduced to negligible levels (i.e. less than 10 mg/l). For context, the bivalve mollusc production area at Gorsedd y Penrhyn (which, according to the 2020-21 Food Standards Agency classification list, is not currently commercially active) and the planned oyster/clam/mussel lay presented in *Figure 13.8* (*Section 13.5.5) of the ES* are each located over 1.5km east of the dredge footprint (thereby ~1km from the modelled plume).

Whilst acknowledging the comment from Cefas that disturbance of sediment increases the risk of sediment-bound coliforms (and any other contaminants) being transported in the marine area, it should be noted that the distance of the bivalve sites from the modelled plume means that the risk of any effects are negligible, and any consequent impacts on potential human health would not be anticipated.

4.5.3 Edible crab

There is the potential that capital dredging may be undertaken during the edible crab reproductive season (November to February), when berried females are less mobile. The MarLIN sensitivity assessment for this species indicates that it has very low sensitivity to smothering and very high recoverability (Neal and Wilson, 2008), though berried females, which are less likely to be able to move away from areas of siltation, are likely to have an increased sensitivity.

As dredged sediment would no longer be used to reclaim the two areas, the volume of silt released into the marine environment would be far less than that considered by the ES, see **Sections 3.3.1** and **3.3.2**. Where sediment is predicted to be deposited outside of the proposed dredge footprint, this is predicted to be less than 10cm (see **Figure 3-1**). As described in *Sections 10.5.1 and 10.5.2 of the ES*, the uniformity of the subtidal habitats identified during the benthic surveys and the output of the HABMAP predictive model (Robinson *et al.*, 2011) indicates that soft-sediment biotope is abundant throughout Holyhead Bay. As such, when set in the context of the overall area of potential habitat available for berried crabs in Holyhead Bay (i.e. excavated pits in soft sediment or under rocks), the area affected by increased sediment deposition would represent a very small proportion. The limited and low levels of predicted smothering outside of the dredge footprint supports the conclusion in the ES that the impact on shellfish species is likely to be of **negligible significance**.

It is recognised that removal of substrate during the capital dredging could lead to the loss of edible crabs within the footprint of the dredge. While the MarLIN sensitivity assessment (Neal and Wilson, 2008) indicates that edible crabs have moderate sensitivity (yet moderate recoverability) to substratum loss, it is acknowledged that berried female crabs would be less likely to escape during capital dredging operations and would be of high sensitivity.

However, as discussed above, the evidence provided in the ES indicates that suitable habitat for breeding edible crabs (i.e. soft sediment and/or rock) is abundant throughout Holyhead Bay, and in the context of the overall habitat availability (which can be considered a proxy for the distribution of berried edible crabs in Holyhead bay), the magnitude of the loss of substratum within the footprint of the capital dredge is considered to be low. Using the assessment methodology outlined in *Section 5.5.6 of the ES*, the direct impact of capital dredging on berried female edible crabs (if undertaken during the period November to February) is expected to be of **minor adverse significance**.

4.5.4 Entrainment of fish and fish eggs

Use of dredging apparatus during capital dredging could potentially lead to the entrainment of fish/shellfish and fish eggs. Potential effects from direct uptake during dredging include physical injury, mortality and displacement. Demersal species, which are more likely to be affected than pelagic or semi-pelagic species, are likely to be present within the dredge footprint.

Physical and noise/visual disturbance within close proximity to the dredging activity would likely result in an avoidance reaction by mobile individuals (i.e. adult and juvenile fish, crustaceans), with temporary relocation away from the immediate area, thereby avoiding direct uptake. Given their ability to relocate away from the source of entrainment, adult/juvenile finfish and mobile shellfish likely to be present in the area are considered to have low sensitivity to such impacts. Eggs and larvae, with less mobility than adults, would have a higher sensitivity.

Given that the defined spawning areas are delineated at a resolution of half an ICES rectangle (Ellis *et al.*, 2010), the overall defined extent of spawning areas is generally very large. As such, localised effects on fish eggs would be of low magnitude when considered in the context of the wider populations. The potential impact is therefore predicted to be of **negligible significance**.

4.5.5 Potential impacts of noise on larvae and juveniles

According to the assessment sensitivity criteria set out by Popper *et al.* (2014), the mortality and potential mortal injury threshold for larvae and eggs of >210 dB SELcum dB re 1 µPa2·s or >207 dB peak dB re 1 µPa is the same as that for adult fish with a swim bladder that is not involved in hearing. As indicated in *Table 11.7 in the ES*, the extent to which this threshold may be exceeded during impact piling has been modelled to a very small range of 20m or less from the source of the noise. While it is acknowledged that larvae and eggs may be more sensitive than adult fish, given that they have limited mobility and are less capable of moving away from noise sources, the very small range to which serious injury may occur means that, in the context of larvae and egg abundance within Holyhead Bay, any impacts would be of **minor adverse significance**, as per the conclusion in *Section 11.6.1 of the ES*.

4.5.6 Potential impacts on recreational angling at Holyhead Breakwater

Whilst it is acknowledged that the Holyhead Breakwater is used by recreational anglers who fish on both the leeward and seaward side of the breakwater, the updated sediment plume dispersion modelling (see **Section 3.2.3**) predicts that the suspended sediment plume would only just extend to the leeward side of the breakwater structure and, if it does, SSCs would be less than of 100 mg/l (as shown in **Figure 3-5** to **Figure 3-8**) and last only 30mins following cessation of the dredging (see **Section 3.2.7**). The model predicts no increase in suspended sediment at the seaward side of the breakwater. Deposition of sediment is not predicted to reach the breakwater (see **Figure 3-1**). Such changes in SSC and deposition would not be anticipated to have any significant effect on fish sheltering at the leeward side of the structure that may be targeted by anglers.

Section 11.6.1 of the ES predicted that there would be a minor adverse impact from construction noise on fish with swim bladders and negligible impact on those without. While there may be temporary behavioural effects on fish during noisy activities, this would be periodic during the construction phase and there would be no long-term impacts from noise that could affect recreational angling at the breakwater.

4.6 Marine Mammals

4.6.1 Response to Stakeholder comments

Table 4-9 sets out the responses to each of the Marine Mammals stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-9 Responses to Marine Mammal comments.

Ref	Stakeholder	Comments received	Response
MM1	Cefas	To the best of my knowledge, the description of the environment and potential impacts are accurate. The marine mammal species considered in the assessment are harbour porpoise, bottlenose dolphin, common dolphin, Risso's dolphin, minke whale and grey seal.	Comment is noted.
MM2	Cefas	Underwater noise has been appropriately identified as a potential effect on marine mammals and fish during the construction phase (specifically auditory injury and possible behavioural impacts from noise during piling, dredging and from multiple sources).	Comment is noted.
MM3	Cefas	The assessment focuses on impulsive and non-impulsive sources, and it is appropriate that the estimated source levels for each activity are provided. The source levels for impact piling are provided as a SPLpeak and SELss value. For continuous sources (peckering, dredging and drill piling), the source levels are provided as RMS values. Table 3-5 (Appendix F) later shows the adjusted weighted source levels to account for the marine mammal weightings; they are provided as SEL values (which is consistent with the noise exposure criteria).	Comment is noted.
MM4	Cefas	Section 3.1.3 of Appendix F states that the source chosen for impact piling is an IHC S-280 hammer operating at 280 kJ driving a 610 mm pile. However, I note from the main ES that larger piles are anticipated to be installed (see Table 3.1 in the ES). Therefore, it is not clear how this is representative of the piles (and potentially hammer energy). This should be clarified.	Due to the substrate present it is anticipated that the piles will be drilled into place; however, there may be a requirement for the piles to be 'tapped' through the layer of soft surface substrate before drilling can commence. This activity would not require full power percussive piling, so to best represent this methodology, a smaller pile size was included within the modelling. The hammer energy, rather than the pile size, is the primary consideration for noise emission.
MM5	Cefas	When calculating the SELcum impacts, the following is assumed (note, it has been estimated that each pile would require approximately 10.5 hours of drilling and 3 hours of piling per day): • Impact piling over a 3-hour period, operating without a soft-start	The assessment considers the cumulative impact of 'tapping' a pile over three hours. Should a pile take less time than this to install it should be possible for the contractor to move on to the

Ref	Stakeholder	Comments received	Response
		• Peckering noise is present over a continuous 24-hour period • Dredging noise is present over a continuous 24-hour period • Drill piling is present over a continuous period of 10.5 hours Note that the assessment of cumulative exposure is therefore based on the assumption of installing a single pile per day, and the marine licence should reflect this. If more than one pile is anticipated to be installed, then the cumulative exposure assessment should reflect this, since the noise exposure criteria require a noise accumulation period of 24 hours.	next pile, if feasible, to start tapping that in, as long as it does not exceed the 3 hour time limit.
MM6	Cefas	The underwater noise modelling also considers multiple construction activities based on the following worst-case scenario: impact piling in two locations (Salt Island Expansion and Pelham Patch Development), drill piling and peckering all operating simultaneously for a period of 24 hours. Section 4.6 of Appendix F states that for the multiple source scenario, "the SPLpeak noise level from impact piling in two locations, in addition to drill piling and peckering, is presented in Figure 4-6. The modelling assumes that all four sources are operating simultaneously. These results have been analysed for their potential impact given in the summary in section 4.7. Calculations of multiple pulse impacts consider the different operation period for each piece of equipment". The report further states "where multiple sources are considered, the most onerous criteria (impulsive) should be used, although both sets have been included". I am not clear as to how the multiple scenario modelling has been derived. The sources considered are both impulsive and continuous, however the SPLpeak metric (as displayed in Figure 4-6, below for reference) has been used which is not appropriate for continuous sources. This should be clarified.	See Section 4.15.
MM7	Cefas	The predicted effect ranges for marine mammals and fish, for the multiple source scenario, are then based on the following: • Marine mammals: SELcum for impulsive and non-impulsive criteria • Fish: SELcum for impulsive criteria and SPLrms for continuous criteria Table 4.6 in Appendix F shows the SPLrms ranges, but not the unweighted SELcum (as suggested in the table caption).	Comment is noted. The referenced table caption is incorrect in *Appendix F of the ES*. The ranges within the table are however correct, and therefore no changes have been made.
MM8	Cefas	No mitigation measures have been proposed for marine mammals, as the assessment concluded that there will be a negligible impact on the primary receptor species. For fish, it is proposed that all impact piling activities feature	Soft start was not considered to be required as mitigation within the *marine mammal chapter (Chapter 12*) as potential impacts arising from single noise sources (e.g. piling and dredging) and

Ref	Stakeholder	Comments received	Response
		soft starts. Section 11.6.1 of Chapter 11 states that "this will ensure that sensitive fish species within the impact range will have the opportunity to move away from the noise source and reduce the risk of injury, either mortal or recoverable. With soft start piling in practice, the magnitude of this impact would be considered very low. The residual impact when incorporating soft start practices would be of negligible significance". I agree that soft start procedures may reduce the total number of dangerous exposures in relation to auditory damage. I recommend that soft start measures are included as a licence condition. The duration of the soft start will need to be agreed with the regulator.	multiple noise sources (piling in two locations and dredging) were assessed as negligible for all species. Due to the methodology set out in response to comment MM4, it is anticipated that the hammer energy required to tap the pile through the top soft substrate would be low. Therefore, due to this low energy required a soft start is not considered to be possible to perform a ramp up of the hammer energy. An increase in the frequency of hammer strikes is another option, however the pile will be installed before the 'full power' of the ramp up is reached; therefore, rendering a standardised soft start unachievable. Further mitigation requirements are addressed in **Section 4.15** below.
MM9	NRW	12.6.1 Potential auditory injury and possible behavioural impacts from underwater noise during piling. We note that the underwater noise modelling shows that the estimated maximum potential impact range within which PTS onset could occur in all marine mammal species is estimated to be less than 10m (maximum area of 0.0003km2) for a single strike, and 40m (maximum area of 0.02km2) in harbour porpoise from cumulative exposure for the maximum hammer energy of 280kJ during impact piling (Table 12.7). We agree with the conclusion that this impact on all marine mammal species would be negligible/very low. We disagree however that mitigation is not required. Permanent threshold shift is a form of auditory injury and could be considered deliberate which would constitute an offence under the Habitats Regulations. We recommend therefore that mitigation is applied to ensure that no marine mammals are present within the potential injury zone prior to commencing piling. Specifically, we recommend that during any piling activity the statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) is adhered to. This can be found here: http://archive.jncc.gov.uk/pdf/jncc_guidelines_piling%20protocol_august%202010.pdf	
MM10	NRW	We note that the estimated maximum potential impact range within which TTS onset or a fleeing response could occur in harbour porpoise from cumulative exposure is estimated to be up to 400m (maximum area of 0.215km2), 750m for minke whale, 430m for grey seal and 10m for other cetacean species.	See Section 4.15.

Ref	Stakeholder	Comments received	Response
		We agree that due to the limited range and short duration of this disturbance, the impact is negligible and does not require mitigation. We note however that the underwater noise report (Appendix F) states that specific plant details were unavailable at the time of modelling, so source levels were estimated using a likely comparable source from Subacoustech's database. Should the actual equipment used differ significantly from those used in the modelling, such that significantly different noise characteristics could reasonably be assumed, the conclusions of this assessment and subsequent HRA may no longer be valid.	
MM11	NRW	There appears to be a mistake with Table 12.14 which should show the modelled results and areas of impact from dredging noise, but appears to show an assessment of impact significance.	The cross referencing of this paragraph should refer to *Table 12.15 of the ES* and not *Table 12.14*. *Table 12.14* is an additional table and not required within the impact assessment.
MM12	NRW	The duration of construction activity is estimated to be 65 weeks - while we acknowledge that disturbance won't occur continuously during this time, it is unclear how much time there will be between noisy activities to allow potential recovery from disturbance. Disturbance over this period of time is therefore not insignificant and could exclude animals from their normal activities for up to 14 months. However, we acknowledge that the area of impact is relatively localised and the density of marine mammals in the area relatively low. We therefore we agree with the conclusion that the likely impact from this activity is negligible.	Comment is noted.

4.6.2 Multiple scenario modelling

Figure 4.6 (Section 4.6 of Appendix F of the ES) shows the distribution of noise levels using the SPL_{peak} metric. It is acknowledged that SPL_{peak} is not the best metric to use for the continuous source types, but the data was presented in this way to attempt to show the differences in the noise level that the key sources produced, as overlaying the most appropriate metrics for each source (SPL_{peak} over SPL_{RMS} or SEL) would be misleading. Presenting each source using the same metric provides a 'level playing field', although we can see how it has led to confusion. The figure simply shows how much louder the impact piling is than the drill piling or peckering and the noise distribution and does not represent the numerical calculations shown in *Section 4.7* (*Appendix F of the ES*).

The appropriate metrics – impulsive metrics for impulsive sources and non-impulsive metrics for non-impulsive sources – have been used to derive the calculated ranges in *Section 4.7* (*Appendix F of the ES*). It is these tables which are considered within the assessment of impacts to marine mammals and fish.

4.6.3 Mitigation requirements

As outlined in **Table 4-9**, it will not be possible to carry out a soft start for piling due to the low energy use and short duration of piling. However, if there is a requirement to ensure that no marine mammals are present within the potential injury zone prior to piling the follow measures are suggested based on the JNCC (2010) guidance:

- Visual monitoring will be undertaken by a trained Marine Mammal Observer (MMO) for a period of 30 minutes prior to the start of piling and covering breaks of longer than 10 minutes;
    - As the pile will be 'tapped' in to place either a dedicated or non-dedicated MMO will perform the searches; and,
    - A non-dedicated MMO refers to a trained MMO who may undertake other roles on the vessel when not conducting their mitigation role. This person can be a member of the vessel's crew provided that during the mitigation period, they do not undertake any other roles on the vessel.
- If a marine mammal is sighted within the 500m mitigation zone during the pre-survey search acoustic survey commencement will be delayed until the mitigation zone has been clear of marine mammals for a period of at least 20 minutes, and the pre-survey search has been completed. This mitigation zone of 500m is significantly higher than the modelled PTS impact range of 40m for harbour porpoise; and,
- Once piling has commenced, there is no requirement to stop or delay if marine mammals enter the mitigation zone.

4.7 Commercial Fisheries

4.7.1 Response to Stakeholder comments

Table 4-10 sets out the responses to each of the Commercial Fisheries stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-10 Responses to Commercial Fisheries comments.

Ref	Stakeholder	Comments received	Responses
CF1	Cefas	Section 13.5.5 states that the Class B mussel bed is located 2.5km from Holyhead Port, however Section 4.38 indicates that the bed is located 1.7km from the project. This should be clarified, and consistency should be ensured within the ES.	The Class B harvesting area is located approximately 1.7km from the proposed scheme; however, as stated in *Section 13.5.5 of the ES*, the mussel lay within the Class B area is located 2.5km from the proposed scheme.
CF2	Cefas	In Section 13.5.3 of the ES (Commercial Fisheries Chapter), the section on scallop dredging states that scallop beds are primarily located to the north and west of Anglesey – i.e. on the other side of Anglesey to the project areas, however Figure 13.4 and 13.5 indicate that the beds are located to the northeast of Anglesey. This should be clarified in the ES.	Comment is noted. For clarity, *Figures 13.4 and 13.5 of the ES*, taken from Fishmap Môn (NRW, 2014) present the nearest areas of significant scallop dredging activity. *Section 13.5.4 of the ES* should state that "scallop dredging primarily targets beds to the north and east of Anglesey".
CF3	Cefas	Section 13.6.1 states that Notice to Mariners will be issued to keep area users (including fishers) informed of disruption. This approach is welcomed. I would also suggest utilising a bulletin service such as Kingfisher which is typically subscribed to by the fishing industry.	Comment is noted.
CF4	Cefas	The fish resource baseline has been based on data collected within ICES statistical rectangle 35E5 and appropriate data sources have been used to present a desk-based assessment. It is appreciated that some of the limitations of the data have been recognised. While third party data is discussed, seasonal limitations, gear selectivity, survey sampling methodology etc has not been considered or acknowledged as previously recommended. These are likely to affect catchability of non-target species. For example, the Cefas Irish Sea and Bristol Channel survey utilises a 4 m beam trawl and is conducted in September. Consequently, the gear is selective in which species are effectively targeted (the trawl will not adequately sample pelagic species and any species and life stages smaller than the liner mesh size) and seasonality of the sampling means that some parts of the local fish assemblage (both species and life stages) may not be representatively sampled.	See Section 4.7.2.

Ref	Stakeholder	Comments received	Responses
CF5	Welsh Government Fisheries	There is lobster potting activity, mainly recreational with some commercial, within the New Harbour. Pots are found in the vicinity of the Sailing Club and Breakwater. Any potting activity currently practised within the vicinity of the proposed works will come to an end. Underwater noise resulting from impact and drilling during piling installation may cause displacement of shellfish away from the works site.	See Section 4.7.3.

4.7.2 Data limitations

Table 11.2 of the ES, which presents the data sources used for assessment of potential impacts on fish and shellfish resources, highlights the main limitations associated with each source. However, as stated in comment CF4 by Cefas, other limitations exist that are inherently associated with the use of fisheries data, such as the seasonality of surveys and the gear type/sample method employed. These limitations are particularly restrictive when considering the data in isolation; however, using different surveys with different methods helps to provide a general idea of the fish stocks and distribution and inform the assessment. As such, while we acknowledge that, individually, the data from *inter alia* the ICES Irish Sea trawl surveys, seine net surveys on North Anglesey, plankton tows and baited trap surveys listed in *Table 11.2 of the ES* have their limitations, when used collectively they give a good indication of the species likely to be present in the wider Holyhead Bay area. Therefore, those limitations are not considered to affect the outcome of the assessment.

4.7.3 Potential impacts on lobster potting in Holyhead

Displacement of recreational and commercial fishing activities is discussed in *Section 13.6.1 of the ES*, in which it is acknowledged that there may be some activities displaced by the proposed scheme. However, most of the works will take place within the existing port area or within the busy approaches to the port, where there is unlikely to be any significant potting activity due to the existing vessel traffic accessing and leaving the port. Comment CF5 in **Table 4-10** highlights that pots within Holyhead New Harbour are found in the vicinity of the Sailing Club and the Breakwater; however, neither of these areas fall within the footprint of the proposed scheme and access to these locations would not be significantly hampered.

For the users who may currently deploy pots within the footprint of the proposed scheme, there is good availability and ease of access to alternative sites nearby once construction starts, hence the conclusion in the ES that displacement effects on fishing activity would be of **negligible significance** holds true for the recreational and commercial potting fleet.

Section 13.6.3 of the ES discusses the potential for the displacement of species through noise and increases in SSC and determines such impacts to be of **negligible significance**. The term 'Impact piling' has been used to describe the tapping in of the piles through the softer surface sediments, prior to them being drilled through the rock. As such, the underwater noise generated is not considered to be as significant as for more typical impact piling. The underwater noise modelling, showed that the presence of port structures would block underwater noise from travelling into much of the New Harbour, including areas adjacent to the breakwater and around the Sailing Club where recreational lobster potting occurs.

Given this, and the fact that the underwater noise would be periodic and limited to the piling works, potential impacts to lobster potting form underwater noise is predicted to be of **negligible significance**.

4.8 Ornithology

4.8.1 Response to Stakeholder comments

Table 4-11 sets out the responses to each of the Ornithology stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-11 Responses to Ornithology comments.

Ref	Stakeholder	Comments received	Response
ORN1	IoACC	Birds: Table 14.6; also Table 27.1 at end of report. Disturbance and displacement to birds (black guillemot) due to construction activities: this is deemed to be 'Moderate significance'; suggested mitigation is provision of alternative nest sites. However, the IoACC question how will such mitigation nest sites be provided. Further clarity is required.	Black guillemots have occupied nest boxes in harbour locations in the UK and Ireland, for example Bangor in Northern Ireland (BTO 2020; Greenwood 2002) and Dublin (Dublin Port Company 2017). Information on nest box design is available from such studies. In collecting baseline information for the ES, Robin Sandham, a local bird-ringer who studies black guillemots in Holyhead Harbour. He provided information on potential locations for nest boxes to provide alternative sites and reported that in 2019 a pair of black guillemots occupied a nest box in Holyhead Harbour for the first time, thus confirming the potential feasibility of this mitigation.
ORN2	IoACC	The last paragraph of section 14.8 mentions mitigation for other species of nesting birds in the form of surveys 'to identify areas of potential nesting habitat or active nesting attempts.' A survey is, technically, not mitigation in itself. What measures are proposed in the event that nests are found? How will harm to active nests be avoided? Further detail is required to clarify this matter.	The proposed mitigation to avoid destroying active nests, or disturbing Schedule 1 birds or their nests, during construction works is described at the end of *Section 14.6.1 of the ES*. These measures would be incorporated into a Construction Environment Management Plan.
ORN3	IoACC	It would be helpful if a list of the relevant species and habitats in s7 of the Environment Wales Act (2016) habitat and species of conservation concern could be provided. This would help the IoACC formulate advice in connection with public bodies' duty under the Act (s6) to seek to conserve and enhance biodiversity.	Relevant species in s7 of the Environment Wales Act (2016) of conservation concern include: • Herring gull (*Larus argentatus*); • Black-headed gull (*Larus ridibundus*); • Eurasian curlew (*Numenius arquata*); • House sparrow (*Passer domesticus*); • Dunnock (*Prunella modularis*); • Chough (*Pyrrhocorax pyrrhocorax*); and, • Song thrush (*Turdus philomelos*). Note, that the proposed scheme area is not important for the species above. Relevant habitats in s7 of the Environmental Wales Act (2016) are addressed in **Section 4.4.2**.

4.9 Commercial and Recreational Navigation

4.9.1 Response to Stakeholder comments

Table 4-12 sets out the responses to each of the Commercial and Recreational Navigation stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-12 Responses to Commercial and Recreational Navigation comments.

Ref	Stakeholder	Comments received	Response
NAV1	NATS Safeguarding	The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal. However, please be aware that this response applies specifically to the above consultation and only reflects the position of NATS (that is responsible for the management of en route air traffic) based on the information supplied at the time of this application. This letter does not provide any indication of the position of any other party, whether they be an airport, airspace user or otherwise. It remains your responsibility to ensure that all the appropriate consultees are properly consulted.	Comment is noted.
NAV2	Trinity House	Trinity House has no objections to the above application and confirm any vessels used to exhibit signals as per collregs. Trinity House must be informed if any changes to any AtoNs are required during the campaign.	Comment is noted.
NAV3	Maritime and Coastguard Agency	The Marine Licence application and supporting documentation have been considered by Navigation Safety Branch. On this occasion, the Maritime and Coastguard Agency (MCA) has no objection to consent being granted provided all maritime safety legislation is followed and the conditions/advisories below are applied: Conditions: 1. The Licencee must issue local notification to marine users - including fisherman's organisations, neighbouring port authorities and other local stakeholders - to ensure that they are made fully aware of the activity. 2. The Licencee must ensure that HM Coastguard, in this case nmoccontroller@hmcg.gov.uk, The National Maritime Operations Centre is made aware of the works prior to commencement. In addition, the following advice should be provided to the applicant to facilitate the proposed works: Advisories: 1. The Consent Holder should ensure suitable bunding, storage facilities are employed to prevent the release of fuel oils, lubricating fluids associated with the plant and equipment into the marine environment. 2. Any jack up barges / vessels utilised during the works/laying of the cable, when jacked up, should exhibit signals in accordance with the UK Standard Marking Schedule for Offshore Installations. 3. The site is within port limits and the applicant should gain the approval/agreement of the responsible local navigation authority or the Harbour Authority/Commissioners/Council. They may wish to issue local warnings to alert those navigating in the vicinity to the presence of the works, as deemed necessary.	Comment is noted.

Ref	Stakeholder	Comments received	Response
		4. If in the opinion of the Secretary of State the assistance of a Government Department, including the broadcast of navigational warnings, is required in connection with the works or to deal with any emergency arising from the failure to mark and light the works as required by the consent or to maintain the works in good order or from the drifting or wreck of the works, the owner of the works shall be liable for any expense incurred in securing such assistance.	

