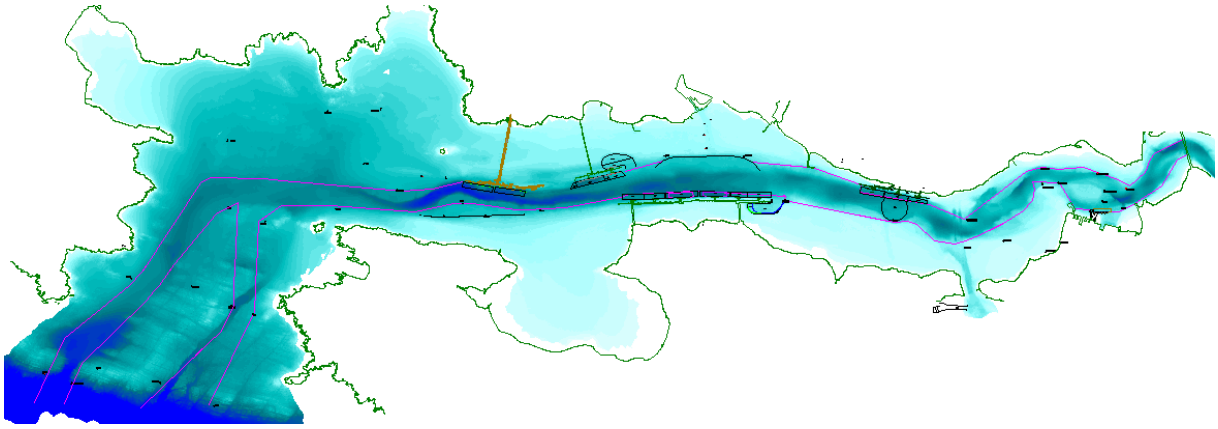
Milford Haven Port Authority

Dredging Strategy 2022-2031

Water Framework Directive Compliance Assessment



November 2021

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Client: Milford Haven Port Authority
Project: Dredging Strategy 2022-2031
Title: WFD Compliance Assessment

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1 Introduction

1.1 Water Framework Directive Compliance Assessment

1.1.1 This report presents the findings of an assessment of the Dredging Strategy for Milford Haven from 2022 to 2031 in relation to compliance with the EU Water Framework Directive (the 'WFD'), as transposed under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and as retained in UK law following the UK's withdrawal from the European Union under the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 (the 'WFD Regulations').

1.2 Dredging Strategy 2022-2031

Historical Maintenance Dredging and Disposal of Dredged Material

1.2.1 For many years Milford Haven Port Authority (MHPA) have undertaken capital and maintenance dredging of the channels and berths within their harbour limits in and around Milford Haven. MPHA's harbour limits are shown in **Figure 1** in **Appendix 1**. A detailed historical review of dredging activity is provided in the Dredging Strategy Document (Revision 3) (MHPA, 2021).

1.2.2 Between 1985 and 2021, capital and maintenance dredging campaigns have been undertaken at various locations within Milford Haven between St Anne's Head to the west and the Cleddau Bridge to the east; including various locations along the main navigation channel, including but not limited to Milford Docks' approach channel and pontoon area, the Valero Refinery's berths and approaches, the Valero Pembrokeshire Oil Terminal's (VPOT; previously known as 'Semlogistics') berths, Dragon LNG berth, Pembroke Dock's approaches and berths, Pembroke Dock Ferry Terminal (PDFT) berth and approaches, and the cooling water intake and outfall for the Pembrokeshire Power Station. Neyland Marina and approach channel has also been dredged regularly although this has been carried out directly by the marina operators and does not form part of the MHPA's Dredging Strategy 2022-2031. The dredging locations are shown in **Figure 2** in **Appendix 1**.

1.2.3 Between 1985 and 2021, capital dredging campaigns have been undertaken in 7 of the 36 years and have generated up to approximately 115,000m^3 of dredged material in any one year, and maintenance dredging campaigns have been undertaken in 19 of the 36 years and have generated up to approximately 200,000m^3 of dredged material in any one year. Combined, capital and maintenance dredging campaigns have generated up to approximately 235,000m^3 of dredged material in any one year. The annual timing and volume of the capital and maintenance dredging campaigns is summarised in **Figure 3** in **Appendix 1**.