4.10 Archaeological and Cultural Heritage

4.10.1 Response to Stakeholder Comments

Table 4-13 presents the comments received on Archaeological and Cultural Heritage. Subsequent to receiving these comments, further consultation was undertaken with the IoACC and Cadw to confirm the mitigation required to avoid/reduce the potential impacts that could arise as a result of the proposed scheme (see **Section 1.3** and **Appendix C3**). This consultation supersedes the comments made on the ES presented in **Table 4-13**. The outcome of this consultation is presented in **Section 4.10.2**.

Table 4-13 Responses to Archaeological and Cultural Heritage comments.

Ref	Stakeholder	Comments received	Response
ACH1	IoACC	Admiralty Pier (including the sea wall between Salt Island Bridge and the George IV Arch). The importance of the grade II listed Admiralty pier has been acknowledged within the Holyhead Port Expansion Environmental Statement report as being Very High. Consequently, the proposal for the Salt Island Expansion to directly abut the listed building, and by doing so restrict much of the appreciation of the building as a pier, is of concern.	
ACH2	IoACC	Lighthouse on Admiralty Pier The importance of the grade II listed Lighthouse has been assessed within the Holyhead Port Expansion Environmental Statement report as being High. Consequently, the proposal for the Salt Island Expansion to directly abut Admiralty Pier and by doing so restrict much of the appreciation of the building and its function as a pier is of concern. The intention to introduce a new lighthouse wall to the South, that would further erode the setting and views of the listed building particularly from the direction of the grade II listed South Pier, is of equal, if not greater concern.	
ACH3	IoACC	Pelham Patch Development Admiralty Pier (including the sea wall between Salt Island Bridge and the George IV Arch). The importance of the grade II listed Admiralty pier has been acknowledged within the Holyhead Port Expansion Environmental Statement report as being Very High. Consequently, the Pelham Patch Development proposal to directly abut the listed building that the report acknowledges as being of international importance, and by doing so restrict much of the appreciation of the building, is of great concern.	
ACH4	IoACC	The Environmental Statement (ES) (p475) states 'The Quay Wall, south of Salt Island (RHDHV 129), against which the Pelham Patch Development will abut, will also be subject to direct impact which may result in the total loss of the asset (very high magnitude). As an asset considered to be of low heritage importance, this will result in a minor adverse impact significance.' Whilst the report acknowledges that Admiralty Pier is of international importance it does not appear to appreciate that the importance relates to the whole designated building (between Salt Island Bridge and George IV Arch) and not just a part of it. Therefore, the IoACC would strongly disagree with much of the above conclusion. All alternatives that would not result in the possible 'total loss' of an internationally important building should be exhaustively explored.	
ACH5	IoACC	Reference is made in the ES to the teleconference of 17 May 2019, one of the objectives of which was to "explore proportional and meaningful mitigation strategies that may be applied to reduce the impact upon the setting of heritage assets." Apart from a proposed practically indiscernible, from many viewpoints, circa 0.5m difference in finished ground level between the existing Admiralty Pier and the proposed Pelham Patch	

Ref	Stakeholder	Comments received	Response
		Development no additional mitigation is proposed. Additionally, the ES states that the impact of the proposed scheme would be moderate-major adverse, which, in EIA terms, is considered to be significant. Yet the lack of meaningful mitigation compounds the impact, thereby rendering what is proposed as ineffectual. Combined with the lack of continuity of views into the Port if the Pellham Patch area is to be used for storage, the impact of the proposal would be to detrimentally affect the character and setting of the heritage assets.	
ACH6	IoACC	In order that the setting and views of the listed building are maintained further mitigation would be required. The most effective mitigation would be to provide an appreciable void between the proposed infill development and the listed building so that the historic interest of the structure can still be clearly interpreted. The proposals to remove existing perimeter fencing and open up views of the historic port are welcome. However, the proposed land infill at Pelham Patch together with the placement of storage containers (two containers in height) would severely compress views, out of the conservation area, of the port water and consequently its interpretation as a historic port as well as visual links between listed buildings. Whilst visual links between designated heritage assets may be temporarily disrupted by port vehicular movement this does not challenge the significance of these assets. As a result, appreciation of the historic port from outward views from the conservation area i.e. from perimeter fence level, will be greatly diminished – as clearly illustrated in Viewpoint 3 (Photomontage view of the proposed Pelham Patch Development) Holyhead Port Expansion Environmental Statement Appendices Report Volume II. No mitigation has been presented to date regarding the visual impact of the siting of storage containers at the Pelham Patch Development.	
ACH7	Welsh Government	There are 6 scheduled monuments and 70 listed buildings located inside 3km of the proposed works and the impact on the designated heritage assets and their settings is considered in the Archaeology and Cultural Heritage section of the Environmental Impact Assessment prepared by Royal Haskoning DHV. This work concludes that the proposed works will have a moderate/high and therefore a significant impact on the settings of two listed buildings (the Admiralty Pier (including the sea wall between Salt Island Bridge and the George IV Arch) (LB 14757) and the Admiralty Pier lighthouse (LB 14758) but no significant impact on any other designated heritage asset or their settings. I concur with these conclusions. When this application is determined the significant impact of the proposed development on the setting of the two listed building will; need to be considered against the public benefit of the proposed development.’	Comment is noted.

4.10.2 Further consultation with the IoACC

As a result of the further consultation undertaken with the IoACC, the following advice was provided / mitigation measures agreed (see **Appendix C3**):

Admiralty Pier

i. The IoACC welcome the explanation why a 'void / cul-de-sac' is not a possible between the reclaimed area and Admiralty Pier. The IoACC also fully understand the economic consequences of a shorter berth and accept this is not a credible option given the IoACC's desire for the Port to expand and to accommodate the larger cruise vessels.
ii. Further detail is required on the engineering solution in order to protect the integrity of Admiralty Pier. The IoACC do not wish to see visible pilling along the southern side of Admiralty Pier (Quay Wall) towards Pelham Patch. This wall should remain in view. If pilling is required to strengthen the Pier, the IoACC would request that pilling is along the northern side of the Pier to strengthen and protect the Pier before filling (see **Section 4.10.3**).
iii. The IoACC note the 0.5m lowering of the ground level of the reclaimed area compared to the Pier. Whilst this is welcomed, the IoACC would question whether this provides a discernible difference in levels and would it be possible to lower this further (to 1m) to have a clearer distinction between the Pier and the reclaimed area? (see **Section 4.10.4**)
iv. IoACC welcome the lowering of the lighthouse wall so as not to impede views of the lighthouse and pier.
v. Removal of 'clutter' along the prier and around the lighthouse (e.g. buoys, boats, sheds, concrete blocks etc.) would also improve the setting of these listed buildings.

Pelham Patch

vi. The IoACC welcome the applicant's commitment not to permanently store containers on Pelham Patch. Whilst the existing visual link to the group of listed buildings are frequently obscured, the proposed new perimeter fencing and realignment of the service road offers an opportunity to open up this view and improve the visual setting of these listed buildings. This combined with interpretation boards overlooking the Old Harbour (from Marine Square area / Victoria Road) would be a welcomed addition to capture the historic value and 'tell the story' of these important local landmarks.
vii. Potential for viewing platform and interpretation boards at car park off Marine Square (towards public toilets) would be welcomed.
viii. The removal of stored lorries/buses etc. in front of these listed buildings (particularly Admiralty Arch and Customs House) would also improve the setting of these listed buildings.
ix. Further detail on the type of perimeter fence to be used is required. Also fencing within the site may obscure the view therefore, consideration of this fence is also required (see **Section 4.10.5**).
x. Further clarity is required on what is meant by 'containers may need to be stored on the site temporarily'. Need to define and agree what is meant by temporary and where the containers will be stored to maintain line of sight to the heritage assets from key viewpoints (see **Section 4.10.5**).

Additional Mitigation

xi. The proposal to develop a 3D digital model of the existing pier and lighthouse is welcomed. The IoACC also welcome the proposal to develop a museum / exhibition piece of the group of listed buildings and would encourage this to be displayed at the Holyhead Maritime Museum or Market Hall. The combination of a physical model and a 3D digital display would assist in telling the story of these important local buildings.

xii. Similarly, it is important to tell the 'next chapter' of Holyhead Port's story and to show the proposed development overlaid on the current model. This will be important in public consultation and for local people to understand the Port

Expansion proposals.

xiii. The IoACC also welcome the inclusion of public facing interpretation boards. These could also be linked to the digital model (through QR code, for example) so that people could get to see these assets and have an explanation of their history and importance through their mobile phones. This is important as the view is sometimes obscured when the ferry is loading/unloading.

xiv. Arranging pre-arranged tours into the Port's operational areas is also to be encouraged so people can see and appreciate these historical assets. The IoACC note the operational difficulties of this but it is important that local people (e.g. schools or local groups) have the opportunity to see and learn about these listed buildings.

4.10.3 Protection of Admiralty Pier

No piling is proposed along Admiralty Pier. The strength of the structure is sufficient to cope with the area being reclaimed along its' north face.

Similarly, the wall around the lighthouse is essential to ensure that the turret section and the lighthouse mounted on it does not collapse into the dredge pocket as the required depth of the berth is below the founding of the turret section.

4.10.4 Height of Salt Island Expansion reclaimed area

The current proposed finished level on the quay edge for Area A is +8.50m CD which corresponds to the existing level on Salt Island. The level was set using the following design information:

- The threshold / freeboard heights of the vessels that are likely to use the berth;
- Providing a sensible and suitable tie-in with the existing structures; and,
- H.M. Government guidelines on predicted sea level rise.

It is critical that +8.50m CD is achieved not only for future sea level rise but also to prevent wave overtopping. This occurs during storm conditions and would flood the proposed Salt Island Expansion completely leaving it unusable during most of the winter months. It is therefore not possible to lower the proposed Salt Island Expansion reclamation area any further.

4.10.5 Pelham Patch fencing and container storage

Further detail on the final design of the perimeter fence, and any fencing within the site would be provided to the IoACC as part of the final design, together with additional clarity on any temporary storage of containers which may be required and how these can be sited to maintain the line of sight to the heritage assets from key viewpoints.

4.11 Visual Setting

4.11.1 Response to Stakeholder Comments

Table 4-14 sets out the responses to each of the Visual Setting stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-14 Responses to Visual Setting stakeholder comments.

Ref	Stakeholder	Comments received	Response
VS1	NRW	The Construction Phase Good site management measures are proposed for noise and air quality to mitigate local impacts. These would also help minimise effects upon AONB views and the character of the AONB. Moderate adverse effects mitigated to Minor adverse have been assessed by the ES. We concur with this assessment. Requirement: The CEMP to include objectives and actions to minimise construction disturbance upon AONB visual and sensory receptors. To be submitted to NRW for our approval. We would require a CEMP to be prepared and submitted as a condition of any approval. Minimising disturbance upon the visual and sensory experience of visual receptors within the AONB is to be an explicit objective of the CEMP. The range of actions that will support this objective will need to be highlighted.	Comment is noted.
VS2	NRW	The Operational Phase Effects have been assessed to be minor adverse. We concur with this assessment. No additional mitigation is proposed. We are satisfied with this approach. In conclusion, the current particulars submitted to address the Marine Licence would also be acceptable as a subsequent planning submission. We therefore have no concerns with the ES or the development proposal.	Comment is noted.

4.12 Coastal Defence and Flood Risk

4.12.1 Response to Stakeholder Comments

Table 4-15 presents the responses to each of the Coastal Defence and Flood Risk stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-15 Responses to Coastal Defence and Flood Risk comments.

Ref	Stakeholder	Comments received	Response
FRA1	NRW	We note from the description and location section that great breakwater provides shelter (from waves) to a significant area of the coast. We also agree with the comment made that without the influence of breakwater, many areas within the inner Holyhead Bay would be exposed to coastal flooding. We understand that plans to repair the breakwaters have recently been submitted although it is unclear if funding will be made. We note that a joint probability analysis of wave heights and extreme water (sea) levels has been carried out (EIA Appendix C1: Holyhead EIA – Wave Transformation Modelling) which considered various scenarios for the proposal with and without the breakwater and note that the EurOtop method produces wave heights of 0.6m against the extreme sea level.	Comment is noted.
FRA2	NRW	We would question that the development type is that of “other” as per figure 2 of TAN15: Development and Flood Risk.	Further comment on the development type has been provided in **Section 4.12.2.**
FRA3	NRW	Section 21.3.3 would appear to be taken from Welsh Governments guidance 1 ‘Summary of what TAN15 requires for highly vulnerable development (houses) to be considered acceptable’. We would suggest that is not relevant for this type of proposal.	Noted and further information provided in Section 4.12.2 below. Section 5.3 of TAN 15 notes that “other” uses are still subject to Section 7 and the requirements of Appendix 1. Appendix 1 was used to inform the details set out in *Section 21.3.3* and *Table 21.2 of the ES*.
FRA4	NRW	The proposed scheme elevations for the Salt Island expansion would appear to be acceptable and the levels as shown in ES Table 21.6 show compliance with ES Table A1.14 of the TAN. However, we have significant concerns regarding the Pelham Patch development. The proposed scheme elevation levels (of 4.95m AOD) do not show compliance with TAN15 if the development is classed as that of a highly vulnerable development (100 years to 2119). Thus if a planning application is received and confirmation that the development should	Further details on the levels used within the assessment and relevant to the lifetime of the development are set out in **Section 4.12.3**. The Pelham Patch Development forms part of the wider Port development and is in accordance with the above description requiring it to be located in a coastal location. Therefore, the Pelham Patch Development is not classified as highly vulnerable and would be categorised under the “other” uses classification.

Ref	Stakeholder	Comments received	Response
		consider climate change allowances beyond 75 years (i.e. not a Less vulnerable development as per figure 2 in TAN15) then the threshold frequency would not have been met and thus the scheme would not comply with section 7/Appendix 1 of the TAN. Previous correspondence suggest that 75 years of cc allowances is appropriate and in line with Welsh Government advice on such development proposals. The FCA section of the EIA refers to the year 2119	On this basis, further justification related to the levels used for the Pelham Patch Development are described in **Section 4.12.3**.
FRA5	NRW	It should also be noted that although a class A gauge exists in the harbour, we do not provide a site-specific flood warning service for Holyhead. We offer a general flood alert for the coastline of west Anglesey.	Comment is noted.

4.12.2 Classification of scheme development type

Comments FRA2 and FR3 queried whether the development type identified for the scheme should be classed as “other” and the approach taken to assessing flooding consequences. The proposed scheme comprises the expansion of the existing Holyhead Port and therefore does not specifically match the development types listed in Figure 2 of TAN 15. A review of TAN 15 Paragraph 5.3 noted that:

“There are uses which are considered to be exceptions to the general rule, and have not been classified above, because they are required in a fluvial, tidal or coastal location by virtue of their nature. These include boatyards, marinas, essential works required at mooring basins, and development associated with canals.”

As the proposed scheme comprises the expansion of the existing Holyhead Port facility, which by its nature requires a coastal location, the conclusions of the assessment remain that the type of development should be categorised as “other”, in line with TAN 15 Paragraph 5.3.

On the basis of this development type, the guidance set out in TAN 15 Section 5.3 notes that:

“*They will not be subject to the first part of the justification test in section 6 but will be subject to the acceptability of consequences part of the test as outlined in section 7 and the requirements of appendix 1.”*

Consequently, Appendix 1 was reviewed and used when setting out the information within *Section 21.3.3* and *Table 21.2 of the ES*. Within TAN 15 Appendix 1 Paragraph A1.11, it does not specifically reference that the guidance is applicable to highly vulnerable development only and sets out information on the need to assess the flooding consequence of a development.

On this basis, it is considered that in setting out the information in *Table 21.2 of the ES*, a comprehensive and conservative approach has been adopted to assess the potential flooding consequences to the proposed scheme against a number of criteria.

4.12.3 Pelham Patch Development Compliance

The Pelham Patch Development forms part of the wider Port development and, as explained in **Section 4.12.2**, is in accordance with the “other” description requiring it to be located in a coastal location. Therefore, the Pelham Patch Development should not be classified as highly vulnerable.

As also noted in **Section 4.12.2**, and in accordance with TAN 15 Paragraph 5.3, this development type will not be subject to the first part of the justification test in TAN 15 Section 6; however, is subject to the acceptability of consequences part of the test as outlined in TAN 15 Section 7 and the requirements of Appendix 1.

A review of TAN 15 Section 7 Assessing Flood Consequences was carried out. Information used for water levels, threshold levels and lifetime of the proposed scheme adopted a conservative approach focusing on the potential flood risk to the proposed scheme, to ensure that it is as safe as possible and that there is minimal risk to and from the proposed scheme.

When looking at the threshold frequency, as stated in TAN 15 Appendix 1 Assessing Flooding Consequences, reference has been made to Paragraphs A1.14 and A1.15. The proposed scheme, comprising a port expansion with no built elements, does not fit into a specific category; however, it is assumed that it is most similar in nature to the ‘General Infrastructure’ category. The General Infrastructure

category should consider the threshold frequency as the 0.5% tidal event (I in 200 year) (Table A1.14) and the maximum depth of flooding (Table A1.15) as 600mm.

The Pelham Patch Development has an elevation of 4.95m AOD. During the present day, 2019, 1 in 200 year scenario, the Pelham Patch Development extreme water level is 4.1m AOD. Therefore, it will be above the coastal / tidal water levels and is not at risk of flooding.

During the future, 2119, 1 in 200 year scenario the Pelham Patch Development proposed tidal extreme water level is 5.2m AOD and therefore it may be subject to coastal / tidal flooding with maximum water depths of approximately 0.25m (i.e. 5.2m AOD - 4.95m AOD).

On the basis that the proposed scheme is most aligned with the 'General Infrastructure' type of development, this would mean that the flood depth on the site at the end of its lifetime (i.e. 0.25m) would be less than half of the tolerable depth (i.e. 0.6m) identified within TAN15 A1.15.

Taking a conservative approach, the 1 in 200 year water levels (including climate change) are considered over 100 years, i.e. longer the proposed scheme's lifetime, and therefore the stated water levels would be higher than they would be when compared with water levels in 75 years i.e. proposed lifetime of the proposed scheme. The conclusion therefore remains that the maximum water depth of 0.25m (in 100 years) is below the maximum tolerable depth of flooding of 600mm (i.e. 0.6m) and the proposed scheme can be delivered safely in terms of present and future flood risk.

4.13 Cumulative Impact Assessment

4.13.1 Response to Stakeholder Comments

Table 4-16 presents the responses to each of the Cumulative Impact Assessment comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-16 Response to Cumulative Impact Assessment stakeholder comments.

Ref	Stakeholder	Comments received	Response
CIA1	IoACC	Whilst the IoACC agrees with the list of 'relevant' projects identified (apart from the omission of the Great Breakwater), the IoACC believes that Morlais (or WADZ as referred to in the table) should be screened in. The Morlais project manages a 35km2 area of seabed near Holy Island, Anglesey. It has the potential to become one of the largest tidal stream energy sites in the world with a generating capacity of up to 240MW of electricity. The applicant (Menter Môn) has applied on the 16th September 2019 to Welsh Government under the Transport and Works Act 1992 for an order to develop and operate the Morlais demonstration zone. Menter Môn has also applied to Natural Resources Wales Marine Licensing Team for a marine licence under the Marine and Coastal Access Act 2009. Both processes will run in parallel with each other. The IoACC acknowledge this application for this Marine Licence was made prior to Morlais application for a Marine Licence and an Order under the Transport and Works Act 1992. However, Morlais have undertaken a number of public exhibition events and the date for application submission has been known for some time. Furthermore, there is only two weeks between the date of this Marine Licence Application and Morlais application date, therefore it would be reasonable to request the applicant to consider Morlais as part of any Cumulative Assessment given that the environmental data is available and the projects will be constructed during the same or similar timeframe.	See Section 4.13.2.
CIA2	IoACC	The applicant should also consider the refurbishment to the Great Breakwater as part of any cumulative assessment. The IACC have received a Screening Opinion Request from the applicant Stena Line	An environmental scoping report was issued to the IoACC and NRW relating to the proposed refurbishment of the Holyhead Breakwater on 20th April 2020. The report was issued in support of Screening and Scoping

Ref	Stakeholder	Comments received	Response
		Ports Ltd for the refurbishment of the Great Breakwater in July 2019. Being the same applicant using the same consultants, the IACC would have expected this to be included in the list of relevant projects to be considered.	Opinions from the IoACC and NRW, and the opinions were received on 20th August 2020 and 23rd July 2020, respectively. The IoACC considered the refurbishment works to be EIA Development and as such an EIA is required to support the required consents. Given the project is currently at the scoping stage, there is insufficient information on which to carry out a CIA with the proposed scheme. The proposed scheme would be considered by the subsequent CIA that is undertaken as part of the proposed refurbishment works' EIA, ensuring that any cumulative impacts are appropriately assessed and managed.

4.13.2 Morlais CIA

4.13.2.1 Coastal Processes and Marine Water and Sediment Quality

The sediment plume dispersion modelling predicts that disposal activities related to the proposed scheme would result in the geographical distribution of the plume and particularly the resulting bed level change would be mainly contained within the boundary of Holyhead North disposal site. According to the Morlais assessment, the predicted changes in sediment transport and bed level occur within the immediate vicinity of the array area, and there would be no changes predicted in the wider area. Hence, the footprints of the effects of the two activities do not overlap from a sediment transport perspective, and so there would be no cumulative effects.

Changes to tidal currents imposed by the Morlais project have been predicted to extend just less than 5km towards the Holyhead North disposal site, so the footprint of the changes is close to the southeast corner of the disposal site. Here the changes to mean spring tide peak speeds are at the outer edge of the changes and so are less than 0.1m/s on both ebb and flood tides. Hence, they would only have a small influence on a limited area of the disposal site, and the tidal current cumulative effects are of **negligible significance**.

Changes to waves due to the Morlais project could potentially have an effect when they approach from 210° or 240°; however, these changes from these directions only extend up to 2km towards Holyhead North and so there would be no changes at the disposal site. No cumulative effects are predicted.

4.13.2.2 Marine and Coastal Ecology

As part of the Morlais project, pre-construction surveys would be undertaken to check for the presence of any rare or protected species, such as Annex I reef. Following these surveys, micro-siting of the cable would be used to mitigate direct impacts to these receptors. Prior to any disposal activities related to the proposed scheme, a survey of the disposal site would be undertaken to determine the location of Annex 1 reef and other habitats of conservation importance to allow micro-siting of the dredged material within the disposal site to avoid these sensitive areas. As both projects provide mitigation to avoid impacting Annex I reef and other habitats of conservation concern there would not be any cumulative impacts on marine and coastal ecology.

4.13.2.3 Marine Mammals

There are a number of potential cumulative impacts for the proposed scheme with the Morlais project, as follows:

- Construction at the proposed scheme and construction at Morlais:
  - Underwater noise from construction activities causing:
    - Temporary auditory injury (Temporary Threshold Shift (TTS)); and,
    - Disturbance and behavioural impacts.
  - Potential for increased collision risk.
  - Potential for disturbance at seal haul-out sites.
  - Changes to water quality.
  - Changes to prey species.
- Construction at the proposed scheme and operation of Morlais:
  - Underwater noise from construction activities at the proposed scheme and operation of Morlais:
    - TTS; and,
    - Disturbance and behavioural impacts.
  - Potential for increased collision risk.
  - Changes to water quality.

- Changes to prey species.
- Operation at the proposed scheme and operation at Morlais:
  - Potential for increased collision risk; and,
  - Potential for disturbance at seal haul-out sites.

Impacts screened out of CIA for marine mammals
Due to the inclusion of mitigation measures to ensure there is no permanent auditory injury to marine mammals, there is therefore no potential for permanent auditory injury when considered cumulatively with other projects. This potential cumulative impact has therefore not been considered further.

Table 4-17 below presents the CIA for marine mammal with the proposed scheme and the Morlais project.

4.13.2.4 Ornithology

Potential impacts to ornithology from the proposed scheme are described in *Chapter 14 of the ES*. Most species of birds present in Holyhead Harbour are of local or county importance. The exception to this is a regionally important population of black guillemot, of which some nest in drainage holes in the harbour walls.

Cumulative effects of Morlais and the proposed scheme could arise if there was construction activity taking place simultaneously with the proposed scheme during the breeding season and if there was the possibility of cumulative disturbance (from both projects simultaneously) to black guillemots nesting in Holyhead Harbour.

The export cable landfall site for the Morlais project is in the vicinity of Porth Dafarch on the west coast of Holy Island approximately 3.3km from the proposed scheme at the nearest point (which is across land). At this distance, there would be no effects of construction activities at the Morlais landfall on black guillemot nesting in Holyhead Harbour and therefore no cumulative effects with the proposed scheme.

The ES for Morlais indicated that Holyhead Harbour is the preferred construction port; thus during the construction of Morlais there would be increased vessel movement, industrial activities and road traffic to the harbour. There could be a cumulative effect of Morlais and the proposed scheme if construction was ongoing simultaneously and the Morlais construction resulted in an increase in shipping activity in Holyhead Harbour during the black guillemot breeding season.

The possibility for a cumulative impact between Morlais and the proposed scheme is therefore considered to be low. Mitigation identified for the proposed scheme, to create alternative nesting sites for black guillemot in areas of Holyhead Harbour which are distant from the proposed expansion works, is considered to reduce the potential for cumulative impact on black guillemot from other activities in and around the harbour to minor adverse, and therefore at a level that is not significant.

4.13.2.5 Commercial and Recreational Navigation

During the installation phase of the Morlais project, three vessels would be required to install the cable tails over 20 days per year, two vessels would be required to install the export cable over 20 days per year and three vessels would be required to install the export cable protection over 12 days per year. This equates to 148 vessel movements over the course of one year, or less than 0.5 vessel movements per day. As with the proposed scheme, the movement of these vessels would be advertised in Notice to Mariners, and their movement in and out of the port would be controlled by the Harbour Master to ensure navigational safety. Therefore, it is not considered that there would be a cumulative impact to navigation arising from the proposed scheme and Morlais.

Table 4-17 Marine Mammals CIA for the proposed scheme with the Morlais project.

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
Construction at the proposed scheme and construction at Morlais			
Underwater noise - TTS	The worst-case assessment for TTS for each marine mammal species is as follows (based on the multiple construction activities scenario): ■ 1.27 harbour porpoise (0.001% reference population). ■ 0.000006 bottlenose dolphin (0.000002% reference population). ■ 0.000065 common dolphin (0.0000001% reference population). ■ 0.000009 Risso's dolphin (0.0000001 % reference population). ■ 0.0067 minke whale (0.00003% reference population). ■ 0.016 grey seal (0.0003% of reference population). All marine mammal species were assessed as having a medium sensitivity, and very low to negligible magnitude of impact, resulting in an assessment of negligible (not significant).	The potential for TTS at Morlais was based on the total number of marine mammals that could be at risk of TTS from all construction activities together, including the installation of tidal devices and hubs (two drilling rigs), two cable laying activities, two cable protection activities and up to 16 vessels, as a worst case for each marine mammal species is as follows[1]: ■ 6.2 harbour porpoise. ■ 0.002 bottlenose dolphin. ■ 0.03 common dolphin. ■ 0.004 Risso's dolphin. ■ 0.45 minke whale. ■ 0.08 grey seal. All marine mammal species were assessed as having a medium sensitivity, and very low to negligible magnitude of impact, resulting in an assessment of minor (not significant) for all marine mammal species.	In total, there is the potential for TTS to occur on the following number (and % of reference population) of marine mammals cumulatively for the proposed scheme and Morlais: ■ 7.47 harbour porpoise (0.007% reference population). ■ 0.002 bottlenose dolphin (0.0005% reference population). ■ 0.003 common dolphin (0.000005% reference population). ■ 0.004 Risso's dolphin (0.00005% reference population). ■ 0.46 minke whale (0.002% reference population). ■ 0.1 grey seal (0.002% of reference population). For a temporary impact, this results in a negligible / very low magnitude, and combined with a sensitivity of medium results in a cumulative impact of negligible (not significant).

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
Underwater noise – disturbance / behavioural	The worst-case assessment for disturbance / behavioural impacts as a result of construction activities at the proposed scheme for each marine mammal species is as follows (based on the assessment for underwater noise impacts from vessels): ■ 88 harbour porpoise (0.08% reference population). ■ 0.69 bottlenose dolphin (0.17% reference population). ■ 7.55 common dolphin (0.01% reference population). ■ 1.07 Risso's dolphin (0.01 % reference population). ■ 0.59 minke whale (0.003% reference population). ■ 4 grey seal (0.07% of reference population). All marine mammal species were assessed as having a low sensitivity, and low to negligible magnitude of impact, resulting in an assessment of negligible (not significant).	At Morlais, the potential for disturbance to marine mammals was assessed as a part of the assessment for TTS. Therefore, the above has been used to inform this cumulative impact.	In total, there is the potential for disturbance to occur on the following number (and % of reference population) of marine mammals cumulatively for the proposed scheme and Morlais: ■ 94.2 harbour porpoise (0.09% reference population). ■ 0.69 bottlenose dolphin (0.17% reference population). ■ 7.58 common dolphin (0.013% reference population). ■ 1.07 Risso's dolphin (0.012% reference population). ■ 1.04 minke whale (0.004% reference population). ■ 4.08 grey seal (0.07% of reference population). For a temporary impact, this results in a negligible / very low magnitude, and combined with a sensitivity of low results in a cumulative impact of negligible (not significant).
Increased collision risk	The worst-case assessment for the potential for an increased risk of collision as	The worst-case assessment for the potential for an increased risk of collision as a result of construction	In total, there is the potential for an increase in collision risk to occur on the following number (and % of reference

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
	a result of construction activities at the proposed scheme for each marine mammal species is as follows: ■ 8.78 harbour porpoise (0.008% reference population). ■ 0.07 bottlenose dolphin (0.01% reference population). ■ 0.75 common dolphin (0.001% reference population). ■ 0.11 Risso's dolphin (0.001 % reference population). ■ 0.06 minke whale (0.0003% reference population). ■ 0.41 grey seal (0.007% of reference population). All marine mammal species were assessed as having a low sensitivity, and low to medium (for bottlenose dolphin only) magnitude of impact, resulting in an assessment of negligible to minor adverse (for bottlenose dolphin only) (not significant).	activities (vessels only) at the proposed scheme for each marine mammal species is as follows[2]: ■ 1.18 harbour porpoise. ■ 0.031 bottlenose dolphin. ■ 0.336 common dolphin. ■ 0.047 Risso's dolphin. ■ 0.027 minke whale. ■ 0.237 grey seal. All marine mammal species were assessed as having a low sensitivity, and negligible to low magnitude of impact, resulting in an assessment of negligible to minor adverse (not significant).	population) of marine mammals cumulatively for the proposed scheme and Morlais: ■ 9.96 harbour porpoise (0.01% reference population). ■ 0.1 bottlenose dolphin (0.025% reference population). ■ 1.09 common dolphin (0.002% reference population). ■ 0.16 Risso's dolphin (0.002% reference population). ■ 0.03 minke whale (0.0001% reference population). ■ 0.65 grey seal (0.01% of reference population). For a permanent impact, this results in a negligible / very low magnitude for minke whale, low for common dolphin and Risso's dolphin, and medium for harbour porpoise, bottlenose dolphin and grey seal, and combined with a sensitivity of low or medium (for bottlenose dolphin only) results in a cumulative impact of negligible to minor adverse (not significant) for all species.
Disturbance at seal haul-outs	Due to the intermittent and temporary nature of the vessel disturbance, and the already busy nature of vessel movements in	Taking into account the distance of the proposed cable corridor area from the nearest grey seal pupping site (over 200m), and the proximity of current	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it was considered unlikely that there would be any

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
	the area, the magnitude was assessed as negligible to very low. Seal species' sensitivity to the small increase in vessel disturbance, and their habituation to the already high vessel use in the area, gives a sensitivity of very low. This resulted in an overall impact significance of **negligible** (not significant).	vessel movements to these sites, it was considered that there is unlikely to be any increased disturbance at grey seal pupping sites. Taking into account the low sensitivity to any disturbance (i.e. has some tolerance to avoid, adapt to, accommodate or recover from the anticipated impact) and the potential magnitude of the effect (negligible / very low), the impact significance for any potential disturbance at grey seal haul-out sites has been assessed as **negligible** (not significant).	potential for significant impact as a result of disturbance at seal haul-out sites. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).
Changes to water quality	The magnitude of effect in all species was assessed as negligible / very low, due to the vey localised area in which changes to water quality may occur, with less than 1% likely to be affected by the temporary increase in SSC or contaminants. The overall impact significance is **negligible** (not significant) for all marine mammal species.	Taking into account the negligible sensitivity of all marine mammal species to any changes in water quality and the potential magnitude of the effect (negligible or low), the impact significance for any impact to marine mammals as a result of a change in water quality has been assessed as **negligible** (not significant) for all marine mammal species.	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it is considered unlikely that there would be any potential for significant impact as a result of changes to water quality. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).
Changes to prey species	As the impact to fish species were assessed as negligible or minor adverse significance for all impacts assessed, the magnitude of impact (of the change in marine mammal prey species availability) is considered to be low. Taking into account the receptor sensitivity (of low to medium) and the potential magnitude of the impact, and the temporary	As the impact to marine mammals as a result of changes to prey availability (based on the assessments for fish species) were assessed as negligible or very low magnitude significance for all impacts assessed. Taking into account the receptor sensitivity (of low to medium) and the potential magnitude of the impact, and the temporary nature of the disturbance, the impact significance for any changes in prey resource	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it is considered unlikely that there would be any potential for significant impact as a result of changes to marine mammal prey availability. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
	nature of the disturbance, the impact significance for any changes in prey resource has been assessed as **minor adverse** (not significant) for all marine mammal species.	has been assessed as **negligible to minor adverse** (not significant) for all marine mammal species.	
Construction at the proposed scheme and operation of Morlais			
Underwater noise - TTS	See above.	There would be no potential for auditory injury as a result of operational noise, or maintenance and repowering activities at Morlais. There would however be the potential for TTS as a result of an increase in vessels shown for all marine mammal species below[3]: ■ 0.78 harbour porpoise. ■ 0.00001 bottlenose dolphin. ■ 0.0001 common dolphin. ■ 0.00001 Risso's dolphin. ■ 0.2 minke whale. ■ 0.01 grey seal. All marine mammal species were assessed as having a low sensitivity, and very low to negligible magnitude of impact, resulting in an assessment of negligible (not significant).	In total, there is the potential for TTS to occur on the following number (and % of reference population) of marine mammals cumulatively for the proposed scheme and Morlais: ■ 2.05 harbour porpoise (0.002% reference population). ■ 0.00002 bottlenose dolphin (0.000005% reference population). ■ 0.00017 common dolphin (0.0000003% reference population). ■ 0.00002 Risso's dolphin (0.0000002% reference population). ■ 0.21 minke whale (0.0009% reference population). ■ 0.03 grey seal (0.0005% of reference population). For a temporary impact, this results in a negligible / very low magnitude, and combined with a sensitivity of low results in a cumulative impact of negligible (not significant).
Underwater noise – disturbance	See above.	The worst-case assessment for disturbance / behavioural impacts as a result of operational noise[4], maintenance and repowering activities[5], vessels[3],	In total, there is the potential for disturbance to occur on the following number (and % of reference population) of

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
/ behavioural		and ADDs[6] at Morlais for each marine mammal species is as follows: ■ 109.68 harbour porpoise. ■ 2.506 bottlenose dolphin. ■ 28.061 common dolphin. ■ 4.009 Risso's dolphin. ■ 2.656 minke whale. ■ 19.61 grey seal. All marine mammal species were assessed as having a low sensitivity, and very low to negligible magnitude of impact, resulting in an assessment of negligible (not significant).	marine mammals cumulatively for the proposed scheme and Morlais: ■ 197.68 harbour porpoise (0.19% reference population). ■ 3.2 bottlenose dolphin (0.81% reference population). ■ 35.61 common dolphin (0.063% reference population). ■ 5.08 Risso's dolphin (0.058% reference population). ■ 3.25 minke whale (0.01% reference population). ■ 23.61 grey seal (0.39% of reference population). For a temporary impact, this results in a negligible / very low magnitude, and combined with a sensitivity of low results in a cumulative impact of negligible (not significant).
Increased collision risk	See above.	For Morlais, the collision risk assessment during operation was based on both the increased risk of collision from vessels[7], and the risk of collision from the tidal turbines[8] (the initial phase of development only). Only Phase 1 collision risk has been included as mitigation would ensure collisions is reality would not be worse than the initial phase of the project. The total collision risk for each marine mammal species are as follows: ■ 24.2 harbour porpoise. ■ 1.02 bottlenose dolphin. ■ 8.34 common dolphin.	In total, there is the potential for an increase in collision risk to the following number (and % of reference population) of marine mammals cumulatively for the proposed scheme and Morlais: ■ 32.98 harbour porpoise (0.03% reference population). ■ 1.09 bottlenose dolphin (0.27% reference population). ■ 9.09 common dolphin (0.02% reference population). ■ 1.56 Risso's dolphin (0.02 % reference population). ■ 3.09 minke whale (0.01% reference population). ■ 5.65 grey seal (0.09% of reference population).

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
		■ 1.45 Risso's dolphin. ■ 3.03 minke whale. ■ 5.24 grey seal. All marine mammal species were assessed as having a low sensitivity, and medium magnitude of impact, resulting in an assessment of minor (not significant).	For a permanent impact, this results in a medium magnitude, and combined with a sensitivity of low or medium (for bottlenose dolphin only) results in a cumulative impact of minor adverse (not significant) for all species.
Changes to water quality	See above.	As for construction, taking into account the negligible sensitivity of all marine mammal species to any changes in water quality and the potential magnitude of the effect (negligible or low), the impact significance for any temporary impact on marine mammals has been assessed as **negligible** (not significant).	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it is considered unlikely that there would be any potential for significant impact as a result of changes to water quality. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).
Changes to prey species	See above.	As the impact to marine mammals as a result of changes to prey availability (based on the assessments for fish species) were assessed as **negligible or very low** magnitude significance for all impacts assessed. Taking into account the receptor sensitivity (of low to medium) and the potential magnitude of the impact, and the temporary nature of the disturbance, the impact significance for any changes in prey resource has been assessed as **negligible to minor adverse** (not significant) for all marine mammal species.	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it is considered unlikely that there would be any potential for significant impact as a result of changes to marine mammal prey availability. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).

Potential Cumulative Impact	Proposed scheme potential impact	Morlais project potential impact*	CIA
Operation at the proposed scheme and operation at Morlais			
Increased collision risk	As for the construction phase – see above.	See above.	As for construction at the proposed scheme, and operation at Morlais as above. For a permanent impact, this results in a medium magnitude, and combined with a sensitivity of low or medium (for bottlenose dolphin only) results in a cumulative impact of minor adverse (not significant) for all species.
Disturbance at seal haul-outs	As for the construction phase – see above.	See above.	Due to the very localised nature of this impact, the short term nature, and low magnitude of impact from both projects, it is considered unlikely that there would be any potential for significant impact as a result of disturbance at seal haul-out sites. Therefore, the overall impact significance for the proposed scheme and Morlais cumulatively is considered to be **minor** at worst (not significant).

** Mentor Mon Morlais Limited (2019) Morlais Project Environmental Statement Chapter 12: Marine Mammals.*
1 Table 12-54 of the Morlais Environmental Statement
2 Table 12-57 of the Morlais Environmental Statement
3 Table 12-70 of the Morlais Environmental Statement
4 Table 12-66 of the Morlais Environmental Statement
5 Table 12-68 of the Morlais Environmental Statement
6 Table 12-73 of the Morlais Environmental Statement
7 Table 12-84 of the Morlais Environmental Statement
8 Table 12-86 of the Morlais Environmental Statement

4.14 Water Framework Directive Compliance Assessment

4.14.1 Response to Stakeholder Comments

Table 4-18 sets out the responses to each of the WFD Compliance Assessment stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum.

Table 4-18 Responses to WFD Compliance Assessment comments.

Ref	Stakeholder	Comments received	Response
WFD1	NRW	We do not consider the capital dredge component of the scheme has been adequately assessed in the WFD assessment. Please refer to detailed comments for further information on this matter.	See responses below and Section 4.14.2.
WFD2	NRW	Further consideration is required regarding the direct impacts of the scheme to hydromorphology and benthic invertebrate habitats.	See responses below and Section 4.14.2.
WFD3	NRW	No maintenance dredging has been considered in the WFD Assessment. This is an important omission and further information is required. No maintenance dredging is discussed in detail within the WFD assessment – it is stated within Table 25.3 that the requirement for maintenance dredging will be low and therefore not of concern – however this is not supported by evidence. NRW advises that maintenance dredging should be considered in the current application as the recovery of habitats in the channel will depend on the frequency of maintenance dredging required and volume of dredged material.	A prediction of future maintenance dredge requirements has been completed using information on past maintenance dredging activities carried out at the port over the last 10 years in conjunction with the modelling results presented within the ES. An extrapolation of the port data using expert geomorphological assessment has been used to inform the likely maintenance dredge requirements of the new approach channel. The results of this assessment are presented in **Section 4.2.2**. It has been predicted that dredging of the approach channel would be required approximately every five years. Given that the dredged area is considered to be recolonised rapidly (see **Section 3.3.3.2**), this provides sufficient recovery time between dredging campaigns.
WFD4	NRW	Section 25.2.2 states that the scoping process will be carried out for the water body in which the activities will occur (i.e. the Holyhead Bay WFD water body). If a potential risk is identified within this water body, then potential risks to the connecting water bodies (Holyhead Strait and Caernarfon Bay North) will be considered in Stage 3: Detailed Assessment. It would be more appropriate to consider that where there is a pathway for effect – i.e. sediment transport, biotic or migratory route, all water bodies should be included in the scoping assessment.	A pathway for effect can be identified through scoping for the waterbody where the activity is taking place. A significant issue raised for the immediate waterbody would flag a potential issue in adjacent waterbodies which is the methodology we have used. In this case there are no wide-ranging impacts, including suspended sediment which could affect the status of neighbouring waterbodies. It is therefore more precautionary to scope on the basis of the water body in which activities occur and assume that

Ref	Stakeholder	Comments received	Response
			where one is identified, that there is a pathway for effect in adjoining water bodies. This has been the agreed approach on numerous other projects.
WFD5	NRW	In relation to Section 25.4 - There is a pressure to the hydromorphology and biology (benthic invertebrates) for the operational phase of the project arising from physical presence of structures and capital dredge and therefore hydromorphology should have also been included here. No calculation of the physical pressure resulting from the capital dredge and other direct impacts has been presented here. As set out in "Clearing the Waters for All" (Environment Agency, 2016), for dredging activities, the footprint should be calculated 1.5 times the dredged area.	Using the information provided in *Chapter 8 of the ES* and the conclusions drawn, the WFD compliance assessment concludes that there would be no effects to hydromorphology due to the physical presence of the structures or the presence of the deepened channel. It is confirmed that the total dredge area has been multiplied by 1.5, as required by the Clearing the Waters for All guidance.
WFD6	NRW	We do not agree with the approach set out in Section 25.5.1 in relation to subtidal habitat disturbance – approach channel and Pelham Patch dredge. The assessment states that "The dredging that would be required to deepen the approach channel and the berth at Pelham Patch would result in the removal of the superficial subtidal benthic community within the footprint of the dredge (an area of up to 0.52km2). This does not constitute a long-term habitat loss (as subtidal habitat would still be present below the dredged footprint), but, in the short term, the benthic community would be removed from within the capital dredged areas." This is not the correct approach to assessment and it depends on recoverability of habitats – we would advise that this area should be treated as habitat lost and a consistent approach taken to that set out in 10.6.2. which states that "The capital dredge would take place over approximately six months and would permanently deepen the approach channel to 10m bCD, deepening the channel by up to 7m, in places close to the port. Given the depth of the dredge in places, it is likely that the habitats and biotopes that develop post dredge would be different to those currently present. As such the impact of the capital dredge is considered to represent a long-term permanent impact to the subtidal habitats present, and therefore of high magnitude" – therefore we advise the capital dredged area is treated as habitat lost for the purposes of the WFD assessment.	See Section 4.14.2.
WFD7	NRW	The report states that within the Salt Island reclamation area, a small area of the higher sensitivity subtidal kelp (Laminaria sp.) will be lost during the reclamation. It is not clear what proportion of the kelp bed would be lost and	According to the information available on Defra's MaGIC map service, the area of kelp identified within the Holyhead Bay waterbody is 93,736m^2. The area of kelp which would be lost

Ref	Stakeholder	Comments received	Response
		we request this is clarified by the Applicant. In the absence of detailed information at this stage, a reasonable worst-case scenario should be presented.	within the Salt Island reclamation area would be approximately 377.35m^2, which represents 0.4% of the kelp in the water body. This small proportion is not considered to cause a deterioration in water body status.
WFD8	NRW	The assessment would benefit from a map illustrating the outputs of the sediment dispersion model overlain with biotope maps.	See Figure 3-12.
WFD9	NRW	In Section 25.5.2 –and CEFAS Action Level 1 exceedances are describes as being- “marginal exceedance of thresholds”. We do not agree that averaging this across the total number of samples is a suitable method of assessment.	The raw data, without averaging, is presented in *Tables 9.6, 9.7, 9.8, 9.10 of the ES*. As can be seen, the exceedances are marginal and the assessment does not rely on the use of the average.
WFD10	NRW	Since the scoping stage of the project, there has been an increase to the proposed capital dredged volume, in terms of depth and surface area, however it does not appear this increase has been accounted for in the WFD Assessment. We advise the Applicant updates the WFD Assessment to account for this increase.	It is confirmed that the WFD Compliance Assessment considered the increased dredge volume. This is documented in *Appendix L Table 1.1 of the ES.*
WFD11	NRW	We do not agree that hydromorphology should be scoped out of further assessment, as is presented in Table 25.3. We advise that further information is required and the metrics of the scheme (total capital dredged area, permanent areas of intertidal and habitat loss) are totalled and a factor of 1.5x applied as set out in Clearing the Waters for All (Environment Agency, 2016) for the dredge components and presented as a percentage of the total water body area (1,171 hectares). Please refer to “Recommendations on Surface Water Classification Schemes for the purposes of the Water Framework Directive”, published in December 2007 by the UK Technical Advisory Group of the Water Framework Directive. Table A1a provides “spatial criteria for the geographic extents of failures of standards or condition limits that are expected to have an effect on the ecological status of a water body”. This would be relevant to the assessment of benthic invertebrates – changes to the hydromorphology of a water body may impact upon the ecology. Please refer to comment made in 2.3 for information on how the capital dredge area should be considered.	The area of the approach channel dredge = approximately 500,000m^2 Area of dredge in front of the Pelham Patch Development = approximately 14,665m^2 Total dredge (not within a reclamation area) = approximately 514,665m^2; multiplied by 1.5 = 771,998m^2 or 0.77km^2. The footprint of the reclamation areas = approximately 65,750m^2 (Salt Island Expansion) + 24,250m^2 (Pelham Patch Development) = 90,000m^2 = 0.09km^2 Total area = 0.77+0.09 = approximately 0.86km^2 = 86 hectares = 7% of the waterbody area (1,171 ha). With reference to table A1a in UKTAG 2007, this is well below the threshold of 15% stated (Holyhead Bay water body is classified as having "Moderate" ecological status) and as such is not considered to have a significant effect on the water body status. This is supported by the findings of the numerical modelling and analysis undertaken for *Chapter 8 of the ES* where potential impacts to hydromorphology within the bay during construction and operation were not significant. This is further supported by the findings of *Chapter 10 of the ES* and **Section 3.3.3** of this ES

Ref	Stakeholder	Comments received	Response
			Addendum, where the potential impact to benthic fauna within the approach channel was assessed to be of **minor significance**.
WFD12	NRW	It is unclear if a Biosecurity Risk Assessment has been completed – this was requested by NRW at the Scoping stage and is required in order to ensure the risk of spread of invasive non-native species(INNS) during construction and operational activities is minimised. This has been previously raised by NRW (See Appendix I, pages 11&33).	It is proposed that a Biosecurity Risk Assessment would be carried out by the chosen contractor prior to construction, and therefore this should be a condition of the licence. See also comment MCE2 (**Section 4.4.1**) and HRA5 (**Section 4.15.1**).

4.14.2 Potential impacts to Subtidal Habitats

The proposed approach channel dredge would involve dredging of some rock in order to achieve the required depth. This is considered to represent a permanent loss of habitat as the substrate would be changed from sediment to rock. The area of rock to be dredged is approximately 68,048m^2 which represents 1.2% of the soft subtidal sediment within the water body (calculated to be 5.8km^2). This does marginally exceed the 1% threshold; however, there would be sedimentation between maintenance dredge campaigns (predicted to be every 5 years). The prevalence of one subtidal sediment biotope (*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment) within Holyhead Bay (see **Figure 3-12**) means that as sediment accumulates within the proposed approach channel, the species present would be able to recolonise this area. The bivalves and polychaete worms which are characteristic of this biotope typically have an 'r' type life-cycle strategy, characteristics of which are high fecundity and rapid development, that allow rapid exploitation of available habitat (Tillin and Budd, 2016).

The remainder of the proposed approach channel area would remain as subtidal soft sediment, as sediment from within Holyhead Bay would settle in the area that, as discussed above, can be recolonised to an extent by the fauna in the surrounding soft sediment habitats. It is therefore considered that this would result in a change to a disturbed habitat capable of rapid recolonisation, rather than permanent loss of habitat. Therefore, this would not result in a non-temporary impact to the Holyhead Bay coastal water body.

4.15 Shadow Habitats Regulations Assessment

4.15.1 Response to Stakeholder comments

Table 4-19 sets out the responses to each of the Shadow HRA stakeholder comments received and, where required, where comments have been addressed elsewhere within this ES Addendum. Given the requirement to include the Morlais project in the CIA, an in-combination assessment has been undertaken in accordance with the Habitats Regulations, see **Table 4-20.** The designated sites that this updated assessment is relevant to include:

- North Anglesey Marine/Gogledd Môn Forol SAC (designated solely for harbour porpoise); and,
- Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC (designated for both bottlenose dolphin and grey seal).

Table 4-19 Responses to Shadow HRA Comments.

Ref	Stakeholder	Comments received	Response
HRA1	NRW	We welcome the information submitted with the application to address the potential implications of the proposed development on the designated features of the sites. We also welcome the draft HRA Form 1 provided by the Marine Licencing Team (MLT). However, we note that the Form 1 used is following the old format and we recommend the HRA is revised and presented in the new Form 1 format which takes into account the outcome of the People over Wind case ruling.	We believe that this should be carried out by MLT. We have followed the precedent set by the People over Wind case ruling and not taken into account mitigation at the screening stage.
HRA2	NRW	On the basis of the information provided with the application, NRW Advisory is unable to state that the proposed development would not be likely to have a significant effect on the features of the European Sites. Furthermore, the proposal is not directly connected with the management of these sites for nature conservation purposes. We therefore welcome that MLT, as the competent authority, has carried out an 'appropriate assessment' of the proposal in accordance with Regulation 63 of the Conservation of Habitats and Species Regulations 2017. However, we cannot concur with the conclusion of the appropriate assessment at this time due to the need for further	See responses below.