1.2.4 Between 1985 and 2021, the dredged material arising from capital and maintenance dredging campaigns, excluding Neyland Marina, has been disposed of at three offshore locations. Dredged material has been deposited at Milford Haven One (LU170) until 1994, and at Milford Haven Two (LU168) and Milford Haven Three (LU169) since 1994. Disposal site LU168 can receive unrestricted volumes of dredged material with particle sizes >250μm, and disposal site LU169 can receive annual volumes of 250,000m^3 dredged material of all particle sizes. The disposal site locations are shown in **Figure 4** in **Appendix 1**.

Proposed Maintenance Dredging and Disposal of Dredged Material

1.2.5 Under the Dredging Strategy 2022-2031 (MHPA, 2021), maintenance dredging will be undertaken as a series of campaigns at one or more of the following locations within Milford Haven:

- Main approach channel at Mill Bay.
- Main approach channel at Thorn Island.
- Valero Refinery berths and approaches.
- Main approach channel at Milford Shelf.
- Milford Docks' approaches.
- Dragon LNG's berth.
- VPOT's berths and turning basin.
- Pembroke Power Station cooling water intake.
- Pembroke Dock berths and approaches.
- Pembroke Dock Ferry Terminal berths and approaches.

1.2.6 The dredging locations are shown in **Figure 5** in **Appendix 1**.

1.2.7 Provisionally, MHPA estimate that maintenance dredging will be undertaken in seven of the ten years from 2022 to 2031 (2022, 2023, 2025, 2026, 2027, 2030 and 2031) and will generate between approximately 2,000m^3 and 179,350m^3 in any one year. Maintenance dredging is likely to take place 7 days per week and 24 hours per day unless there is a restriction of working hours for a particular reason; for example, a tidal access restriction associated with shallow water, or a night-time working restriction to avoid noise nuisance at nearby properties (e.g. no dredging during the hours from 22:00 to 06:00). The annual timing and volume of the maintenance dredging campaigns, including the dredging locations and the disposal sites, is summarised in **Figure 6** in **Appendix 1**.

1.2.8 MHPA predict that the majority of the dredging will be carried out by a trailing suction hopper dredger (TSHD), possibly supported by a plough dredger. However, some dredging locations (e.g. the intake for Pembroke Power Station and the mooring dolphin approaches at the VPOT facility) have shallow water such that dredging may be carried out by alternative dredging plant; for example, a backhoe dredger, a grab dredger or a cutter suction dredger (CSD).

1.2.9 Provisionally, MHPA estimate that dredged material from most dredging locations will comprise fine-grained sediment and will be disposed of at LU169, but dredged material from Mill Bay will comprise coarse-grained sand and shell, and will be disposed of at LU168. The dredged material will be disposed of because there is little opportunity for alternative uses of the dredged material (e.g. re-use, recycling or recovery options), including uses for construction works (e.g. as a fill material) and/or for habitat recreation and/or restoration (e.g. recharging of mudflats).

1.3 Consenting Requirements

1.3.1 MHPA have statutory powers to undertake maintenance dredging within the harbour limits in accordance with the provisions of the Milford Haven Conservancy Act 1958. However, MHPA require a marine licence for the disposal of dredged material in accordance with the provisions of the Marine & Coastal Access Act 2009. Previously, MHPA have had marine licences in place for the disposal of dredged material including for years 2006, 2008, 2011 to 2016 and for years 2017 to 2022.

1.3.2 MHPA need a marine licence for the disposal of dredged material. A marine licence application will be made to the Marine Licensing Team (MLT) within Natural Resources Wales (NRW). The application will seek permission for the disposal of up to 250,000m^3 of dredged material at LU168 and LU169 in any one 12-month period and, therefore, the potential disposal of up to 2,500,000m^3 dredged material over the years 2022 to 2031. In reality, the actual need for maintenance dredging and the resultant volume of dredged material to be disposed of will be considerably less than the maximum volume (as summarised in **Figure 6** in **Appendix 1**), but MHPA wishes to retain flexibility within their dredging strategy to enable at least two large campaigns to be undertaken over the period of the marine licence (i.e. between 2022 and 2031).

1.3.3 The marine licence application will be subject to a number of environmental assessments to ensure compliance with relevant laws and policies, including compliance with the WFD, as transposed and retained in UK law.

2 WFD Assessment

2.1 Introduction

2.1.1 This assessment considers whether the maintenance dredging and/or disposal of dredged material is likely to have impacts on the achievement of the WFD objectives set out in the Western Wales River Basin Management Plan (RBMP) and, in particular, is likely to have impacts that:

- Cause or contribute to deterioration of a water body's status.
- Jeopardise a water body achieving good status.

2.1.2 The maintenance dredging and disposal of dredged material will take place at different locations and have the potential to affect different water bodies, as described below.

2.1.3 Maintenance dredging will take place at various locations within Milford Haven between St Anne's Head to the west and the Cleddau Bridge to the east and, therefore, the various campaigns will take place within one or two of the following water bodies:

- The Milford Haven Outer water body – a coastal water body extending from St Anne's Head in the west to the mouth of the Pembroke River in the west, and covering maintenance dredging locations including the main approach channel at Mill Bay, the main approach channel at Thorn Island, the Valero Refinery berths and approaches, the main approach channel at Milford Shelf, the Milford Docks' approaches, the Dragon LNG's berth, and the VPOT's berths and turning basin.
- The Milford Inner water body - a transitional (estuarine water body) extending from the mouth of the Pembroke River in the west to the tidal extents of the Cleddau Ddu in the east, and covering maintenance dredging locations including the Pembroke Power Station cooling water intake, the Pembroke Dock berths and approaches, and the Pembroke Dock Ferry Terminal berths and approaches.

2.1.4 The disposal of dredged material will take place at disposal sites LU168 and LU169 which are situated beyond 1 nautical mile out to sea and, therefore, beyond the boundaries of the nearest coastal water bodies, as follows:

- The Pembrokeshire South water body - a coastal water body extending 1 nautical mile from the shoreline between St David's Head and Manobier, which at its nearest point (at Linney Head) is situated approximately 12km to the northeast of disposal site LU168.
- The Grassholm Island & The Smalls water body - a coastal water body extending 1

nautical mile around the individual islands, which at its nearest point (at The Smalls) is situated approximately 14km to the north of disposal site LU169.

2.1.5 The boundaries of these water bodies are shown in **Figure 7** in **Appendix 1**.

2.2 Methodology

2.2.1 This assessment has been undertaken in accordance with the UK Government's guidance for assessing the impact of activities in estuarine and coastal waters with regard to the provisions of the WFD. This guidance is known as 'Clearing the Waters for All' and is published online (www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters).

2.2.2 The guidance establishes the following three stages for a WFD assessment:

- Screening – excludes any activities that do not need to go through the scoping or impact assessment stages.
- Scoping – identifies the receptors that are potentially at risk from the activity and need impact assessment.
- Impact assessment – considers the potential impacts of the activity, identifies ways to avoid or minimise impacts, and shows if the activity may cause deterioration or jeopardise the water body achieving good status.

2.3 Screening

2.3.1 In accordance with 'Clearing the Waters for All', if an activity was carried out during 2009 to 2014 (when evidence was collected for the 2015 RBMP) and a WFD compliance assessment has been carried out, it does not need to be repeated unless:

- The activity has changed (method, size or scale, volume, depth, location or timings).
- There has been a pollution incident since the activity was last carried out.

2.3.2 As described in **Section 1.2**, MHPA have been dredging within Milford Haven for many years, with readily available records dating back to dredging conducted since 1985, and have been disposing of dredged material at LU168 and LU169 since 1994, with marine licences granted to undertake this activity. While this activity was being undertaken during 2009 to 2014 (when evidence was collected for the 2015 RBMPs) and MHPA have carried out WFD compliance assessments previously (in 2011 and 2016), the activity has not been assessed in accordance with the guidance 'Clearing the Waters for All'.

2.3.3 A review of the RBMP (Environment Agency, 2009a) and its update (NRW, 2015) and supporting documents such as the Habitats Regulations Assessment of the RBMP (Environment Agency, 2009b), indicates that dredging and the disposal of dredged material for navigation purposes is acknowledged to be essential for economic prosperity but must be planned to ensure that it does not affect the protection and improvement of water quality (Environment Agency, 2009a), and should not cause physical modifications that affect processes (e.g. natural flows and water levels) and result in the excessive build-up of sediment and the loss of habitat and/or species (Environment Agency, 2009b; NRW, 2015). Accordingly, on a precautionary basis, MHPA consider that maintenance dredging and/or disposal of dredged material should be subject to the subsequent stages of the WFD assessment.