Ref	Stakeholder	Comments received	Response
		information as part of the environmental impact assessment as specified in NRW Advisory comments in this letter.	
HRA3	NRW	Until we have agreed on the coastal process assessment of near-field and far field affects during construction and operation, we advise that all sensitive sites within the sediment sub-cell should be scoped in to the HRA until evidence shows otherwise, such as Cemlyn Bay SAC.	See Section 4.2.1, response to comments CP12, CP13 and CP14.
HRA4	NRW	We note that no benthic habitats or species are assessed as part of the HRA. This should be addressed in conjunction with the coastal processes/sedimentation modelling to demonstrate that the following site and features will not be impacted: - Bae Cemlyn/ Cemlyn Bay SAC - Coastal lagoons - Perennial vegetation of stony banks	See Section 4.2.1, response to comments CP12, CP13 and CP14.
HRA5	NRW	There is also the potential for INNS to impact upon numerous sites and features dependant on the number and location of vessels that may be used. We understand however that a Biosecurity Risk Assessment for the construction phases of the project will be submitted as part of the Marine Licence process, and therefore these risks can be minimised.	It is proposed that a Biosecurity Risk Assessment would be carried out by the chosen contractor prior to construction, and therefore this should be a condition of the licence.
HRA6	NRW	There is a note on the draft HRA from Peter Morrison asking whether Grey seal (and reefs and sea caves) should be considered under Holy Island SAC given that they are listed as 'present' but not qualifying features. No, we do not consider grey seal as they aren't a feature of the site.	Comment is noted.
HRA7	NRW	We agree with the conclusions of the draft HRA that due to the temporary nature, and limited range of impacts there will be no adverse effect on site integrity on the sites with marine mammal features, namely: North Anglesey Marine SAC West Wales Marine SAC Bristol Channel Approaches SAC	See **Section 4.6.3**, response to MM8 and MM9 stakeholder comments.

Ref	Stakeholder	Comments received	Response
		Pen Llyn ar Sarnau SAC Cardigan Bay SAC Pembrokeshire Marine SAC While we agree that there will be no adverse effects, please note the recommended mitigation in our comments above to ensure potential injury to marine mammals is minimised. We recommend that this is included as a condition in the marine licence.	

Table 4-20 In-Combination Assessment for Marine Mammals between the proposed scheme and the Morlais project.

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise	Increased collision risk with vessels (and tidal turbines) during the operation of both projects (as the worst-case for in-combination collision risk).	The assessment in *Chapter 12* shows that a total of 4.6 to 8.8 harbour porpoise may be at increased risk of collision with vessels (0.004% to 0.008% of the CIS MU reference population). Therefore, it has been assessed that there would be **no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objective s for harbour porpoise** from the proposed scheme alone.	The assessment of effects for Morlais shows that a total of 23.94 harbour porpoise may be at increased risk of collision with vessels[1] and operational tidal turbines[2] (for Phase 1 of the project only) (0.0211% of the CIS MU reference population). Therefore, it has been assessed that there would be **no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objective s for harbour porpoise** from the project alone.	There would be no significant effect on the harbour porpoise population from either the proposed scheme alone, or from Morlais. Taking into consideration the relatively low number of harbour porpoise that may be affected in relation to the reference population (a total of 32.74 individuals; 0.03% of the CISA MU reference population), it is concluded that there would be **no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the proposed scheme in-combination with the Morlais project.	**No adverse effect** on the integrity of the site.
	Harbour porpoise	Underwater noise effects from Morlais and the proposed scheme during construction of both projects (as the worst-case potential	The assessment in indicates that up to 1.27 harbour porpoise (up to 0.001% of the CIS MU reference population) could be at risk of TTS onset if exposed to worst-case scenario during construction of the proposed scheme. Therefore, there would be **no adverse effect on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC**	TTS was assessed as part of the assessment of disturbance effects at Morlais. The Morlais assessment indicated that the maximum number of harbour porpoise disturbed at Morlais would be up to 95 harbour porpoise (0.094% of the CIS MU reference population) based on	There is no potential for in-combination effects auditory injury effects for the proposed scheme and Morlais, as PTS would be mitigated for fully at both projects, and Morlais did not include an assessment of TTS (rather the assessment was based on the disturbance effects as included below). The total area that could be disturbed by underwater noise would be less than	**No adverse effect** on the integrity of the site.

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
		for underwater noise impacts).	**in relation to the Conservation Objectives for harbour porpoise** from the proposed scheme alone. The assessment indicated that up to 87.8 harbour porpoise (0.08% of the CIS MU reference population) could be disturbed based on the worst-case of vessel disturbance, and that displacement of harbour porpoise from the site would not occur over 20% of the summer area at any one time (1.1%), or at 10% of the summer area (1.1%) over the entire season. Therefore, there would be **no significant displacement and no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the proposed scheme alone.	the worst-case of ADDs[3], and all construction activities[4], and that displacement of harbour porpoise from the site would not occur over 20% of the summer area at any one time (3.6%), or at 10% of the summer area (3.6%) over the entire season. Therefore, there would be **no significant displacement and no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the project alone.	20% of the summer area at any one time (4.7% of the SAC), and less than 10% of the summer season (4.7%), with a total of 182.8 harbour porpoise (0.174% of the CIS MU) being potentially disturbed by the proposed scheme and the Wylfa Newydd Nuclear Power Plant in-combination. Therefore, there would be no significant displacement and no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise from the proposed scheme in-combination with the Morlais project.	
		Changes to water quality from Morlais	The change to water quality could affect up to 1.1 harbour porpoise (0.001% of the CIS MU reference	Any potential in changes in marine water quality as a result of sediment re-suspension	It was concluded that there would be no effect on the harbour porpoise population from either the proposed scheme alone,	**No adverse effect** on the

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
		and the proposed scheme (during construction as the worst-case).	population) over an area of 0.422km^2 (0.01% of the SAC summer area). Displacement of harbour porpoise from the site would not occur over 20% of the summer area at any one time, or at 10% of the summer area over the entire season. Therefore, there is **no significant displacement and no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the proposed scheme alone.	caused by seabed disturbance; mobilisation of contaminants adsorbed onto potentially re-suspended seabed sediments; and accidental discharge and spillage of oils, fuels and materials are likely to be localised, dispersed quickly, temporary and would have a negligible effect. Therefore, there would be **no significant displacement and no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the project alone.	or from Morlais. Taking into consideration the localised and temporary nature of any potential impacts from either project, it is concluded that there would be **no adverse effect on the integrity of North Anglesey Marine/Gogledd Môn Forol SAC in relation to the conservation objectives for harbour porpoise** from the proposed scheme in-combination with the Morlais project..	integrity of the site.
Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	Bottlenose dolphin	Increased collision risk during operation of Morlais and construction and operation of the	The assessment shows that up to 0.03-0.07 bottlenose dolphin may be at increased risk of collision (0.009%-0.01% of the reference population). Therefore, it has been assessed that there would be there would be **no adverse effect on the integrity of the Llŷn Peninsula and the**	The assessment of effects for Morlais shows that a total of 1.021 bottlenose dolphin may be at increased risk of collision with vessels[5] and operational tidal turbines[6] (for Phase 1 of the project only) (0.26% of the reference population). Therefore, it has been assessed	It was concluded that there would be no effect on the bottlenose dolphin population from either the proposed scheme alone, or from Morlais. Taking into consideration the low number of bottlenose dolphin that may be affected, (1.09; or 0.27% of the reference population), it is concluded that there would be **no adverse effect on the**	**No adverse effect** on the integrity of the site.

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
		proposed scheme.	**Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for bottlenose dolphin** from the proposed scheme alone.	that there would be **no adverse effect on the integrity of Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the conservation objectives for bottlenose dolphin** from the project alone.	**integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for bottlenose dolphin** from the proposed scheme in-combination with the Morlais project.	
	Bottlenose dolphin	Underwater noise effects from Morlais and the proposed scheme.	The assessment indicates that up to 0.000006 bottlenose dolphin (up to 0.000002% of the reference population) could be at risk of TTS onset if exposed to worst-case scenario during the construction of the proposed scheme. Therefore, there would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for bottlenose dolphin** from the proposed scheme alone. The assessment indicates that up to 0.69 bottlenose dolphin (0.17% of the reference population) could be disturbed based on the worst-case for disturbance from	TTS was assessed as part of the assessment of disturbance effects at Morlais. The Morlais assessment indicates that the maximum number of bottlenose dolphin disturbed would be 2.008 based on the worst-case of ADDs[7], and all construction activities[8]. Therefore, there would be **no adverse effect on the integrity of Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the conservation objectives for bottlenose dolphin** from the project alone.	There is no potential for in-combination effects auditory injury effects for the proposed scheme and Morlais, as PTS would be mitigated for fully at both projects, and Morlais did not include an assessment of TTS (rather the assessment was based on the disturbance effects as included below). The in-combination assessment indicates that up to 2.7 bottlenose dolphin (0.68% of the reference population) could be disturbed based on the worst-case for disturbance from both the proposed scheme and Morlais. Therefore, there would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for bottlenose dolphin** from the proposed	**No adverse effect** on the integrity of the site.

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
			vessels. Therefore, would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for bottlenose dolphin** from the proposed scheme alone.		scheme in-combination with the Morlais project.	
	Grey seal	Underwater noise effects from Morlais and the proposed scheme.	The assessment indicates that up to 0.016 grey seal (0.0003% of the reference population) could be at risk of TTS onset if exposed to worst-case scenario during the construction of the proposed scheme. Therefore, there would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for grey seal** from the proposed scheme alone. The assessment indicates that up to 4 grey seal (0.07% of the reference population) could be disturbed based on the worst-case of vessel disturbance.	TTS was assessed as part of the assessment of disturbance effects at Morlais. The Morlais assessment indicates that the maximum number of grey seal disturbed would be 16.11 (or 0.27% of the reference population) based on the worst-case of ADDs[7], and all construction activities[8]. Therefore, there would be **no adverse effect on the integrity of Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the conservation objectives for grey seal** from the project alone.	There is no potential for in-combination effects auditory injury effects for the proposed scheme and Morlais, as PTS would be mitigated for fully at both projects, and Morlais did not include an assessment of TTS (rather the assessment was based on the disturbance effects as included below). The in-combination assessment indicates that up to 20.11 grey seal (0.34% of the reference population) could be disturbed based on the worst-case for disturbance from both the proposed scheme and Morlais. Therefore, there would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for grey seal**	**No adverse effect** on the integrity of the site.

Designated site	Designated species	Potential in-combination effect	Assessment of effect for proposed scheme alone	Assessment of Morlais*	In-combination assessment of effect	Adverse effect on integrity of the site
			Therefore, would be **no adverse effect on the integrity of the Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives grey seal** from the proposed scheme alone.		from the proposed scheme in-combination with the Morlais project.	
	Grey seal	Increased collision risk during operation of Morlais and construction and operation of the proposed scheme.	*Table 12.23 of the ES* shows that up to 0.2-0.4 grey seal may be at increased risk of collision (0.003-0.007% of the reference population). Therefore, there would be **no adverse effect on the integrity of the Pen Llyn a'r Sarnau/Llŷn Peninsula and the Sarnau SAC SAC in relation to the Conservation Objectives for grey seal** from the proposed scheme alone.	The assessment of effects for Morlais shows that a total of 4.837 grey seal may be at increased risk of collision with vessels[5] and operational tidal turbines[6] (0.08% of the reference population). Therefore, it has been assessed that there would be **no adverse effect on the integrity of Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the conservation objectives for grey seal** from the project alone.	A total of 5.24 grey seal (0.09% of the reference population) may be at increased risk of collision with vessels from the proposed scheme and Morlais in-combination. Therefore, there would be no displacement and no adverse effect on the integrity of Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC in relation to the Conservation Objectives for grey seal from the proposed scheme in-combination with the Morlais project.	**No adverse effect** on the integrity of the site.

** Mentor Mon Morlais Limited (2019) Morlais Project Document MOR/RHDHV/DOC/0067: Information to Support Habitats Regulations Assessment.*
1 Table 8-10 of the Morlais Information to Support HRA report
2 Table 8-8 of the Morlais Information to Support HRA report
3 Table 8-6 of the Morlais Information to Support HRA report
4 Table 8-7 of the Morlais Information to Support HRA report
5 Table 8-31 of the Morlais Information to Support HRA report
6 Table 8-29 of the Morlais Information to Support HRA report
7 Table 8-28 of the Morlais Information to Support HRA report
8 Table 8-27 of the Morlais Information to Support HRA

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Appendix A

Request for clarification / Further Information from NRW on the Marine Licence Application CML1931

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CML1931

Ty Cambria / Cambria House
29 Heol Casnewydd / 29 Newport Road
Caerdydd / Cardiff

Ebost/Email:
peter.morrison@cyfoethnaturiolcymru.gov.uk

Ffôn/Phone: 0300 065 3371

Sent via email

20 December 2019

REQUEST FOR CLARIFICATION/FURTHER INFORMATION

Dear Captain Parry,

Marine Licence Application CML1931 – Holyhead Port Expansion

Stena Line Ports Ltd has applied to Natural Resources Wales (NRW) for a Marine Licence under the Marine and Coastal Access Act 2009 for construction and dredge works associated with the expansion of Holyhead Port. NRW is required to consider such requests in accordance with the Marine Works (Environmental Impact Assessment) (EIA) Regulations 2007 (as amended) ("the Regulations").

Request for further clarification/information

NRW considers that clarification and/or further information is required to properly consider, or come to a conclusion on, the likely significant environmental effects of the project. NRW will not proceed with the consideration of the environmental impact or the determination of the marine licence until this information is provided. The consultation responses received during determination have been shared with you and you will note a number of concerns which should be addressed and would recommend that you review and look to respond to the comments made. I would particularly draw your attention to following which you are required to address in order to allow us to proceed with the determination:

1. **Welsh National Marine Plan**;
   The Welsh National Marine Plan (WNMP) was published on the 12th of November 2019. From this date the plan must be considered within our decision making. To allow us to do this we request that further information is provided in order to demonstate that consideration of the WNMP. The plan can be found on the Welsh Government website here . I have also attached a template which can be completed to demonstate consideration of the plan.
2. **Underwater Noise Assessment;**
   Clarification is required surrounding the Underwater noise modelling carried out. Section 3.1.3 of Appendix F states that the source chosen for impact piling is an IHC S-280 hammer operating at 280 kJ driving a 610 mm pile. However the ES details that larger piles are anticipated to be installed (Table 3.1 of the ES). It is not

clear how this is representative of the piles (and potentially hammer energy). This should be clarified. Cefas also highlight in correspondence attached that the assessment of cumulative exposure carried out is based on the assumption of installing a single pile per day. If more than one pile is anticipated to be installed, then the cumulative exposure assessment needs to reflect this, since the noise exposure criteria require a noise accumulation period of 24 hours. Please look to address this or confirm if only a single pile is being proposed per day. In addition Cefas have highlighted that the underwater noise modelling considers multiple construction activities, however it is unclear how the multiple scenario modelling has been derived and whether the correct metrics have been used for this consideration, see Cefas comment for further detail regarding this.

3. **Holyhead North Disposal Site;**
   Scoping Report SC104 issued on the 12th July 2017 detailed that an assessment of impact of the works on the Holyhead North disposal site must take place, this assessment should ensure the site can accept this volume of material and to ensure the volume of material will not have an adverse impact on the marine environment. Consideration should also be given of effects in combination with other works that use the disposal site. There does not appear to be an assessment of the works on the disposal site, consideration must be given to this. NRW Technical Experts (NRW TE) have highlighted that Annex I and Section 7 habitats namely *Sabellaridae reef* has been identified within the disposal site. The site is known to be dispersive for fine sediment however concerns have been raised in relation to rock disposal. Proposed mitigation has been put forward by NRW TE in their response which includes identifying the extent of the benthic communities within the disposal site in order to locate a suitable area for rock disposal. Please provide comment on the proposed mitigation for the disposal site.
4. **Maintenance Dredging;**
   Concerns have been raised that the ongoing maintenance regime has not been considered within the Environmental Statement. Further consideration of the maintenance dredging regime and potential impacts should be provided, this may have impact on considerations associated with recovery of habitats following completing of the works.
5. **Shellfisheries;**
   Responses were received from Cefas in relation to Shellfisheries, although overall Cefas agree with the impact levels assigned a number of clarifications have been requested. These can be seen in Cefas consultation response date 9th September 2019. Clarification should be provided to all points raised.
6. **Fisheries;**
   Cefas advice were satisfied in general that the characterisation of fish ecology and commercial fisheries provides an adequate description of these receptors' presence in the vicinity of the proposed port expansion. However Potential noise impacts on developing eggs and larvae needs to be considered this assessment.
7. **Cultural Heritage;**
   The Environmental Statement has considered the historic environment. It concludes that the proposed works will have a moderate/high and therefore a significant impact on the settings of two listed buildings (the Admiralty Pier (including the sea wall between Salt Island Bridge and the George IV Arch) (LB

14757) and the Admiralty Pier lighthouse (LB 14758). Concerns have been raised by Isle of Anglesey County Council (IACC) regarding the impact of the work on these assets, extensive comment can be found in their consultation response dated 9th October 2019 need to be addressed. Particularly I would draw your attention comments relating to the Quay Wall. IACC highlight that the Quay Wall is considered part of the heritage asset and as page 475 of the ES suggest the potential total loss of this element of the asset and consider that this loss is significant. We would ask that you demonstrate that alternatives to total loss have been considered. Please show consideration has been given to further mitigation in relation to impact on setting of the assets. Detail of impact and potential mitigation to be considered has been provided within IACC response. Where mitigation is not provided justification should be provided. We would strongly encourage you to further discuss potential impacts and mitigation with both CADW and IACC prior to submitting your response.

8. **Coastal Processes;**
   Significant concerns have been raised by NRW TE. NRW do not consider the impact of removing around 2 million m^3 has been adequately assessment, concerns have been provided regarding the analysis and modelling carried out, full details of these comment can be found in NRW TE consultation response dated 23 October 2019. You should provide further information to address these concerns. We would encourage you to lease with NRW TE in order to discuss these concerns prior to submission of further information. I would draw your attention to concerns relating to far field effects, and further consideration should be made prior to scoping sites out of the assessment, this includes that Cemlyn Bay SAC should be considered further unless evidence is available to prove otherwise.
   NRW TE have also raised concerns that the use of sediment as infill will remove a large volume of sediment from the overall sediment budget for the area. Please could you look to provide a response considering the impact of removing the quantity of material from the sediment budget, including consideration of impact on sediment supply to coastal beaches down drift of the harbour. Please also provide information on consideration of alternatives which have been considered if dredged material were not be used as infill. Consideration is also required of impact of sedimentation and potential changes to the sediment make of local beaches.
   NRW TE have also highlighted in the response a number of areas where there is a discrepancy in the quantities of material proposed to be dredge and used as fill, please could you provide clarification surrounding this.
9. **Marine Water and Sediment Quality;**
   NRW TE have provided a number of points related to marine water, sediment quality and the WFD, please could you review the comments within NRW TE consultation response and look to provide clarification.
10. **Invasive Non-Native Species;**
    Please could you confirm whether an additional biosecurity Risk assessment has been completed in addition to the ports current biosecurity risk assessment.
11. **Marine and Coastal Ecology;**

NRW TE have raised concerns that the areas adjacent to the dredge channels have not been adequately characterised, further detail is provided within the NRW response dated 23 October 2019, this includes queries relating to the extent of survey which has taken place outside the dredged area, and considerations of how primary and secondary impact zones have been derived and considered. Further clarification and response to comments made should be provided.
A number of Section 7 Habitats have the potential to be impacted by the works, it would be helpful if a list of relevant species and habitats from Section 7 of the Environment Wales Act (2016) could be provided highlighting how these have been considered. I would encourage you to review comments made by NRW TE in relation to these species and to discuss potential impacts with both LA and NRW TE.
The works have identified that there will be habitat loss due to land reclamation, and there may also be other biodiversity loss associated with the wider effects of the works. Please confirm whether consideration has been given to providing works to promote restoration and/or enhancement of marine ecosystems (please see Policy ENV_01 of the Welsh National Marine Plan). Consideration of this should be provided.

12. **Marine Mammals;**
NRW TE have recommended that the JNCC protocol for minimising the risk of injury to marine mammals from piling noise (JNCC 2010) is adhered to. Please confirm if that you can adhere to these recommendations or propose alternative mitigation for us to consider.
13. **Ornithology;**
Mitigation has been proposed within the ES in relation to the provision of alternative nesting sites for black guillemot, please provide further detail on how alternative nesting sites may be provided. In addition, surveys are proposed in relation to impact on other nesting birds, please provide further information regarding what is being proposed should the survey identify nesting birds.
14. **Coastal Defence and Flood Risk;**
Significant concerns have been raised in relation to compliance of the works with TAN15, in relation to Pelham Patch, (see NRW TE comments for full details). You are required to address these concerns and demonstrate compliance with TAN 15, we encourage you to engage with NRW TE to discuss further. TAN 15 is referred to in policy SOC08 and SOC09 of the Welsh National Marine Plan.
15. **WFD assessment**
Detail comment has been provided by NRW TE in relation to the WFD assessment, many of these comments are related to conclusion of consideration of impacts discussed above. However, I would ask that you review the comments provided by NRW TE in correspondence dated 23 October 2019 and look to provide a response and update or provide an addendum to the WFD assessment where required.

Cumulative / incombination Assessment;
The ES contains an assessment of cumulative impacts. It is expected as the Morlais application has been received that potential interaction should be considered as there is a potential that works could take place during a similar timeframe. Likewise, although an application has not been received if information

is available on works to the Great Breakwater we would also expect this to be considered.

Please provide the information requested above by 28 February. Please contact me as soon as possible if additional time will be required to collate this information.

Please note should we determine that information provided is considered further information there will be a requirement to publicise this in accordance with the requirements stipulated in Regulation 16 of the Regulations. This will be reviewed once the response is received. If this is the case you will be provided with a public notice to publish in the same newspaper as the project was previously publicised at your own expense.

In the meantime, should you have any queries please do not hesitate to contact me on peter.morrison@cyfoethnaturiolcymru.gov.uk

Yours sincerely

Peter Morrison
Marine Licensing Team
Natural Resources Wales

Appendix B

ES Completeness Report from The Planning Inspectorate on the HRO Application (DNS/3234821)

The Planning Inspectorate
Yr Arolygiaeth Gynllunio

Asesiad o Ddatganiad Amgylcheddol	Assessment of Environmental Statement
gan Clive Nield, BSc(Hon), CEng, MICE, MCIWEM, C.WEM	by Clive Nield, BSc(Hon), CEng, MICE, MCIWEM, C.WEM
Arolygydd a benodir gan Weinidogion Cymru	an Inspector appointed by the Welsh Ministers
Dyddiad: 10/02/2020	Date: 10/02/2020

Ref: 3234821/Harbour Revision Order

Site address: Holyhead Harbour, Isle of Anglesey

- The Environmental Statement which is the subject of this assessment has been submitted in relation to the above case in accordance with Schedule 3 of the Harbours Act 1964, as amended by the replacement Schedule 3 in the Harbour Works (Environmental Impact Assessment) Regulations 1999.
- The application is for a Harbour Revision Order to be made under Section 14 of the Harbours Act 1964.
- The application is made by Stena Line Ports Limited, the statutory harbour authority for Holyhead harbour.

Introduction

1. The Environmental Statement comprises 5 documents, dated 17 June 2019, and a set of plans, dated March 2019:

   - Report, comprising 28 chapters;
   - Appendices Volume 1, comprising Appendices A – D;
   - Appendices Volume 2, comprising Appendices E – M;
   - 2 Non-Technical Summaries: one in English; one in Welsh.
   - Set of 7 Plans, Sections and Elevations, numbered PB6108-HRO-0001 – 0007.

2. The same Environmental Statement has been submitted in support of a Marine Works application made to Natural Resources Wales (NRW) in parallel with the application for a Harbour Revision Order. Accordingly, the Environmental Statement seeks to meet the requirements of both the Harbour Works (Environmental Impact Assessment) Regulations 1999 and the Marine Works (Environmental Impact Assessment) Regulations 2007, as amended by amending Regulations in 2009, 2011 and 2015.

3. A Screening and Scoping Report was submitted to the Marine Management Organisation (MMO), acting on behalf of the Department of Transport, and NRW in April 2017, and their Scoping Opinions were issued in October and July 2017 respectively. Subsequently, the Wales Act 2017 has devolved powers to the Welsh Government in respect of harbours wholly in Wales. However, Welsh Government has confirmed that it has accepted the MMO's Scoping Opinion.

4. The Environmental Impact Assessment (Miscellaneous Amendments for Harbours, Highways and Transport) Regulations 2017 implement Directive 2014/52/EU which amends Directive 2011/92/EU (on the assessment of the effects of certain public and private projects on the environment) and amend the Harbours Act 1964 accordingly. However, as the Scoping Request preceded the commencement date of these Regulations, the Environmental Statement is reported to have been prepared in accord with the 2011 Directive.

Proposed Development and Scope of Order

5. The Order would authorise Stena Line Ports Limited (SLPL) to construct and maintain works at Holyhead harbour, principally comprising the reclamation of land to provide new berths for vessels and associated landside areas for port related use. Two areas of land would be reclaimed: the Salt Island Expansion to serve as a new multi-purpose area for freight traffic, heavy and abnormal loads, and cruise ships; and the Pelham Patch Development to serve as a smaller new multi-purpose berth and potential security and customs facility. In addition to land reclamation, the principle works would consist of lengths of quay wall and wave wall, rock armour revetment, and 2 warehouse buildings.

6. Most of the fill material for these land reclamations would be sourced from capital dredging of the approach to the harbour to accommodate larger vessels. That work is the subject of the Marine Works application made to NRW, and the Environmental Statement includes assessment of its environmental impacts.

7. The proposed Order also makes provision for the Company and the harbour master to exercise powers to give general and special directions for the purpose of promoting or securing conditions conducive to the ease, convenience or safety of navigation in the harbour and the approaches to it.

Completeness of Environmental Statements

8. The aim of an Environmental Statement (ES) is to provide a systematic and objective account of the significant environmental effects likely to arise from the proposed development, including sufficient information to verify the conclusions and identify the source of the information provided. Schedule 3 of the Harbours Act 1964, as amended by the replacement Schedule 3 in the Harbour Works (Environmental Impact Assessment) Regulations 1999, specifies the information to be included in an ES. My assessment of completeness is based on these requirements, whilst also bearing in mind the aims of the EU Directives themselves.

9. Whilst this assessment is based on the requirements of the EIA Regulations, a judgement as to the overall adequacy of the environmental statement can only be made by the Welsh Ministers after considering all the evidence presented for consideration of the application for the Order, including any other environmental information.

Description of the Development

10. Chapter 3 of the ES is titled "Description of the Proposed Scheme" and includes detailed descriptions of the construction and operational phases of the development. The construction phase is described as comprising: preliminary works (the setting up of a site compound and the removal of 4 existing navigational structures); the Salt Island Expansion (quay walls constructed either by a combination of tubular and sheet piles or by a caisson wall, the diversion of existing surface water outfalls from the proposed reclamation area, reclamation of the expansion area behind the new quay walls using fill material partly sourced from the dredging works and partly imported, and the installation

of electrical and fuel services and a heavy lift pad); the Pelham Patch Development (quay walls and land reclamation similar to above, though on a smaller scale, but also including the blocking of the existing culvert under the service road, realignment of the service road to Salt Island away from the nearby residential and commercial properties); a protective wave wall with rock armour revetment at the northern end of the Salt Island Expansion; and 2 new warehouse buildings. These works are illustrated on the set of plans.

11. The operational phase describes how it would be proposed to use the new facilities to accommodate anticipated increases in vessel numbers and sizes. The Salt Island Expansion would provide a new deep-water berth for deep-draft vessels, including cruise ships, Ro-Ro and dry bulk vessels. The Pelham Patch Development would provide increased capacity for smaller dry bulk vessels and barges as well as on-shore storage.

12. The proposed dredging works and methods are also described, including the approach channel, the berths alongside the new quay walls, and some dredging within the reclamation areas. This includes arrangements for the disposal of surplus dredged material to an offshore location.

13. I consider this chapter to provide a clear and comprehensive description of the proposed development, and I conclude that the description of the development is satisfactory.

Description of the Main Alternatives Considered

14. The Applicant's consideration of alternative options is explained in Chapter 3 of the ES. It describes studies carried out by the Company into 4 alternative options and says that "None of the above alternatives were considered viable in terms of achieving the required economic objectives or minimising environmental effects". Although the ES does not go into great detail on these alternative options, I conclude that its consideration of the main alternatives is generally satisfactory.

15. However, its treatment of the Admiralty Pier and Lighthouse and the structures around them, both Grade II listed buildings, needs further justification. These are acknowledged as being important or very important cultural heritage features, and the ES assessment (Chapter 19) explains that the scheme would have direct effects on these (and effects on their setting) which are assessed as being moderate adverse or moderate-major adverse. Whilst one of the alternatives outlined in Chapter 3 aimed to reduce these impacts, more information is needed on the consideration of alternative proposals which would have less impact or provide better mitigation. In respect of this part of the scheme, the consideration of alternatives is not satisfactory.

Identification of the Aspects of the Environment likely to be Affected

16. The ES contains 28 Chapters, the vast majority of which address a wide range of environmental effects, particularly:

- Coastal processes (tidal currents, waves and sea-bed morphology), potentially affected by the land reclamations and approach channel dredging;
- Marine water and sediment quality, potentially affected by increased suspended sediment concentrations as a result of dredging and land reclamation activities;
- Marine and coastal ecology, including intertidal and subtidal habitats, which are potentially affected by smothering by suspended sediment disturbed by dredging or disposed of off-shore;

- Fish and shellfish, which are potentially affected by underwater noise, the smothering of nursery or spawning grounds by suspended sediment, and by effects on their prey;
- Marine mammals, which may particularly be affected by underwater noise (piling, dredging, vessel movements);
- Commercial fisheries, which may be affected by disruption, displacement and reduced stocks during the construction phase, and of which Whelk fishing is of particular commercial importance;
- Ornithology, as local birds may be affected by construction activities, particularly black guillemot which are known to nest in the port area;
- Commercial and recreational navigation, which would need particular attention during the construction phase to avoid conflict with construction vessels;
- Traffic and transport, with potential effects on the highway network and local amenity during both the construction and operational phases;
- Noise and vibration, particularly due the piling and other construction activities, with potential to affect the local community as well as the aquatic environment and sensitive aquatic species;
- Air quality, as affected by construction and operational activities and traffic, with potential impacts on the port and town of Holyhead;
- Archaeology and cultural heritage, which includes both on-shore heritage assets and potential remains in the marine and inter-tidal zones, which would be affected by the proposed construction scheme and the dredging;
- Visual setting, as assessed from 3 representative viewpoints for integration with the existing port setting;
- Coastal defence and flood risk, which has been assessed in accordance with Technical Advice Note 15 for effects on coastal flooding;
- Tourism and recreation, considering impacts on recreational mariners and tourism operators, recreational fishermen and anglers, bird watchers, ramblers and walkers, and the general local tourism-based economy; and
- Socio-economics, with potential economic effects during the construction phase due to increased jobs and an influx of construction workers requiring accommodation and local services, and during long-term operations due to cruise ships, increased tourism and business investment.

17. An assessment is also carried out against the Water Framework Directive, and a shadow Habitats Regulations Assessment is also made, including a cumulative impact assessment. The latter reflects the existence in the area of designated environmental sites.

18. These topics are quite comprehensive and have been addressed in a structured and thorough manner. I consider that the aspects of the environment likely to be significantly affected are sufficiently described.

Description of the Main Effects of the Development on the Environment

19. The ES includes assessments of the main effects of the development (during both the construction and operation phases) for all of the aspects listed above. The assessments have been carried out systematically and in almost all cases are sufficient to meet the requirements of the EIA Regulations. However, additional environmental information is needed on several matters for which the effects of the development on the environment have not been assessed sufficiently.

20. The ES addresses the generation of underwater noise due to piling operations and other construction activities and the effects of that noise on a range of marine mammals, fish and other aquatic fauna. Whilst it is not possible to know exactly what plant and equipment would be used by the successful contractor, it is not clear how the assumptions on levels of noise generated have been made (other than by general reference to BS 5228 for some types of construction plant) and how representative they are of the types of plant and equipment likely to be used. More information is needed on this. In addition, it is not clear what period of time each day the piling noise has been taken as being generated; this is likely to be the most critical factor in levels of underwater noise.

21. The second matter concerns the coastal processes, i.e. the movement of sediment around the coast as a result of sea currents and wave regimes. Under natural circumstances a sediment balance is usually maintained, which ensures a degree of stability for coastal features such as beaches. The proposed capital dredging would remove over 2M m^3 of sediment, a substantial proportion of which would be used as fill material for land reclamation. Thus, a large quantity of sediment would be removed from the present coastal regime. The effects of this are not addressed in the ES. In addition to the initial dredging to deepen the port approach channel, long-term maintenance dredging would be required to maintain that channel, and the effect of that on the coastal processes also needs to be considered.

22. In considering these effects, it is not only the quantity of sediment available for local beaches that needs to be assessed, but also the type of sediment, as the dredging process would excavate rock and gravel as well as smaller sediment particles.

23. The ES includes an assessment of the immediate effects of dredging on sediment levels and sediment deposition depths over a period of 3 months. That is a reasonable period of assessment. However, the ES should include further analysis extrapolating these results over the full construction period.

24. The final omission in respect of effects on marine ecology concerns the cumulative and in-combination effects of this scheme and other schemes in the locality. The ES scopes out the West Anglesey Demonstration Zone (WADZ, also known as the Morlais scheme) from the assessment of cumulative effects. However, an application for approval of that scheme was submitted to the Welsh Ministers in September 2019, and it needs to be taken into account in the cumulative assessment.

25. The ES is deficient in one other respect, effects on cultural heritage. The scheme would involve the construction of areas of land reclamation and new quay walls in close proximity to the Admiralty Pier and the Lighthouse on the Admiralty Pier, which are both Grade II listed buildings. The assessment acknowledges that these are of high or very high importance, and that the effects of the scheme would be "moderate adverse" on these features and "moderate-major adverse" on their setting. Clearly, it needs to be demonstrated that these effects would be justified.

26. The ES includes some mention of the consideration of alternatives but little in the way of details. More information is needed on the consideration of alternative proposals which would have less impact on these cultural heritage features or provide better mitigation. In respect of this part of the scheme, the consideration of alternatives is not satisfactory.

Measures to Prevent, Reduce or Remedy Significant Adverse Effects

27. Each of the ES chapters dealing with specific environmental effects includes a section on mitigation measures and residual impact, and in most cases it is reported that no mitigation measures are required as the environmental effects would be negligible or very low. The exceptions are as follows.

28. The impact of piling operations on fish and shellfish would be mitigated by employing "soft starts" which would provide advance warning to any species affected by noise and give them time to move further away. The risks of vessel collisions during construction works would be mitigated by issuing "Notices to Mariners" to all fishing, commercial and recreational vessels using the harbour to warn them of construction vessel activities. The impacts of general construction noise on nearby properties would be minimised by using "best practice" measures on the land-based construction site.

29. The potential for unforeseen impacts on archaeological remains due to dredging would be minimised by further pre-construction investigations and by the use of a protocol to report any unexpected finds during the works themselves. Most of the land-based cultural heritage assets would not be directly affected by the proposed works but precautionary measures would be employed to provide further assurance. In respect of all of these matters the mitigation measures proposed appear to be satisfactory.

30. As described in the section above, the only exception to this is in respect of the effects on the Admiralty Pier and Lighthouse. Whilst it is reported that the scheme has been designed to minimise the physical effects on these Grade II listed buildings, quite limited details of these have been provided. In view of the significance of the predicted effects on these structures, more comprehensive details of these measures are required in order to fully appreciate the residual effects on these important heritage assets, and I consider the ES is unsatisfactory in this respect at present.

Method of Preparing Environmental Statement and Indication of any Difficulties Encountered (in compiling the required information)

31. Chapter 5 describes the methodology adopted in compiling the ES, beginning with the screening and scoping report submitted to the Marine Management Organisation and NRW in 2017. The ES has addressed all of the topics identified at that time, and its methodical and comprehensive nature reflects its preparation by suitably qualified professional experts.

32. Chapter 28 provides an extensive list of reference documents used, and reports on the various studies and site investigations carried out to inform the Environmental Impact Assessment are included as appendices to the ES. No particular difficulties in obtaining information have been reported

Provision of a Non-Technical Summary

33. A non-technical summary has been provided in both English and Welsh and the information contained in it is sufficient for its purpose.

Overall Conclusions

34. I conclude that, whilst the Environmental Statement submitted by Stena Line Ports Limited on 6 January 2020 contains most of the level of information identified in Schedule 3 of the Harbour Works (Environmental Impact Assessment) Regulations 1999, the further information set out in Annex A is required to address the shortcomings identified above.

35. The opportunity should also be taken to correct several policy and jurisdiction oversights, as set out in Annex B.

Clive Nield

Inspector

ANNEX A

Further Information Needed

1. Further information on the assumptions made to estimate the levels of noise generated by the piling operations and on how representative they are of the types of plant and equipment likely to be used.
2. Further information on the period of time it has been assumed piling operations would take place each day and how this has been taken into account in assessing the impact of the piling operations noise on the various aquatic species.
3. Assessment of the effect on the coastal processes (i.e. the movement of sediment around the coast as a result of sea currents and wave action) of removing a substantial quantity of sediment from the seabed by dredging. Effects on the stability of nearby beaches is to be included, both in terms of the quantity of sediment material and the type of material on the beaches.
4. Further analysis to extrapolate over the whole period of dredging the effects of modelling the sediment levels and deposition rates already carried out for a 3 months period.
5. Review of the cumulative and in-combination effects on the marine ecology to include the West Anglesey Demonstration Zone (WADZ, also known as the Morlais scheme).
6. Further information on the alternatives and mitigation measures considered to minimise effects on the Admiralty Pier and Lighthouse, both Grade II listed buildings, and their settings.

ANNEX B

Policy and Jurisdiction Corrections

1. Paragraph 12.2.1, page 216: The Competent Authority under the Habitats Regulations is the Welsh Ministers and not the Secretary of State for Business, Energy and Industrial Strategy.
2. Paragraph 17.2.2, page 349: Mention is made of Technical Advice Note (Wales) 11: Noise (TAN11) which it is said refers to out of date versions of British Standards. Whilst TAN11 is now quite old, it provides useful advice on the assessment of noise and it should be noted that it was updated by the Minister for Natural Resources' letter to Local Authorities in Wales dated 25 November 2015 (described as a clarification letter to factually update TAN11).
3. Paragraph 17.2.2, pages 349 and 350: Reference is made to the National Planning Policy Framework (NPPF) and the National Planning Practice Guidance for Noise (NPPG) 2014, which it is said provide useful guidance even though it is acknowledged that they are not directly applicable to Wales. Care should be taken in applying such documents, which have no standing in Wales.
4. Paragraph 18.2.2, page 396: Reference is made to the UK Government's Planning Practice Guidance (DCLG, 2014) in the context of providing guidance on the impact of new development on air quality. However, that document has no standing in Wales. Section 6.7 of Planning Policy Wales provides the basis for relevant policy in Wales and includes references to the Air Quality (Wales) Regulations 2000, as amended by the Air Quality (Wales) (Amendment) Regulations 2002, and to advice in the EPUK/IAQM guidance, Land Use Planning and Development Control: Planning for Air Quality.

Appendix C1

Response to NRW's Comments on Coastal Processes

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Natural Resources Wales
From:	Sarah Marjoram
Date:	Tuesday, 21 July 2020
Copy:	Jamie Gardiner
Our reference:	PB6108-RHD-ZZ-XX-NT-Z-0021
Classification:	Project related

Subject: **Holyhead Port Expansion ES - Response to NRW's comments on Coastal Processes**

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1 Introduction

The Marine Licence Application (ref CML1931) for the proposed Holyhead Port Expansion project was submitted on the 17th July 2019 supported by an Environmental Statement (ES), Non-Technical Summary and Technical Appendices. Consultation responses were provided by Natural Resources Wales (NRW) on the 20th December 2019.

Consultation comments on Chapter 8 of the ES (Coastal Processes) were received from NRW Advisory as part of this consultation. Some comments received on Chapter 9 of the ES (Marine Water and Sediment Quality) are also relevant to this note and are included below. This note sets out our proposed approach to address these comments for agreement with NRW.

2 Responses to NRW's Comments

2.1 Use of the dredged material

NRW Comment [CP1]: There has been no impact assessment of removing around 2 million m^3 of sediment from the application area. It is important to ensure that the impacts of removal of sediment from the nearshore sediment system are properly considered.

NRW Comment [CP2]: 640,000m^3 of dredged sediment is proposed to be used as sediment in-fill. Our previous advice stated that we would advise against taking the sediment out of the marine environment. We would always aim to encourage sediment to be retained within the nearshore sediment system and actively contributing to sediment budgets which isn't compatible with use of sediment infill as proposed here. The sediment needs to be considered a vital natural resource which requires careful management and safeguarding, rather than being considered a waste material. The Environmental Statement must include an assessment on the potential impact to the sediment budget in the area.

NRW Comment [CP3]: Whilst we welcome the intent of Stena Line to make best use of this material and reduce disposal requirements in line with the Waste Framework Directive, we do not think it is appropriate to apply that approach in this instance. For marine material, within Wales, NRW confirms the sediment needs to be considered a vital natural resource which requires careful management and safeguarding, rather than being considered a waste material.

NRW would encourage and advise (unless contaminants are found to be present) that marine derived material be kept in the nearshore active sediment zone or if not possible, due to other environmental constraints, disposed of offshore rather than locked up in a construction setting. NRW therefore disagree with the approach taken in Appendix B and wish to discuss this further. NRW do not consider using the sediment for construction purposes as 'beneficial re-use' or a positive action on the limited vital natural resource of marine sediments.

NRW Comment [CP4]: In our EIA scoping advice, we raised concerns that removing a large quantity of dredged sediment from the marine sediment budget could also have a negative impact on the sediment supply to coastal beaches down drift of the harbour. NRW cannot see an assessment of this potential impact.

Royal HaskoningDHV Response:

In light of NRW's advice that the dredged arisings should be kept within the marine environment rather than being used as reclamation material, the design of the proposed scheme will be revised so that imported fill material will be used within the reclamation areas rather than using material that has been dredged from the approach channel.

Whilst we understand that keeping this sediment in the near shore environment is preferred, in this case it is not considered viable for the following reasons:

- There are sensitive habitats within Holyhead Bay such as the mussel beds at Beddmanarch Bay, a designated shellfish water, which could be smothered by the release of such a large volume of sediment within the harbour area;
- The release of large volumes of sediment into the harbour would increase suspended sediment concentrations both during re-use (disposal) and post re-use. It is likely that bed sediment within the harbour is continually being re-suspended and redistributed with the greatest effect during storms. If more mobile fine sediment is placed in the harbour (and likely to be in more focussed areas) the effect on suspended sediment concentrations of wave stirring would be greater. The redistribution of this larger volume of sediment in the water column and its re-deposition on the bed could be detrimental to existing bed habitats; and,
- There is a risk that if the sediment is placed in the harbour, some of it could be transported back into the approach channel. Hydrodynamic modelling shows that predicted tidal current velocities are strongest on the flood tide. During this state of the tide, on both neap and spring tides, a clockwise gyre is predicted to form. The currents flow south into the harbour before turning west and then north across the route of the approach channel. Ebb tidal currents also flow north from the harbour across the southern half of proposed location of the approach channel. This northward flow from the harbour to the approach channel on both flood and ebb tides would tend to transport some of the additional sediment back into the approach channel, which would be large sink for sediment, after placement in the harbour. This could create a hazard to navigation into the port and potentially cause an excessive requirement for further dredging.

As such, it is proposed to dispose of all of the dredged material at Holyhead North disposal site.

In light of the changes to the proposed scheme described above, the sediment plume dispersion model for the approach channel dredging and depositing at Holyhead North will be re-run.

2.2 Duration of numerical modelling

NRW Comment [CP5]: Impact one for the construction phase has only considered 3 months of sediment dispersion and thus the results need extrapolating to the whole construction program in which sediments will be released.

NRW Comment [CP6]: The 3-month scenario of dredging induced increase in suspended sediments needs extrapolating up to the 24-month construction period to understand the full impact to changes in bed level and total suspended sediments.

Royal HaskoningDHV Response:

The model results did not show further increase of suspended sediment concentration after the 3-month simulation as this is when an equilibrium balance was reached. Further justification will be presented in the ES Addendum.

2.3 Sediment plume modelling

NRW Comment [CP7]: It is unclear from the analysis of impact two during construction on whether the suspended sediment could smother intertidal areas, changing the make-up of beaches particularly from storm events, no wave modelling is included in the suspended sediment analysis or a dredge spill scenario. Concern remains around the suspended sediment from dredging, the impact of the levels being so high above background (near bed 5.9mg/l), that will end up in the intertidal area and smother beaches or change the sediment make-up of what is there currently. NRW believe this should be a construction impact that is investigated.

Royal HaskoningDHV Response:

Impact 2 relates to disposal of sediment at Holyhead North and the extent of the deposition described in Figure 8.23 of the ES indicates that there is no deposition beyond the approximate limits of the disposal site and no effects of deposition at the coast. As such it is considered that disposed sediment would not reach intertidal areas.

Impact 1 relates to the behaviour of sediment suspended as a result of the dredging activity and land-claim. Analysis of the results shows that outside the dredged area changes in bed thickness are less than 1cm, as shown in Figures 8.20 and 8.22 of the ES. The extent of the plume and the deposition from the plume both extend seawards rather than towards the coast, and as such the material is moving away from the beaches. Furthermore, as the material on the beaches is much coarser than the fine sediment in the plume, there is no source-receptor pathway for the suspended sediment to settle on the beaches or change the sediment make-up.

Waves are not considered to have the potential to significantly affect the dispersion of the plume and further justification for this will be provided in the ES Addendum.

2.4 Maintenance dredging

NRW Comment [CP8]: No maintenance dredging is discussed. We would expect maintenance dredging to be considered and quantified (worst case scenario of volume and frequency) during application. Sedimentation rates could be based upon current maintenance dredging requirements for Holyhead. This was raised at scoping.

Royal HaskoningDHV Response:

We propose to predict future maintenance dredge requirements using information on past maintenance dredging activities carried out at the port over the last 10 years in conjunction with the modelling results presented within the ES. An extrapolation of the port data using expert geomorphological assessment will be used to inform the likely maintenance dredge requirements of the new approach channel. This will be presented within the ES Addendum.

2.5 Cumulative assessment

NRW Comment [CP9]: WADZ aka Morlais needs scoping into the cumulative impact assessment in chapter 24.

NRW Comment [CP10]: WADZ has been scoped out due to the following reason 'This project is not yet consented, nor has a consent application been made. It is therefore assumed that any activity undertaken as part of the WADZ will occur after the proposed scheme has been constructed, and therefore there will be no potential for cumulative effects and this project is screened out of further assessment.' An application is currently in and therefore should be scoped in.

Royal HaskoningDHV Response:

The Morlais project will be added and assessed within ES Addendum.

2.6 Defining the study area

NRW Comment [CP11]: Section 8.4.1. A map and quantification of both the near field and far field areas are needed with an explanation of the approach.

NRW Comment [CP12]: Section 8.4.3. Impact receptors Understanding of sites scoped out due to far field effects. The study area should be defined using evidence of potential impacts of the proposed activities, rather than the use of a standard figure for an area of study. The Welsh Government have a Technical Advice Note on Coastal Planning (TAN 14) which can be found here http://gov.wales/docs/desh/publications/110805tan14en.pdf
The document suggests working at the sediment sub-cell level and keeping all sensitive sites scoped in, until the area can be scaled down based on evidence.

NRW Comment [CP13]: Appendix M - HRA Screening Report. TAN14 suggests working at the sediment sub-cell level and keeping all sensitive sites scoped in, until the area can be scaled down based on evidence. Until the far field effects can be agreed upon, we cannot scope out sites within the sediment sub-cell such as Cemlyn Bae SAC.

NRW Comment [CP14]: Section 8.5.1. Study Area. NRW understand the study area is based on the primary littoral cell, Holyhead Harbour, which stretches from Holyhead Breakwater in the west to the headland at Twyn Cliperau in the east, and to Stanley Embankment in the south. NRW agree with this for near field affects however would look to a wider area for potential far field affects.

Royal HaskoningDHV Response:

Sensitive sites within the wider sediment sub-cell such as the Cemlyn Bay SAC were scoped out of the assessment based on the geographical extent of change predicted by the modelling exercises. The

modelling shows that effects arising from the dredging and disposal activities are limited in extent to the immediate, or near field areas, and no impacts to the SAC or wider far-field areas are predicted.

TAN 14 guidance is general guidance for Local Planning Authorities and indicates that sediment cells should be the basis of understanding coastal issues for planning purposes accompanied by general statements on what to look for in terms of coastal processes impacts. These elements are covered in the chapter without specific reference to TAN 14.

We have defined near-field and far-field as:

- Near-field: the area within the immediate vicinity (tens or hundreds of metres) of the project; and,
- Far-field: the wider area that might also be affected indirectly by the Project (e.g. due to disruption of waves, tidal currents or sediment pathways).

So effectively, anything far-field is considered to be over 500m from the boundary of the approach channel. However, a distinction between near- and far- is not needed because wherever the sensitive areas are relative to the project, they are assessed accordingly.

2.7 Climate change

NRW Comment [CP15]: There is currently no discussion of climate change within the ES chapter, it has been considered in the wave modelling but should be discussed more broadly.

Royal HaskoningDHV Response:

Historic data shows that the global temperature has risen since the beginning of the 20th century, and predictions are for an accelerated rise, the magnitude of which is dependent on the magnitude of future emissions of greenhouse gases and aerosols. To determine projected sea-level rise for Holyhead Harbour, this assessment uses the data of the UK Climate Projections (UKCP18) user interface for the model grid cell that covers the harbour.

The UK Climate Projections (UKCP18) user interface for the model grid cell that covers Holyhead Harbour is shown in Figure 2.1. UKCP18 relative sea-level rise estimates use 1990 as their starting year and are based on the IPCC 5th Assessment Report. They are available for low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenarios and presented by UKCP18 as central estimates of change (50% confidence level, 50%ile) in each scenario with an upper 95% confidence level (95%ile) and a lower 5% confidence level (5%ile).

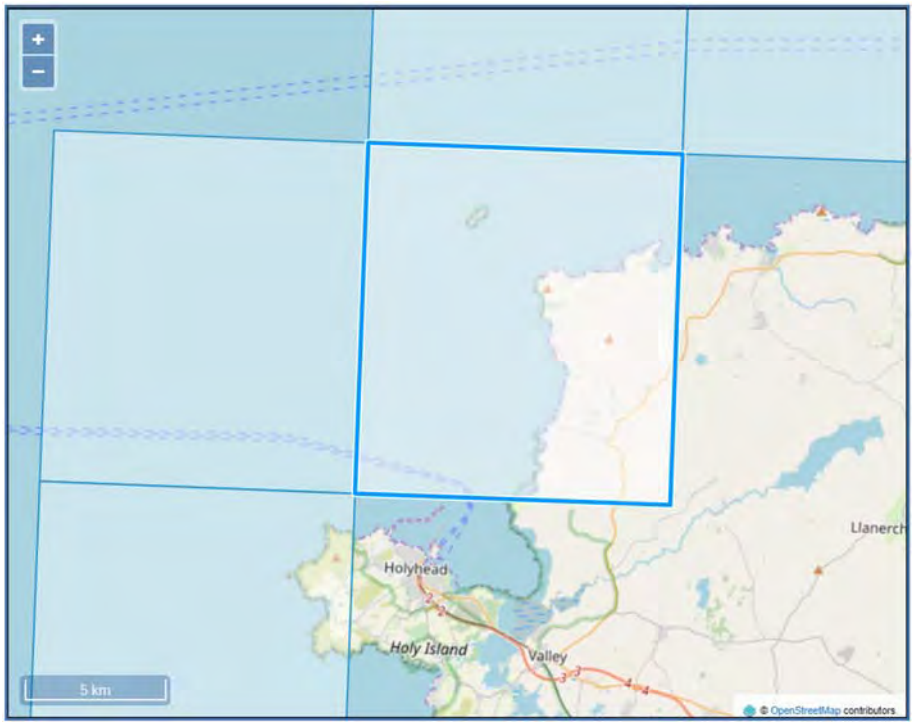


Figure 2.1. UKCP18 model grid used to derive sea-level rise projections for Holyhead

Relative sea-level rise projections using the 50%ile of the medium (RCP4.5) emissions scenario and the 95% of the high (RCP8.5) emissions scenario from the UKCP18 user interface are used in this assessment. Using 2020 as the baseline for the start of operation, and an assumption that the 30 years of relative sea-level rise between 1990 and 2020 has already taken place, then the projected relative sea-level rises using a 2020 baseline are shown in Figure 2.2. Relative sea-level rise in 2070 for medium (RCP4.5) emissions 50%ile is estimated to be approximately 0.22m. This equates to an average sea-level rise of 4.4mm/year over 50 years. For high emissions 95%ile, relative sea level rise in 2070 is estimated to be approximately 0.47m. This equates to average sea-level rises of 9.4mm/year over 50 years.

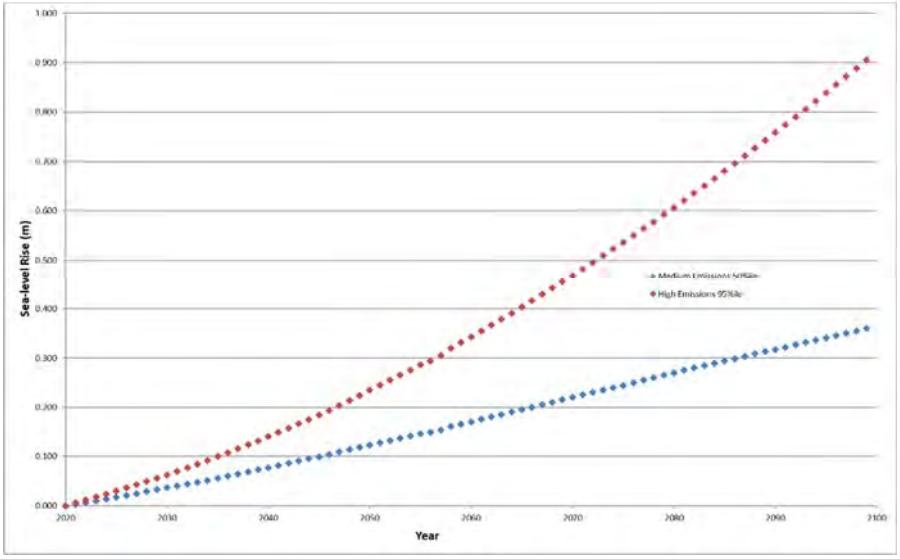


Figure 2.2. Changes in relative sea level (m) under the 50%ile medium and 95%ile high emissions scenario using a 2020 baseline

2.8 Wave data

NRW Comment [CP16]: Section 8.5.8. As raised previously, we note that wave data collected was only over a six-month period and over 10 years ago. It has been shown through the wave modelling however that at the worst-case scenario 330deg and for a 1:1000-year scenario with climate change there is still negligible impact on wave heights and therefore NRW Advisory still thinks this is an omission but one that can be resolved through the modelling and EGA.

Royal HaskoningDHV Response:

The older wave data presented in Section 8.5.8 was only used as part of the baseline description of the area with no intent for use in the wave model. The wave model used is well-established and was initially developed for the Holyhead Breakwater PAR study (modelling completed in March 2017), where the offshore wave conditions were acquired from the Met Office, provided as three-way frequency wave tables based on the 35 year “remap” wave hindcast data.

2.9 Source of additional infill material

NRW Comment [CP17]: The Environmental Statement must clarify the source of any additional material intended for infill. NRW Advisory have indicated that they would advise against taking any further sediment out of the marine environment. NRW advisory cannot see any explanation of where the sediment infill will be derived from.

Royal HaskoningDHV Response:

Imported fill to be used in the reclamation areas will be from a certified construction source which will be suitable for use within the marine environment and for the construction purpose. This will either be from a land-based source or from a licenced marine aggregate source.

2.10 Wave modelling

NRW Comment [CP18]: C1 - Wave Modelling Report - The modelling approach seems appropriate for the study, however NRW Advisory would like these results to be pulled into the ES for completeness and then produce a conceptual understanding of changes to the receiving environment. The wave modelling should also be related to the suspended sediment analysis.

Royal HaskoningDHV Response:

In deeper water, the effects of waves on transport of suspended sediment are negligible. Waves effects are mainly prevalent in shallower water and along the beach (i.e. in the surf zone). This is because the net movement of sediment by waves outside the surf zone is effectively zero.

The effect of waves on sediment erosion (i.e. the stirring effect) was not considered in this study. The purpose of the sediment plume dispersion modelling was to investigate the maximum concentration of suspended sediment generated by the proposed dredging and to track the movement of the released sediment. Previously, we have completed sensitivity tests and found that the inclusion of wave stirring only has a very small impact on the results.

2.11 Hydrodynamic modelling

NRW Comment [CP19]: C2 - Hydrodynamic Modelling Report - Figure 3: Model extent covering the Irish Sea (yellow star indicates the study site) - the yellow star is in the Dee estuary, please amend. Difference plots don't show complete area of change – please revise spatial extent.

Royal HaskoningDHV Response:

Position of yellow star will be moved. Difference plots can be expanded and provided in an addendum to the ES.

2.12 Sediment plume modelling

NRW Comment [CP20]: C3 – Sediment Plume Modelling Report. As detailed in Appendix B Dredge Disposal Options Study, NRW does not support the application to use the sediment as infill. The total stated for land infill in previous reports is 640,000m3. However, this report only measures an impact of 546,909m3 around 100,000m3 less. There is also a discrepancy between the Sediment Plume Modelling Report and the Environmental Statement for the following totals:
a. ES (m3) Modelling report (m3)
b. Sediment Infill 640,000 546,909
c. Offshore disposal 1,260.000 Backhoe: 233,600 TSHD: 1,318,626 Total: 1,552,226
d. Total removal 1,900,000 2,099,135
4. No typical wave modelling is included in the assessment or storm events to assess sediment fate.
5. No dredge spill event is considered as a worst-case scenario, NRW recommend this is included.

Royal HaskoningDHV Response:

The volumes used within the sediment plume modelling were calculated to represent the worst-case scenario for disposal. This reduces the volume of sediment to be used within the reclamation areas and therefore maximises the volume of sediment which would be disposed of offshore.

In the ES we state the capital dredge would remove approximately 1,835,450m3 of sediment from the approach channel, 14,550m3 in front of the proposed quay wall at Pelham Patch, 3,950m3 in the Pelham Patch Development, 37,750m3 in the Salt Island Expansion, and 9,275m3 for installation of scour protection. Of this total volume (1.9Mm3), 520,000m3 would be used to fill the Salt Island Expansion, 120,000m3 to fill the Pelham Patch Development, and 1,260,000m3 would be disposed offshore.

In the modelling report we state 546,909m3 of soft sediment would be dredged for land-claim, 1,318,626m3 for offshore disposal and 233,600m3 of firm clay for offshore disposal - total 2,099,135m3. The discrepancy arises because the modelling report includes the volume of material to be dredged should the caisson option be used to form the new quay walls (see Table 3.2 of the ES).

In relation to NRW's point 4: The sediment plume dispersion model was driven by tidal currents only (see response to NRW Comment CP18, above).

2.13 Additional dredging

NRW Comment [CP21]: Appendix M - HRA Screening Report. Section 2.2.3 Additional dredging. Some dredging within the reclamation areas may be required to remove material that does not provide suitable bearing for the reclamation works. It is anticipated that this dredging would be

completed either prior to, or concurrent to, the installation of the quay walls, in which case the dredged soils may be reclaimed to land utilising conventional terrestrial earth moving equipment. If the dredged soils are surplus or unsuitable for re-use on site, it would be dredged and taken for offshore disposal. NRW request further information on the above point and confirmation this has been considered within the ES.

Royal HaskoningDHV Response:

The fate of the sediment from within the reclamation areas has been considered in the sediment plume modelling for the dredging and reclamation activities and the worst-case disposal activity. This will be reassessed as required in NRW Comment CP1 to model the movement of all dredged material when it is disposed of at the disposal site. This would also then reduce the amount of sediment released during reclamation as this material would be disposed of offshore instead.

Teleconference with NRW on Coastal Processes

Minutes

HaskoningDHV UK Ltd.
Industry & Buildings

Present:	Natural Resources Wales (NRW) - Emmer Litt (EL) and Sarah Revill (SR) Royal HaskoningDHV (RHDHV) - Jamie Gardiner (JG), David Brew (DB) and Sarah Marjoram (SM)
Apologies:	
From:	Sarah Marjoram
Date:	20/08/2020
Location:	Teleconference
Copy:	
Our reference:	PB6108-RHD-ZZ-XX-MI-Z-0001
Classification:	Project related
Enclosures:	

Subject: **Holyhead Port Expansion - Coastal Processes Next Steps**

Number	Details	Action
1	**Introductions** were made and it was agreed that RHDHV would introduce their position for each comment in turn and NRW would provide their response.	
3	**2.1 Use of Dredged Material** **DB** confirmed that the dredged sediment will not be used within the reclamation areas, instead all of it will be disposed of at Holyhead North. **DB** further explained that it would not be appropriate to dispose of the sediment within the nearshore environment of Holyhead Harbour due to the potential to increase suspended sediment concentrations, smother sensitive habitats and create problems for navigation as sediment transported back into the approach channel, and adjacent port areas. **EL** confirmed that NRW was happy with this change in methodology and agreed that the sediment should be disposed of at the offshore Holyhead North site pending plume investigation modelling and environmental assessment. **EL** reiterated NRW's position that in general sediment should be kept within the marine environment if it is not contaminated.	
4	**2.2 Numerical Modelling** **EL** confirmed that it is not practical to run a model for 24 months and welcomed further information that will be provided in the ES Addendum.	**RHDHV** to provide this in the ES Addendum
5	**2.3 Sediment Plume Modelling**	

Number	Details	Action
	DB explained that Impact 2 relates to the disposal site and the model of sediment dispersion at Holyhead North would be re-run with the updated disposal volume. Potential impacts to beaches will be discussed in the ES Addendum. **DB** confirmed that Impact 1 relates to dredging the navigation channel which will release fine sediment into suspension. Most of the beaches in the area are coarser sediment and there is no pathway for the finer dredged sediment to reach and deposit on the beaches. Also, the wave energy at the beaches is high enough to prevent fine sediment from dropping out of suspension. The edge of predicted plume is also at a sufficient distance from the beaches and is directed away from them for there to be no impact. Further information will be provided in the ES Addendum. **EL** explained that this comment is from NRW's benthic ecologist and they are concerned about smothering. **EL** confirmed that more information would alleviate concerns. **JG** added that when the model is re-run this will no longer include an allowance for the release of fines from the reclamation areas which will reduce the volume of sediment released into the harbour. **EL** agreed that less sediment released in the nearshore would be beneficial to the project and shown through the modelling results.	**RHDHV** to include further information in the ES Addendum
6	**2.4 Maintenance Dredging** **DB** confirmed that on NRW's recommendation, an expert geomorphological assessment of the potential maintenance dredge requirements will be undertaken using the port's maintenance dredge data and a review of the physical and sedimentary processes. This will be presented in the ES Addendum. **EL** confirmed that this would be helpful for NRW to assess the project as a whole. **EL** also queried whether, as the dredge will 'break through' a layer of clay this would encourage erosion of the exposed substrate. **EL** explained that this has happened in Mostyn which needed to be monitored.	**RHDHV** to include further information in the ES Addendum

Number	Details	Action
	DB stated that the clay layer in Holyhead Harbour is till and is consolidated. The dredge may remove the more weathered top of the till but the clay left *in situ* would be strong and likely resistant to erosion by the local currents and waves. **DB** stated that sedimentation within the channel would occur, rather than erosion, to which **EL** agreed.	
7	**2.5 Cumulative Impact Assessment**	
	DB confirmed that Morlais would be added to the CIA and presented in the ES Addendum. The numerical modelling which has been undertaken at Morlais and the new plume dispersion modelling at Holyhead North would be included to support the CIA. **EL** confirmed that NRW were happy with this response.	**RHDHV** to include a CIA with Morlais in the ES Addendum
8	**2.6 Study Area**	
	EL confirmed that NRW are happy with the comment in the note and understand the explanation.	
9	**2.7 Climate Change**	
	DB set out that climate change induced sea-level rise is now included in the baseline environment and would be included in the ES Addendum. **EL** confirmed that NRW are happy with this approach.	**RHDHV** to include further information in the ES Addendum
10	**2.8 Wave Data**	
	EL confirmed NRW were happy with the response provided and have no further comment.	
11	**2.9 Source of Infill**	
	JG confirmed that the source of infill material for the reclamation areas would be marine sediment which would be delivered by sea. **EL** confirmed NRW is pleased with this.	
12	**2.10 Wave Modelling**	
	DB suggested that, although the stirring effect will not cause a significant difference to the results of the plume dispersion	

Number	Details	Action
	modelling compared to tidal currents only, now that the model is being re-run, wave stirring effects could be added. **EL** explained that this is not a major point of concern although it could inform the conceptual understanding of the behaviour of the sediment if this is included. **EL** suggested that the conceptual understanding could include summary figures of tidal currents, waves and sediment transport. This could be considered as part of the ES Addendum. **DB** confirmed that a decision will be made following this call on whether to include wave stirring in the model and whether to include diagrams as part of the 'conceptual model'.	**RHDHV** to consider whether to include wave stirring effects in the model and include diagrams as part of the 'conceptual model'.
13	**2.11 Hydrodynamic modelling plot** **DB** confirmed the yellow star would be moved and shared in the ES Addendum. **EL** stated NRW was happy with this.	
14	**2.12 Sediment plume modelling** **JG** explained that the different volumes to be dredged and disposed of in the ES and the modelling report was a result of the modelling using the worst-case scenario for disposal, which is the caisson wall option. The ES mainly considers the combi wall option that requires less dredging. **JG** confirmed that this would be clarified in the ES Addendum. **EL** agreed the clarification will be useful.	**RHDHV** to clarify in the ES Addendum
15	**2.13 Additional Dredging** **JG** reiterated that all dredged arisings will now be taken offshore. **EL** agreed that this was now a redundant point with the change to the methodology.	
16	**AOB** **JG** added that the plume dispersion model would be re-run in 3D which **EL** agreed would be very helpful to understand the potential effects.	

Number	Details	Action
	EL also stated that NRW is overall in agreement with the approach outlined in the note.	
	SR asked **SM** whether this meeting was sufficient as NRW's response to RHDHV's note. **SM** stated that the minutes would be circulated and, once finalised, act as a record of the meeting. Everyone was in agreement.	**SM** to share meeting minutes for agreement with NRW.
	Meeting ends.	
17	**Actions**	
	RHDHV to produce the ES Addendum as set out within the note sent to NRW (Ref: PB6108-RHD-ZZ-XX-NT-Z-0021) and as agreed during the meeting; and,	
	SM to share the minutes with NRW for agreement	

Appendix C2

Proposed Methodology for Supplementary Marine Ecology Video Survey of Holyhead Port

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To: Natural Resources Wales
From: Sarah Marjoram
Date: 16/03/2020
Copy: Wyn Parry; Jamie Gardiner
Our reference: PB6108-RHD-ZZ-XX-NT-Z-0019
Classification: Project related

Subject: **Proposed Methodology for Supplementary Marine Ecology Video Survey of Holyhead Port**

1 Introduction

The Marine Licence Application (ref CML1931) for the proposed Holyhead Port Expansion project was submitted on the 17th July 2019 supported by an Environmental Statement (ES), Non-Technical Summary and Technical Appendices. Consultation responses were provided by Natural Resources Wales (NRW) on the 20th December 2019.

Consultation comments on Chapter 10 of the ES (Marine and Coastal Ecology) were received from NRW Advisory as part of this consultation. Of relevance to this note were comments received on the marine ecology survey undertaken to inform the assessment. The comments are presented in **Table 1** alongside our response. Further detail on our responses is provided in **Sections 2** and **3** of this note.

Table 1 NRW comments received on Chapter 10 of the ES: Marine and Coastal Ecology and our responses

Comment #	Comments received from NRW on the Holyhead Port Expansion ES	Response
1	Page 182. NRW uphold previous comments that the area adjacent to the dredge channel has not been adequately characterised (See Appendix I, page 51).	An extra survey is proposed as outlined in the report below in order to verify the predictions made using the physical data and the benthic survey results for the dredge channel area. This would also observe any epifaunal species, which could be vulnerable to indirect impacts such as smothering.
2	Page 182. Did any grab samples get taken adjacent to the dredge area? This area is also vulnerable to sedimentation during dredging and we believe this was originally requested in the survey scope (See Appendix I, page 51). There is no evidence that our previous comment (K. Robinson, August 2017) on defining primary and secondary impact zones for the dredging activity was taken on board. This is particularly relevant considering *Arctica islandica* present in the area and this needs clarification.	The area adjacent to the dredge area is not vulnerable to direct physical disturbance and so the species at depth within the sediment are not expected to be vulnerable to such impacts. In order to determine the presence of species sensitive to smothering a video survey is proposed. However, based on previous survey data, the species predicted to be present in the adjacent areas are also burrowing bivalve and polychaete species, typical of mixed mobile sediments and of low sensitivity to smothering. The presence of *Arctica islandica* would only be of concern within the direct impact area as it would be sensitive to physical impacts from the dredging activity but not to smothering as it often burrows into sediments for days at a time, respiring anaerobically.
3	It should be noted that HABMAP data is only predictive and shouldn't be relied upon in the absence of survey data. The confidence level associated with the HABMAP prediction is "low" and this should be discussed. This	This is noted. The survey work confirmed that the biotope within the channel area was one of those predicted within the HABMAP data.

Comment #	Comments received from NRW on the Holyhead Port Expansion ES	Response
	reinforces the request for species/habitat characterisation outside the immediate dredge footprint.	
4	Page 188-189. "*Dredging and reclamation activities would occur over the short to medium-term and smothering of biotopes outside the dredge footprint is considered to be reversible through the resilience of the species present and the remobilisation and redistribution of sediment. As such the magnitude of this potential impact is considered to be low. Therefore, an impact of negligible significance is predicted*". If surveys have not occurred in the areas adjacent to the dredge channel, then the species are unknown, and this assessment is not backed up by evidence.	The physical conditions within the area surrounding the dredge channel are similar to the areas that were sampled and the consistency of results within the sampled areas enables a reasonable prediction to be made. As discussed in the impact assessment, any species outside of the dredge footprint could be vulnerable to smothering and infaunal species would have low sensitivity to such impacts. As such the species most at risk would be epifauna. The biotope data did not indicate the presence of any potentially vulnerable species but video surveys will be undertaken, as proposed below, in order to verify the presence of potentially vulnerable epifauna that could be affected by sedimentation.

The sections below present further information on our response to the comments presented in **Table 1**, in order to confirm the rationale behind the design and approach of the marine ecology survey undertaken in 2018 and to seek agreement on our approach to provide further information on the habitats adjacent to the proposed approach channel to support the assessment.

2 Rationale to the Marine Ecology Survey and Assessment Presented in the ES

2.1 Approach

The marine ecology survey specification for the proposed scheme was submitted to NRW for review on the 8th August 2017. The survey design included subtidal grab sampling and intertidal core sampling to identify the biotopes present within the proposed reclamation areas and approach channel. On the 19th September 2017 NRW responded positively to the specification and advised that:

"survey work will also be needed in any wider / secondary impact zone arising from sediment dispersal and any other activities likely to have an impact footprint larger than the development / dredge areas (including any sediment resettlement zones). The size and location of these wider impact zones will potentially need to be determined by modelling and will be dependent on the types of dredging and seabed preparation to be used during the project."

The grab sampling survey within the direct impact zone was targeted to determine the epifauna and infaunal components of the benthic community. This was because, within such zones, the species are vulnerable to physical disturbance from the dredging activity which would affect species on, and burrowed into, the sediment. The survey would therefore sample any epifauna and infaunal species within this zone which can then be assessed as to their sensitivity to such impacts. As such the survey design was not changed at this point while the numerical modelling was undertaken to determine any wider / secondary impact zones arising from sediment deposition during construction.

2.2 Numerical modelling

Numerical modelling was undertaken to inform the assessment of potential changes to coastal processes. This was also directly relevant to marine ecology as changes in physical processes (including increases in suspended sediment concentrations and changes to hydrodynamic conditions) were modelled. The results were used to confirm the design of the marine ecology survey and the subsequent assessments of potential impacts in Chapter 10 of the ES.

To inform this note and provide greater clarity on the results, and the potential impacts to benthic habitats outside the approach channel, the bed thickness plot has been updated (**Figure 1**). The plot has been revised to show deposition levels in increments of 1cm, from 0.001m to 0.1m (0.1cm to 10cm) and provides greater detail on the levels of deposition predicted in areas adjacent to the approach channel.

The areas receiving the most deposition (more than 10cm) are located directly adjacent to the proposed reclamation areas and within areas proposed to be dredged. Small areas of up to 8cm deposition are predicted to the north of Salt Island, in the vicinity of Terminals 3 and 5, and to the east of Orthios Jetty. Terminal 3 and 5 are maintenance dredged every two years and as such represent disturbed habitats. The small area to the east of Orthios Jetty is not dredged, however it would be subject to high levels of deposition during the maintenance dredging of Terminals 3 and 5. The wider area, extending west out to the Breakwater, and three areas extending to the east, is predicted to see a much smaller change in bed thickness of between 0.1cm and 1cm.

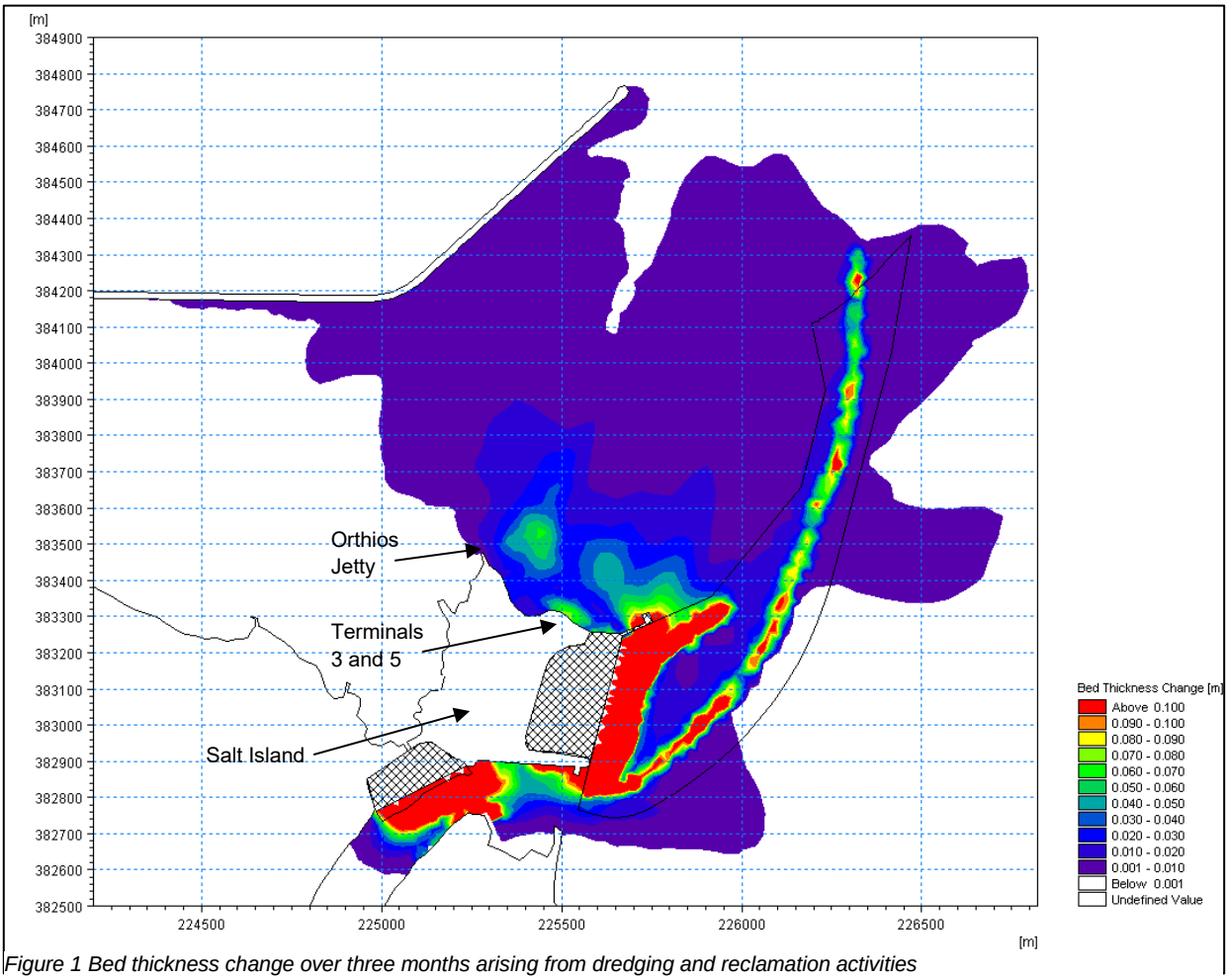


Figure 1 Bed thickness change over three months arising from dredging and reclamation activities

The model was run for a three-month period as this was when an equilibrium balance was reached, i.e. over the total period of dredging and reclamation the levels of deposition seen at three months represent the maximum predicted in these areas due to the action of currents, tides and waves redistributing the sediment.

The level of deposition predicted throughout this wider area (0.1cm-1cm) is not considered to have a significant impact on benthic habitats, with the majority of fauna able to recover by moving through this thin layer of sediment. This amount of deposition is also over a period of 3 months so the rate of sedimentation would be much lower on a daily basis, such that species would be able to move away if they are mobile or continue to move through the sediment for burrowing species. The natural bed shear stresses experienced within Holyhead Bay are between 0 and 2N/m^2 (Chapter 8 of the ES) which also suggest that the fine sediments present within the bay are likely to be continually resuspended and redistributed.

This was further supported by numerical modelling of changes to bed shear stress, driven by changes in tidal current velocities, during the operation of the proposed scheme. Predicted changes to bed shear stresses induced by the dredging of the proposed approach channel were assessed to be small, and the effect on sediment transport and deposition patterns was also found to be small (0.05N/m^2). Hence the potential impact on sediment transport and deposition patterns within Holyhead Bay was determined to be low, and no impact was determined for far-field areas.

2.3 Survey results

The subtidal grab survey was undertaken by the Institute of Estuarine and Coastal Science (IECS) in June 2018, the results were presented in Chapter 10 of the ES and the technical report by IECS was provided in Appendix E (Volume I) of the ES.

The biotopes identified in the survey were:

- *Mysella [Kurtiella] bidentata* and *Thyasira* spp. in circa-littoral muddy mixed sediment;
- *Abra alba* and *Nucula nitidosa* in circa-littoral muddy sand or slightly mixed sediment;
- *Capitella capitata* in enriched sublittoral variable salinity muddy sediments;
- *Aphelochaeta marioni* and *Tubificoides* spp. in variable salinity infralittoral mud;
- *Melinna palmata* with *Magelona* spp. and *Thyasira* spp. in infralittoral sandy mud; and,
- Cirratulids and *Cerastoderma edule* in littoral mixed sediment.

Of these only one was identified within the 16 samples taken directly within the proposed approach channel – *A. alba* and *N. nitidosa* in circa-littoral muddy sand or slightly mixed sediment. The remainder were identified within the reclamation areas and the dredged area in front of the Pelham Patch Reclamation area.

The biotopes outlined above include three of the biotopes predicted to be present within the area by the HABMAP project (Robinson *et al.*, 2011[1]), which are presented in **Table 2** and highlighted in bold.

[1] Robinson K, Ramsay K, Lindenbaum C, Walker P, Frost N, Vittorio M, Wright A. (2011). Habitat mapping for conservation and management of the Southern Irish Sea (HABMAP). III: Modelling and mapping extension study. CCW Sci Rep. 951:102.

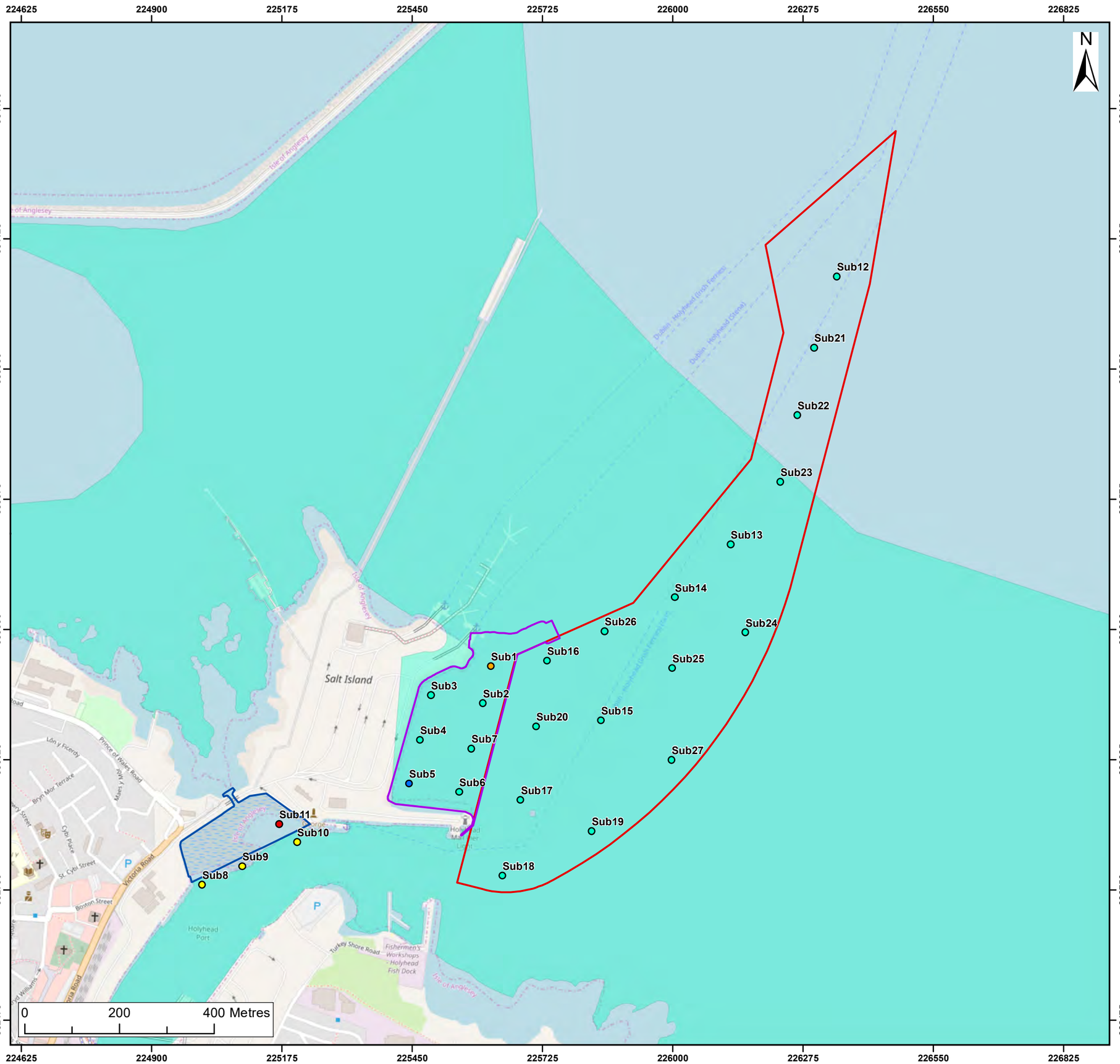
Table 2 Biotopes predicted to be present within Holyhead Bay by the HABMAP project (Robinson et al, 2011)

HABMAP biotope code	Biotope description
SS.SCS.CCS.PomB	*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles
SS.SCS.ICS.SLan	Dense *Lanice conchilega* and other polychaetes in tide-swept infralittoral sand and mixed gravelly sand
SS.SMp.KWSS.LSacR	*Laminaria saccharina* and red seaweeds on infralittoral sediments
SS.SMp.SSgr.Zmar	*Zostera marina/angustifolia* beds on lower shore or infralittoral clean or muddy sand
SS.SMu.CSaMu.AfilMysAnit	*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud
SS.SMu.CSaMu.LkorPpel	*Lagis koreni* and *Phaxas pellucidus* in circalittoral sandy mud
SS.SMu.ISaMu.MelMagThy	***Melinna palmata* with *Magelona* spp. and *Thyasira* spp. in infralittoral sandy mud**
SS.SMx.FluHyd	*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment
SS.SMx.CMx.MysThyMx	***Mysella [Kurtiella] bidentata* and *Thyasira* spp. in circalittoral muddy mixed sediment**
SS.SSa.CMuSa.AalbNuc	***Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment**
SS.SSa.IFiSa.IMoSa	Infralittoral mobile clean sand with sparse fauna
SS.SSa.IMuSa.EcorEns	*Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand
SS.SSa.OSa.OfusAfil	*Owenia fusiformis* and *Amphiura filiformis* in offshore circalittoral sand or muddy sand

The *A. alba* biotope was the only biotope found within the sixteen samples taken with the approach channel area and the species which are dominant within this biotope are those that would not be expected to be sensitive to sediment deposition. For example, *A. alba* is resistant to deposition of up to 20cm[2] with species able to burrow through this amount of sediment within one day. As such it is considered that the predicted maximum deposition levels of between 0.01cm and 0.1cm do not represent a significant impact to this biotope.

Given the similar physical conditions in the surrounding area and the high level of dominance of this biotope in this area, it would be reasonable to predict that this biotope extended into the areas adjacent to the approach channel, certainly within the areas that would be affected by the higher deposition rates. This is also supported by the consistency with the HABMAP data which also predicts the biotopes in the area based on ground truth data and physical conditions (**Figure 2**).

[2] Tillin, H.M. & Budd, G., 2016. [Abra alba] and [Nucula nitidosa] in circalittoral muddy sand or slightly mixed sediment. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 10-03-2020]. Available from: https://www.marlin.ac.uk/habitat/detail/62



Legend:

Proposed Scheme

- Approach Channel

Reclamation Areas

- Salt Island Expansion
- Pelham Patch Development
- Predicted SS.SS.CMuSa.AalbNuc Biotope Region

Subtidal Grab Locations

Biotopes

- SS.SMX.CMx.MysThyMx
- SS.SMU.SMuVS.AphTubi/SS.SMU.ISaMu.MelMagThy
- LS.LMx.Mx.CirCer
- SS.SSA.CMuSa.AalbNuc
- SS.SMu.SMuVS.CapTubi/SS.SSA.CMuSa.AalbNuc

Client:	Project:
Stena Line Ports Ltd	Holyhead Port Expansion

Title:

Subtidal Grab Survey Results and HABMAP Predictive Data

Figure:	Drawing No:
2	PB6108-108-1001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	13/03/20	FC	SM	A3	1:8,000

Co-ordinate system: British National Grid

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3 Next Steps

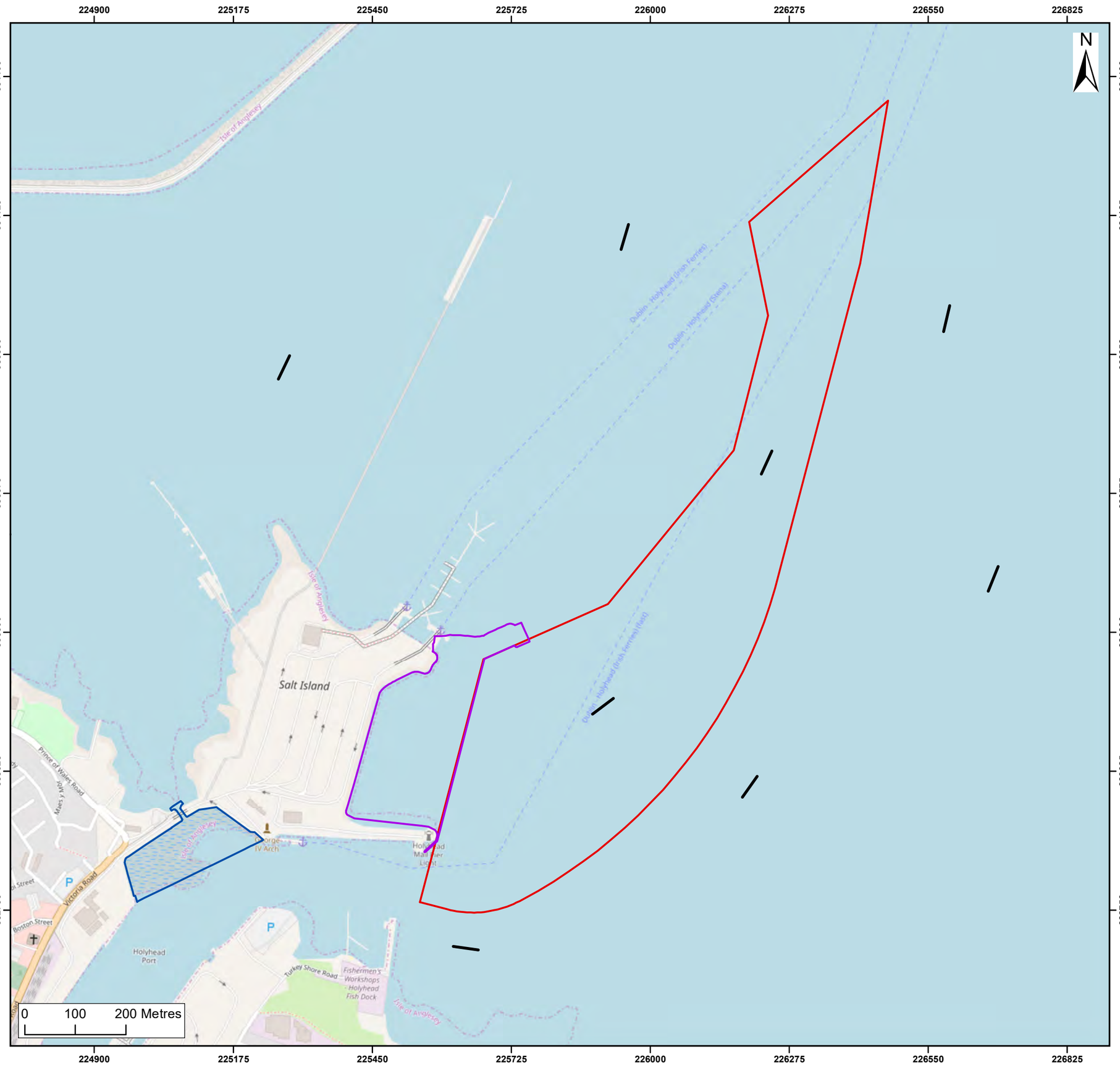
3.1 Video transect survey

In order to address the concerns raised by NRW that the area adjacent to the dredge channel has not been adequately characterised and to provide further support to the prediction that the habitats adjacent to the proposed approach channel are similar to those within, a video transect survey is proposed (**Figure 3**).

Video is selected in order to determine if there are any species that would be sensitive to sedimentation. The infaunal component of the benthic community is not expected to be significantly affected by the small amount of sedimentation over the duration of the dredge activity. The modelling results show minimal deposition in the areas surrounding the dredge channel.

In order to compare the areas within and outside the dredge channel, and to establish the potential for sensitive epifauna, it is proposed that two video transects will be undertaken within the approach channel, with a further six transects located in areas adjacent to the approach channel. A comparison between the habitats present within and outside the approach channel can then be made. This would be able to verify whether the area is composed of burrowing species and/or epifaunal species. If the area is inhabited by burrowing species it should be possible to observe burrowing activity which would verify that the sensitivity is low. The video results would also observe any other sensitivities which could be affected by indirect impacts, such as sedimentation.

The results of the survey will be presented in an addendum to the ES, along with an updated assessment on benthic ecology.



Legend:

Proposed Scheme

- Approach Channel

Reclamation Areas

- Salt Island Expansion
- Pelham Patch Development
- Proposed Video Transect

Client:	Project:
Stena Line Ports Ltd	Holyhead Port Expansion

Title: Proposed Video Transect Locations

Figure:	Drawing No:
3	PB6108-108-1000

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	10/03/20	FC	SM	A3	1:7,500

Co-ordinate system: British National Grid

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Confirmation Email from NRW on Proposed Methodology for Supplementary Marine Ecology Video Survey of Holyhead Port

From:	Wray, Ben
To:	Sarah Marjoram
Cc:	Revill, Sarah
Subject:	CML1931 Holyhead Port Expansion - Proposed Methodology for Supplementary Marine Ecology Video Survey of Holyhead Port
Date:	01 April 2020 11:37:21

Hi Sarah,

On reviewing the supplementary marine ecology video survey methodology proposal with respect to our request for great characterisation effort for the wider area (i.e. secondary/indirect impact zones as a result of potential smothering). We have some reservations on the practicality and justification of using drop-down video survey to determine the presence of habitats and species sensitive to smothering and to support to the prediction that the habitats adjacent to the proposed approach channel are similar to those within the dredge footprint. These are mainly due to the turbid nature of the environment and the ability to detect and assign relevant biotopes and species.

We note from the numerical modelling presented that the areas receiving the most deposition (> 10cm) are located directly adjacent to the proposed reclamation areas and within areas proposed to be dredged. These include most soft sediment habitats but also some intertidal rocky reef areas. To a certain extent I agree with the assumptions made that most of the habitats and species likely present in these areas are likely to be fairly resilient to a certain amount of smothering. However, please could you provide clarification on the upper threshold figures from the numerical modelling as currently it displayed a simply >10cm. This information would help to assess the sensitivity of habitats in these impact zones against MarLIN/MarESA benchmark levels. Please could you display this information acknowledging that dredge frequency for construction and operation, as well as any influence of tides has been considered.

Provided it can be confirmed that deposition in the secondary impact zones will not exceed the relevant MarLIN/MarESA sensitivity thresholds for the predicted habitats and species (subject to agreement with our coastal processes and water quality specialists on the numerical modelling) I would see no need for additional characterisation surveys.

Please let me know if you have any queries.

Thanks
Ben

Ben Wray
Cynghorydd Arbenigol: Ecolegydd Morol / Specialist Advisor: Marine Ecology
Tîm Cyngor Morol Cymru Gyfan / Marine All Wales Advice Team
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Appendix C3

Holyhead Port Expansion – Archaeology and Cultural Heritage Mitigation Options Note

Meeting with the IoACC for Archaeology and Cultural Heritage

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Wyn Parry (Stena Line Ports Limited)
From:	Victoria Cooper and Tim Davies, Royal HaskoningDHV)
Date:	18 February 2020
Copy:	Jamie Gardner and Sarah Marjoram (Royal HaskoningDHV)
Our reference:	PB6108
Classification:	Project related

Subject: **Holyhead Port Expansion - Archaeology and Cultural Heritage Mitigation Options**

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1 Background

Chapter 19 of the Environmental Statement (ES) for the Holyhead Port Expansion (Archaeology and Cultural Heritage) concluded that, with mitigation, there would be no significant impacts upon archaeology and cultural heritage with the exception of the Grade II Listed Admiralty Pier (including the sea wall between salt island bridge and George IV Arch) (RHDHV 25 and RHDHV 129) and the Lighthouse on Admiralty Pier (RHDHV 30).

There have previously been concerns regarding the setting of the group of Listed Buildings around the Pelham Patch reclamation area (George IV Arch (Grade II*) (RHDHV 6), Harbour Office (Grade II*) (RHDHV 7) Customs House (Grade II) (RHDHV 27) and the Grade II marine workshop buildings). Although existing visual links are frequently obscured by various features in the busy operating port (e.g. haulage lorries, modern structures etc) their group value is important and visual links should be maintained. To address this, the permanent storage of containers within Pelham Patch has now been ruled out, however we anticipate occasions when containers will need to be stored on the site temporarily. We propose that these can be placed to minimise impacts to the line of sight with assets on Salt Island and wish to discuss this with the heritage stakeholders. In addition:

- The service road will be realigned which will alleviate traffic currently affecting the assets, thereby reducing the effects of this element of setting upon the historic environment; and
- The perimeter fencing will also be replaced to a more open design to improve views from the Holyhead Beach Conservation Area (in the Marine Square area), towards the Old Harbour.

With the planned permanent storage containers on this area now ruled out, and the above improvements in fencing and traffic arrangements, a significant impact upon the setting of this group is no longer anticipated.

However, direct impacts to the Admiralty Pier (including the sea wall between salt island bridge and George IV Arch) (RHDHV 25) will occur with the reclamation abutting directly against the fabric of the structure following the removal of existing rock armouring. Key features of heritage significance will be preserved, with the south side and surface of the Admiralty Pier maintained and other key heritage assets avoided with no potential for direct impact to occur to the lighthouse (RHDHV 30), George IV Arch (RHDHV 6), Harbour Office (RHDHV 7) and Custom House (RHDHV 27). The Quay Wall, south of Salt Island (RHDHV 129), which also forms part of the Admiralty Pier listing, and against which the Pelham Patch Development will abut, will also be subject to direct impact with the burial of this asset in the volume of the reclamation.

With respect to the setting of these heritage assets, the setting of Admiralty Pier (RHDHV 25) will be significantly altered by the proposed reclamation of the Salt Island Expansion which will result in the asset no longer forming a pier-like structure. Similarly, the setting of the Admiralty Pier Lighthouse (RHDHV 30) will no longer feature as an isolated feature on the end of the pier, which will instead be incorporated into the wider port landscape as a result of the neighbouring reclamation area.

It is therefore necessary to seek appropriate mitigation measures to reduce and offset these impacts where possible.

2 Heritage Settings Telecon

On the 17th May 2019 a call to discuss the setting impacts was arranged by Royal HaskoningDHV attended by John Williams and Keith Williams from Isle of Anglesey County Council (IoACC), Jenny Emmett from Gwynedd Archaeological Planning Service (GAPS) and Deanna Groom from Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW).

During this call, possible mitigation was discussed including:

- Lowering of the lighthouse wall, so as not to impede views of the lighthouse and pier;
- Lowering of the ground level of the reclaimed area by c. 0.5m compared to the pier so that the ground level of the Pier is more prominent;
- The use of different materials to differentiate between the new port areas and the heritage assets; and
- Measures to off-set impacts or compensatory measures such as public facing interpretation panels from areas offering key views of the pier (e.g. South Pier) as a way of enhancing public appreciation of the heritage significance of the asset against the surrounding modern port expansion.

Keith Williams, however, reiterated that IoACC have concerns for the setting of these structures, and the limited opportunities for mitigation, and queried whether the 0.5m difference in height was sufficient in minimising impacts to the pier. It was also felt that, whilst increasing the awareness of the structures by use of information boards would be welcome, this would be insufficient to reduce or off-set an impact of this degree. The potential for shortening the reclaimed area to leave a void between the area and the pier was also discussed (see Section 4 below), although it was acknowledged that this would unlikely reduce the impact of the presence of the reclaimed area in views towards the pier, with the development continuing to be visible as integrated area.

It was concluded that further consultation with Cadw should be carried out in advance of any further discussions.

3 Consultation with Cadw

Following the heritage settings call, Cadw were contacted via email and a supplementary note was provided on heritage mitigation and a consideration of alternatives. Following receipt of this note, Cadw's Senior Inspector of Ancient Monuments and Archaeology responded that the summary of the archaeological assessment does not raise issues of concern, with the main matters to be addressed in the application being those in connection with the Grade II Admiralty Pier and associated undesignated storehouses.

Further consultation on the proposed design, on the potential impacts to the Admiralty Pier and Lighthouse and options for mitigation, such as the use of sympathetic building materials and colour schemes, or the provision of public information panels, will therefore be required with the Local Planning Authority only.

4 Design Considerations

Following submission of the ES IoACC have provided a consultation response with specific reference to the following design features of the reclamation area:

- the abutment of the reclamation area to Admiralty Pier; and
- the introduction of the new Lighthouse Wall to the south;

Specifically, IoACC have commented that:

..the proposal for the Salt Island Expansion to directly abut Admiralty Pier and by doing so restrict much of the appreciation of the building and its function as a pier is of concern. The intention to introduce a new lighthouse wall to the South, that would further erode the setting and views of the listed building particularly from the direction of the grade II listed South Pier, is of equal, if not greater concern.

With respect to the inclusion of a void or 'cul-de-sac' between the pier and reclaimed area, and the need for the lighthouse wall, our response from a design and engineering perspective is included below.

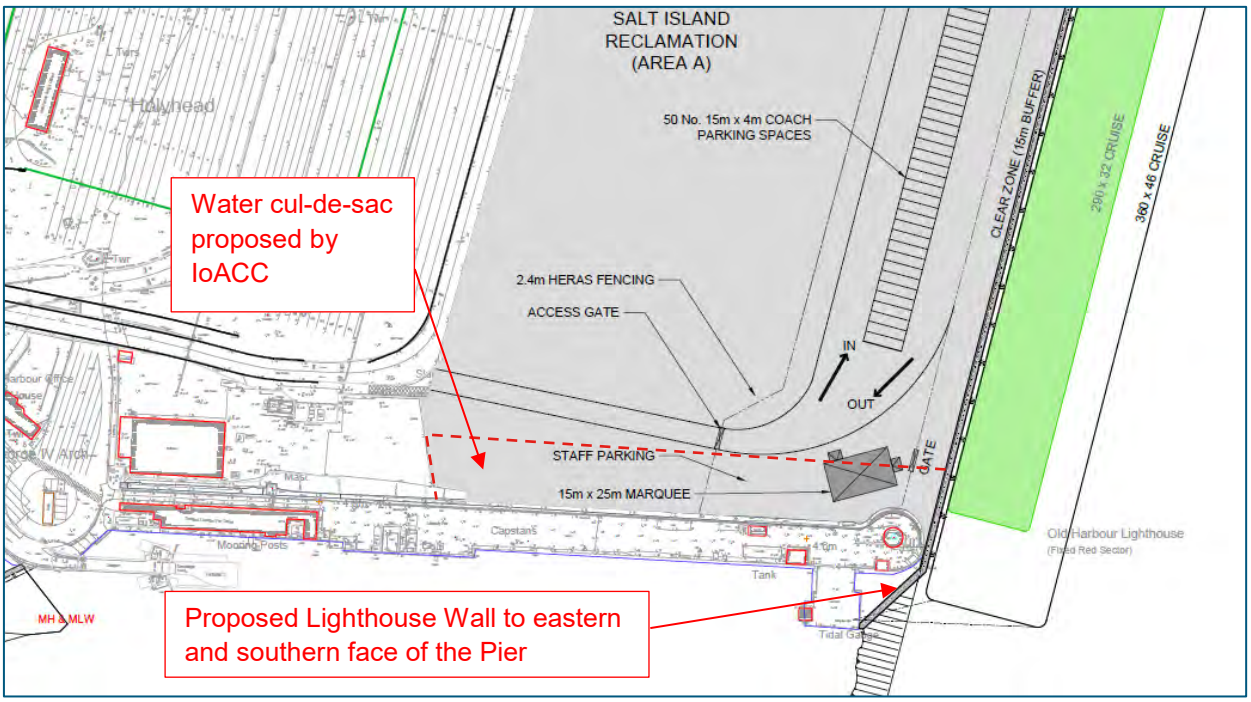

Figure 1: Location Plan

One of the most important design aspects of the proposed facility is to accommodate the larger cruise vessels through all states of the tide whilst moored safely at the berth. To be able to do this the finished dredged level at the berth has to be -10.5 metres Chart Datum for the full length of the berth. The combination of the combi-wall forming the quay and the Lighthouse Wall around the Admiralty Pier ensure that the turret section and the lighthouse mounted on it does not collapse into the dredged pocket as the required depth of the berth is below the founding of the turret section.

In mitigation of the Lighthouse Wall passing around the Pier we deliberately limited the height of the wall to mid-tide level, therefore during most of the tidal cycle the new Lighthouse Wall will not be visible. Without the wall, it will not be possible to dredge to the required depths.

In providing a 'cul-de-sac' of water to remain between Admiralty Pier and the reclaimed area, as indicated on the above plan (**Figure 1**), the southern end of the berth would have to be stopped short allowing for a dredge slope back up to the existing seabed level at Admiralty Pier. The shortened dredge pocket and slope would therefore mean the berth would be 100m shorter than designed and could not accommodate the larger cruise vessels. Furthermore, an additional face of combi or sheet pile wall along the southern edge would have to be provided in order to support the material filling the reclaimed area, a function provided by Admiralty Pier in the current design.

The reduced number of passengers which can be accommodated by smaller vessels (c. 1,200 fewer per vessel), combined with the increase in cost associated with the requirement for an additional retaining structure (c. £3.3 million) would have a significant impact upon the business case for the proposed scheme.

Furthermore, as shown in the image below (**Figure 2**) the existing revetment of Admiralty Pier on the northern side, where the water 'cul-de-sac' would be located, includes crevasses, loose rocks and several closely placed dwarf walls on the right-hand side. These obstacles will attract and retain debris during the tidal movement, and eventually the debris will stop the full flushing (emptying) of the 'cul-de-sac' thereby allowing water to stagnate.

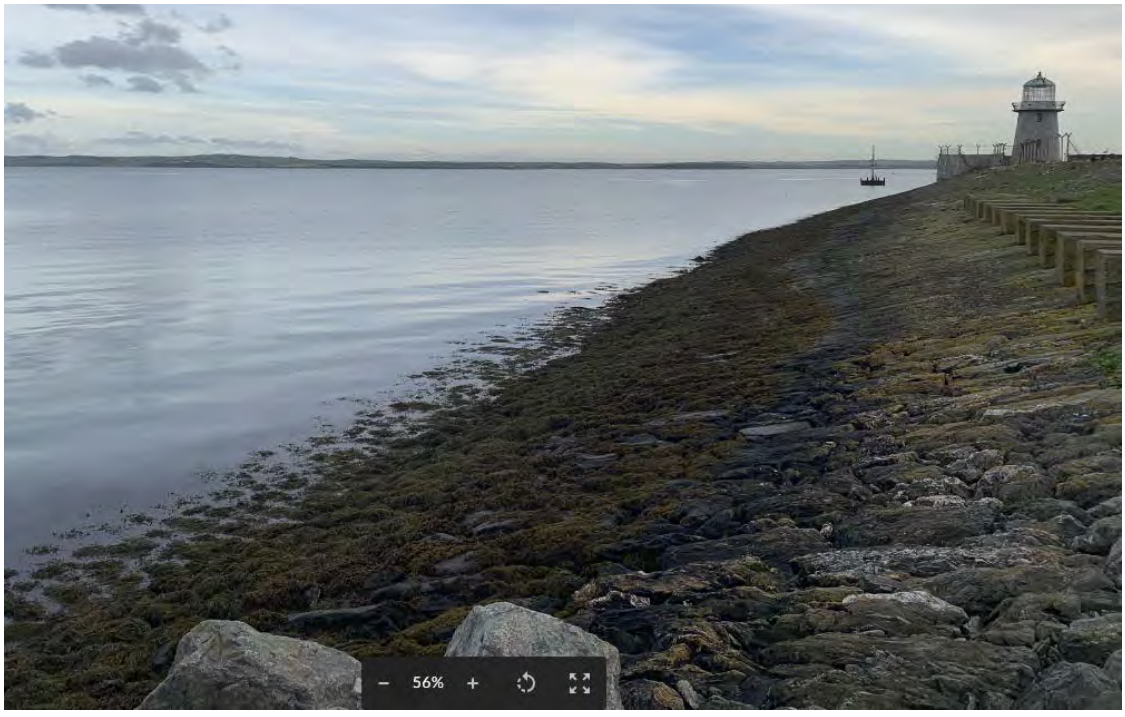

Figure 2: Existing face of Admiralty Pier on the northern side during a low tide looking towards the east

In conclusion, the wall is essential in order to reach required dredging depths and the addition of a void between the reclaimed area and the pier is not a feasible solution if the berth is to be fit for purpose.

5 Proposed Mitigation

In summary, IOACC have raised concerns that proposal for the Salt Island Expansion will restrict much of the appreciation of the Listed structure and its function as a pier, and that the lighthouse wall will further erode the setting and views. Similarly, IoACC also raise significant concerns that the Pelham Patch reclamation will also abut the listed structure (i.e. the section of the sea wall between Salt Island Bridge and the George IV Arch) and by doing so restrict much of the appreciation of the structure.

As stated by IoACC, when this application is determined the significant impact of the proposed development on the setting of Admiralty Pier and the Lighthouse will need to be considered against the public benefit of the proposed development. Any measures, therefore, which can offset or reduce the significance of this impact should be explored.

Following previous consultation, the permanent storage of containers on Pelham Patch has now been ruled out. However, occasions are anticipated where the storage of containers on Pelham Patch will be required. We wish to discuss with the heritage stakeholders where these can be placed in order to minimise impacts to the line of sight to heritage assets on Salt Island. Together with the proposal to improve existing perimeter fencing and open up views of the historic port, the aim is to maintain sight lines between the listed structures around the reclaimed area and improve the setting overall.

It has also been determined that the removal of the lighthouse wall, and the inclusion of a void between the pier and the reclaimed area are not viable for engineering reasons (see Section 4 above).

In order to inform further consultation with IoACC we therefore propose the following mitigation measures for further discussion:

1 It is acknowledged that, at distance, even with the 0.5m reduction in ground level, the pier would still be visually indiscernible from the reclaimed area. However, this height difference, together with the retention of the existing pier surface, will mark out a physical distinction between the pier and the reclaimed area. This can be further distinguished through the use of different (sympathetic) materials to differentiate between the new port areas from the heritage assets. In maintaining the existing surface, the line of the northern edge of the pier, a key characteristic of the pier, will be physically (and visually) maintained.

2 It is proposed that a full 3d model of the current extent of the Pier and Lighthouse can be produced using point cloud data. This will ensure that the existing structures are preserved by record, together with a digital photographic record prior to works commencing.

3 The 3d model, photographs (including existing views) and relevant documentary records can be used to produce publicly accessible information on the Pier and wider port history which could include:

- Public facing information boards; and/or
- A museum display/exhibition piece (for installation either locally e.g. Holyhead Maritime Museum, or at a regional museum or other public building).

4 Arrangements to increase public accessibility into Salt Island and the port operational areas through pre-arranged accompanied tours, for example, improving access to designated structures such at the George IV Arch, Harbour Office and Customs House.

5 Discussion on the sympathetic placement of containers on Pelham Patch to minimise impacts to the line of sight between heritage assets on Marine Yard and Salt Island.

In agreement with Stena Line Ports Limited we propose to issue the content of this note to IoACC, and GAPS, to invite them to meet on site to discuss these options in more detail and any further mitigation which might be considered once on site.

Holyhead Port Expansion – Cultural Heritage

Date: 5th March 2020 **Meeting at:** Council Offices, Llangefni

Subject / purpose:

Discuss IACC's cultural heritage concerns in relation to the Holyhead Port Expansion proposals.

Attendees:

Dylan J. Williams (IACC)
Rhys Ll. Jones (IACC)
Cpt. Wyn Parry (Stena Line Ports Ltd.)
Jamie Gardner (Royal Haskoning DHV)
Victoria Cooper (Royal Haskoning DHV)

Apologies:

Liz Davies (IACC)

Purpose

The purpose of the meeting was to discuss the IACC's concerns in relation to the potential impacts of the proposed Port Expansion proposals on cultural heritage assets within the Port (primarily Admiralty Pier). In response to Natural Resources Wales (NRW) consultation on the Marine Licence application (October 2019), the IACC raised a number of concerns in relation to the potential impact of the proposed developments on Admiralty Pier (including the lighthouse) and on the setting of the other listed buildings within the Port (namely Admiralty Arch, Customs House and the Harbour Office).

In response to the IACC's concerns, the applicant's consultants Royal Haskoning DHV produced a short paper titled "Holyhead Port Expansion – Archaeology and Cultural Heritage Mitigation Options". The purpose of this paper was to address the IACC's concerns and identify potential mitigation proposals. The purpose of the meeting therefore was for IACC to respond to this paper and for the applicant and IACC to identify and agree common ground.

Summary of IACC Response

IACC confirmed that we are committed to seeing the Port develop and expand, but we have a statutory duty to ensure that listed buildings (and their setting) are protected. The IACC is eager to work with Stena to identify and agree mitigation to protect the setting and integrity of these listed buildings, whilst meeting the Stena's ambitions for the Port to develop and expand.

Admiralty Pier

i. The IACC welcome the explanation why a 'void / cul-de-sac' is not a possible between the reclaimed area and Admiralty Pier. The IACC also fully understand the economic consequences of a shorter berth and accept this is not a credible option given the IACC's desire for the Port to expand and to accommodate the larger cruise vessels.

ii. Further detail is required on the engineering solution in order to protect the integrity of Admiralty Pier. The IACC do not wish to see visible pilling along the southern side of Admiralty Pier (Quay Wall) towards Pelham Patch. This wall

should remain in view. If pilling is required to strengthen the Pier, the IACC would request that pilling is along the northern side of the Pier to strengthen and protect the Pier before filling.

iii. The IACC note the 0.5m lowering of the ground level of the reclaimed area compared to the Pier. Whilst this is welcomed, the IACC would question whether this provides a discernible difference in levels and would it be possible to lower this further (to 1m) to have a clearer distinction between the Pier and the reclaimed area?

iv. IACC welcome the lowering of the lighthouse wall so as not to impede views of the lighthouse and pier.

v. Removal of 'clutter' along the prier and around the lighthouse (e.g. buoys, boats, sheds, concrete blocks etc.) would also improve the setting of these listed buildings.

Pelham Patch

vi. The IACC welcome the applicants commitment not to permanently store containers on Pelham Patch. Whilst the existing visual link to the group of listed buildings are frequently obscured, the proposed new perimeter fencing and realignment of the service road offers an opportunity to open up this view and improve the visual setting of these listed buildings. This combined with interpretation boards overlooking the Old Harbour (from Marine Square area / Victoria Road) would be a welcomed addition to capture the historic value and 'tell the story' of these important local landmarks.

vii. Potential for viewing platform and interpretation boards at car park off Marine Square (towards public toilets) would be welcomed. Need to discuss further to establish land ownership etc.

viii. The removal of stored lorries/buses etc. in front of these listed buildings (particularly Admiralty Arch and Customs House) would also improve the setting of these listed buildings.

ix. Further detail on the type of perimeter fence to be used is required. Also fencing within the site may obscure the view therefore, consideration of this fence is also required.

x. Further clarity is required on what is meant by 'containers may need to be stored on the site temporarily'. Need to define and agree what is meant by temporary and where the containers will be stored to maintain line of sight to the heritage assets from key viewpoints.

Additional Mitigation

xi. The proposal to develop a 3D digital model of the existing pier and lighthouse is welcomed. The IACC also welcome the proposal to develop a museum / exhibition piece of the group of listed buildings and would encourage this to be displayed at the Holyhead Maritime Museum or Market Hall. The combination

of a physical model and a 3D digital display would assist in telling the story of these important local buildings.

xii. Similarly, it is important to tell the 'next chapter' of Holyhead Port's story and to show the proposed development overlaid on the current model. This will be important in public consultation and for local people to understand the Port Expansion proposals.

xiii. The IACC also welcome the inclusion of public facing interpretation boards. These could also be linked to the digital model (through QR code, for example) so that people could get to see these assets and have an explanation of their history and importance through their mobile phones. This is important as the view is sometimes obscured when the ferry is loading/unloading.

xiv. Arranging pre-arranged tours into the Port's operational areas is also to be encouraged so people can see and appreciate these historical assets. The IACC note the operational difficulties of this but it is important that local people (e.g. schools or local groups) have the opportunity to see and learn about these listed buildings.

Summary of Actions / Issues Agreed

i. Applicant to respond to the IACC's comments with further detail/explanation of engineering and design solutions.

ii. Discussed the potential to link the listed buildings within the Port with other historic buildings within the Town by creating a 'Heritage Trail'.

iii. Stena confirmed that they are looking to develop the lighthouse on Admiralty Pier into a heritage centre. IACC confirmed this would be welcomed and could be the start of the 'Heritage Trail' for cruise ship passengers.

Appendix D

SSC Conversion Methodology

Titan Environmental Surveys Limited
A GARDLINE COMPANY

Methodology report for:
Stena Line Ports Ltd

Project:
Holyhead Harbour Survey

Description:
SSC Conversion Methodology

Period:
May-June 2018

Project Number:
CS0530

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Oceanography	H. Luck (Marine Surveyor)
Authorisation	Checked	K. Hayes (Environmental Data Scientist)
	Approved	D. Owens (Technical Director)

Revision	Date	Title	Titan Report Ref
1	24/07/2018	SSC Conversion Methodology	CS0530/SSC/V1

Distribution

No of copies: 1

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1. INTRODUCTION

1.1 General

In March 2018, Titan Environmental Surveys Ltd was commissioned by Royal Haskoning DHV (RHDHV) on behalf of Stena Line Ports Ltd. to conduct a geophysical, bathymetric, current and turbidity surveys within the vicinity of Holyhead Harbour. The survey took place between the 3rd March and 12th of June 2018.

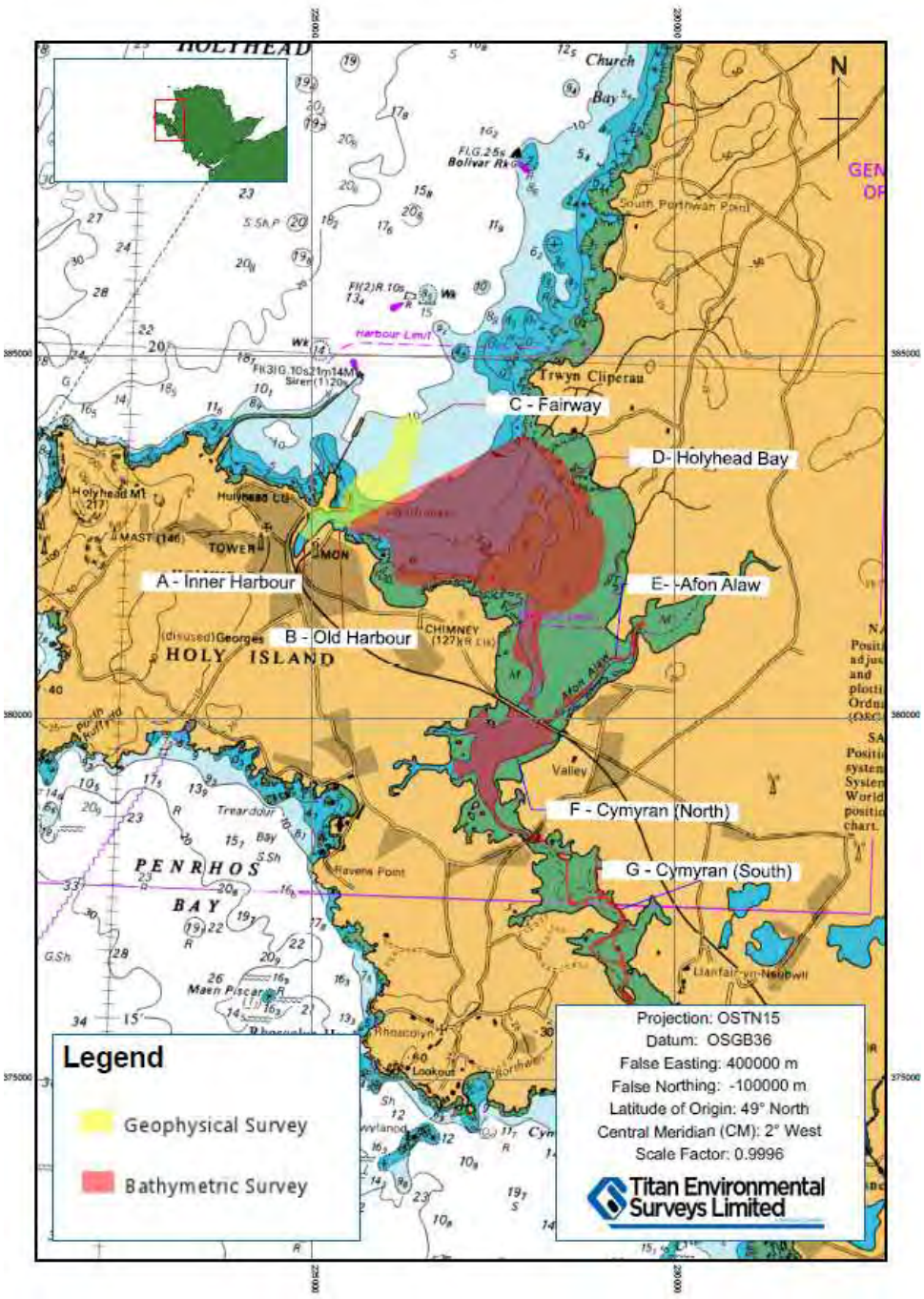

Figure 1.1 Geophysical and Bathymetric Survey Location

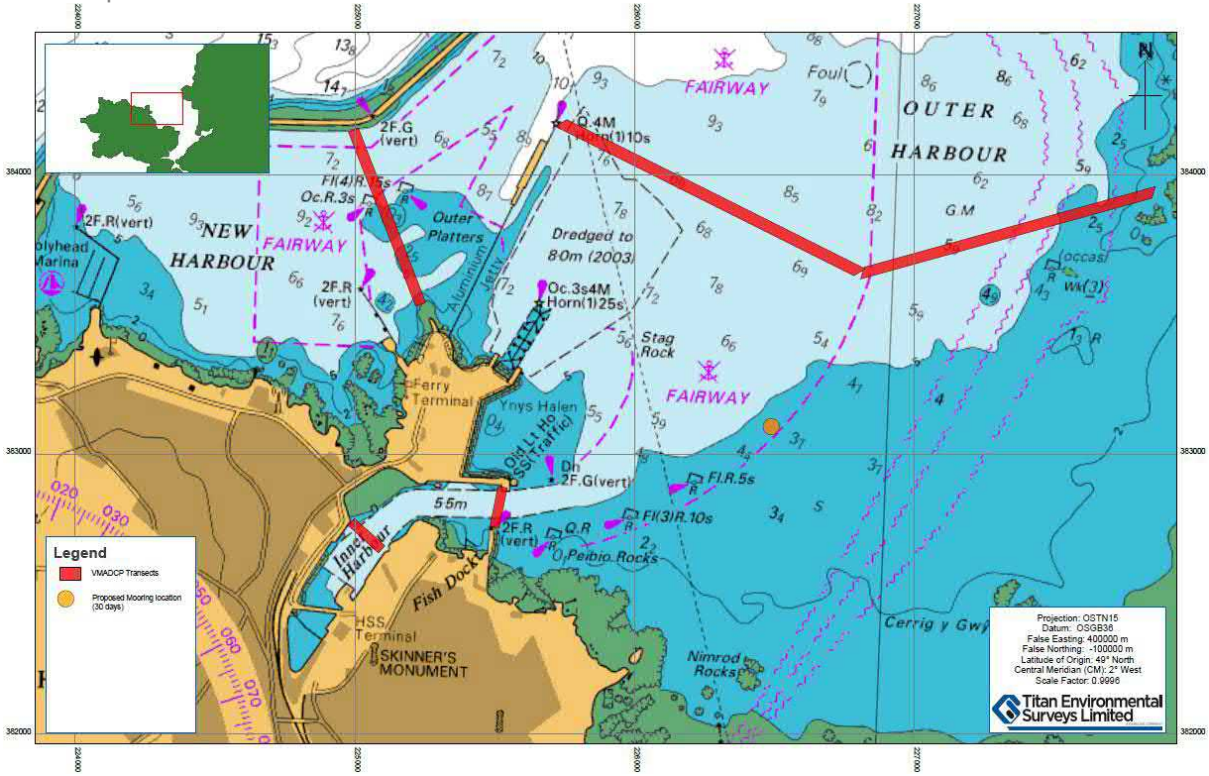

Figure 1.2 Oceanographic Survey Area

1.2 Report

This report details the methodology to be implemented to convert the turbidity data (FTU) collected by the deployed field instrumentation into quantifiable units of Suspended Sediment Concentration (SSC, mg/l).

2. SURVEY OVERVIEW

2.1 Turbidity data

Near bed turbidity data, recorded in FTU or mg/l Kaolin, was collected by monitoring instrumentation located on the met ocean mooring bed frame (Table 2.1). A JFE Infinity-Turbi Logger was deployed equipped with medium and high range sensors, able to measure turbidity up to 1100 FTU and 100g/l Kaolin. In addition to this, the JFE logger has an integral wiper to keep the turbidity sensor windows free of debris together with temperature and pressure sensors.

Table 2.1 Metocean mooring deployment details

Deployment time	Recovery Time	Deployed position			
		Latitude (WGS84)	Longitude (WGS84)	Easting OSGB 36 (OSTN02)	Northing OSGB 36 (OSTN02)
07/05/2018 12:10	12/06/2018 08:10	53°18.937'N	004°36.206'W	383013	226676

2.2 Grab Sampling

As part of the field work campaign, grab samples were collected using a mini van veen grab. 4 x 0.5l sediment samples were collected in close proximity to the mooring to represent the nature of the suspended solids that have dropped out of suspension.

Table 2.2 Summary of the grab sample locations

Grab Sample Locations				
Grab Sample Time	Grab Locations			
	Latitude (WGS84)	Longitude (WGS84)	Easting OSGB 36 (OSTN02)	Northing OSGB 36 (OSTN02)
19/05/2018 07:05	53°18.954'N	04°36.204'W	383044.6	226672.4
19/05/2018 07:10	53°18.953'N	04°36.212'W	383043.1	226663.4
19/05/2018 07:15	53°18.954'N	04°36.194'W	383044.2	226683.5
19/05/2018 07:18	53°18.959'N	04°36.204'W	383053.9	226672.7

3. SSC CONVERSION METHODOLOGY

3.1 Sample preparation

On return to the Titan office the samples are placed in a fridge until required for use. Due to the organic content that may be present in the sample, the calibration process is completed as soon as possible.

Before analysis can begin, the samples must be thoroughly stirred to ensure uniformity throughout. Sediment slurry needs to be made for the SSC conversion by weighing out some of the sediment sample and adding it to a known volume of water. For this conversion, 40g of sediment sample will be added to 250ml of water.

3.2 Standard Addition Technique

The technique to be used in the SSC conversion will be of a similar technique to what is used during the pre-deployment turbidity calibration of the turbidity instrumentation. This is to ensure that the turbidity values collected by each instrument are comparable with those of a known standard concentration (in FTU or g/l Kaolin). This methodology can be found in Appendix D.

Two of each instrument type used on the deployment (Aquatec AQUAlogger 210TY and the JFE Infinity-Turbi) will be suspended in a black container in a predetermined volume of standard sea water together with a rotating magnetic stirrer (Photo 3.1). The prepared slurry will be placed in a glass beaker with a rotating magnetic stirrer to ensure that all sediment particles remain mobilised.

The slurry will be then added into the black container volumetrically at pre-set increments (using a digital pipette). After the addition of each increment, the sediment will be allowed to fully disperse for 2 minutes. The instruments will be allocated a set time and frequency to record the turbidity values (minimum 2 minutes at 1s intervals).

The Aquatec 210TY logger will be set up to provide a real-time reading of the turbidity values to aid in ensuring that each increment has been allocated enough time to be accurately measured.

It is proposed that the addition of sediment slurry will be added until a turbidity of approximately 400 FTU has been achieved for the Aquatec 210TY logger. This will also cover the JFE medium range sensor to 400 FTU.

As the slurry concentration and the relative response of each instrument is unknown; it may be necessary to either repeat the test with different increments or vary the increments as the test progresses.

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Figure 3.1 Aquatec and JFE turbidity loggers setup for adding standard additions

3.3 Laboratory analysis

Once the test has been completed, the Total Suspended Solid (TSS) concentration of the slurry used in the calibration bath will be determined.

As the concentration of suspended solids is low, the determination of the SSC dry weight will be difficult in the Titan laboratory due to the weighing instrumentation being limited in the number of decimal places it can display. 3 x 1 litre samples of the sediment solution from the calibration bucket (while being kept in suspension) will be sent to an accredited laboratory (ALS) to determine Total Suspended Solids (TSS, mg/l).

The determined TSS dry weight value can be then used to determine the concentrations at the individual increments via a ratio basis.

3.4 SSC conversion

Using the result of the “dry weight” analysis, the amount of suspended sediment in each standard addition increment can then be calculated. The TSS concentrations will be plotted against the corresponding mean turbidity values for the instrument..

Regression analysis will be used to obtain the relationship between turbidity (FTU) and TSS concentration (mg/l) for the test instruments. The range of points used in the regression analysis can be tailored to correspond to the range of values found during the deployment for a specific instrument type at a specific location.

Each individual instrument deployed will show slightly different calibrations (using formazin) when compared to the test instrument of the same make / model. The formazin calibration algorithm will be applied to an individual instrument before the TSS conversion algorithms applied in order to correct for these small differences.