2.4 Scoping

2.4.1 In accordance with 'Clearing the Waters for All', scoping has been undertaken to identify whether maintenance dredging and/or disposal of dredged material may pose risks of significant impacts to the following receptors associated with the relevant water bodies:

- Hydromorphology.
- Biology (habitats and fish).
- Water quality.
- Protected areas.
- Invasive non-native species (INNS).

2.4.2 Scoping has been undertaken using the template included in 'Clearing the Waters for All'. The scoping assessment for maintenance dredging is presented at **Appendix 2**, and the scoping assessment for disposal of dredged material is presented at **Appendix 3**.

2.4.3 Scoping (**Appendix 2**) determined that maintenance dredging posed the following risks to the Milford Haven Outer water body and/or the Milford Haven Inner water body which require more detailed consideration:

- Biology (habitats):
  - Potential affect higher sensitivity habitat.
- Water quality:
  - Potential to disturb sediment with contaminants above Cefas Action Level 1.
- Protected areas:
  - Potential to affect the Pembrokeshire Marine Special Area of Conservation (SAC).
  - Potential to affect the Milford Haven Cleddau shellfish water.
- Invasive non-native species (INNS).
  - Potential to introduce or spread INNS.

2.4.4 These risks have been subject to more detailed consideration, as per the impact assessments in **Section 2.5**.

2.4.5 Scoping (**Appendix 3**) also determined that disposal of dredged material posed the following risks to the Pembrokeshire South water body and/or the Grassholm Island & The Smalls water body which require more detailed consideration:

- Water quality:
  - Potential to disturb sediment with contaminants above Cefas Action Level 1.
- Protected areas:
  - Potential to affect the Skomer, Skokholm and the Seas off Pembrokeshire Special Protection Area (SPA) and/or the Pembrokeshire Marine SAC.

2.4.6 These risks have been subject to more detailed consideration, as per the impact assessments in **Section 2.6**.

2.5 Impact Assessment – Maintenance Dredging

Biology (Habitats) - Potential to Affect Higher Sensitivity Habitat

2.5.1 Biology (habitats) is scoped into the WFD assessment because maintenance dredging will take place within 500m of higher sensitivity habitat. The extent of higher sensitivity habitat in the Milford Haven Outer and Inner water bodies is shown in **Figures 8a and 8b** in **Appendix 1** respectively.

2.5.2 None of the maintenance dredging locations under the Dredging Strategy 2022-2031 are situated within higher priority habitat and, therefore, maintenance dredging will not cause direct physical pressures such as removal, damage or disturbance of habitat.

2.5.3 However, the following dredging locations are situated within 500m of higher priority habitat, and therefore, maintenance dredging may cause indirect physical pressures on habitats by increasing concentrations of suspended solids in the water column (thereby affecting water clarity / turbidity at the habitats), and/or by increasing sediment deposition rates (thereby affecting siltation / smothering at the habitats):

- The main approach channel at Mill Bay and at Thorn Island are within 500m of wide areas of subtidal kelp beds that extend from the shoreline into the main body of water, while the Milford Docks' approaches, VPOT's berths and turning basin, Pembroke Power Station cooling water intake, Pembroke Dock berths and approaches, and Pembroke Dock Ferry Terminal berths and approaches are within 500m of narrow areas of subtidal kelp beds that fringe the shoreline.
- The VPOT's berths and turning basin, Pembroke Power Station cooling water intake and Pembroke Dock Ferry Terminal berths and approaches are within 500m of small areas of intertidal mussel beds.
- The Pembroke Power Station cooling water intake is within 500m of a large areas of intertidal seagrass beds.

2.5.4 The following metrics for sensitivities to physical pressures due to maintenance dredging are derived from marlin.ac.uk (accessed 25/11/2021):

- Changes in suspended solids (water clarity / turbidity) – a change in one rank on the WFD scale (e.g. from clear to intermediate) for one year.
- Smothering and siltation rate changes (light) - 'light' deposition of up to 5cm of fine material added to the habitat in a single, discrete event.
- Smothering and siltation rate changes (heavy) - 'heavy' deposition of up to 30cm of fine material added to the habitat in a single discrete event.

2.5.5 The sensitivities of the higher priority habitats to these physical pressures are summarised in **Table 1**.

2.5.6 The potential for maintenance dredging to cause indirect physical pressures on habitats relates largely to the potential releases of sediment during the dredging process. Since the majority of the maintenance dredging will be undertaken using TSHDs, overflowing of excess water and fine-grained sediment within the water from the TSHD's hopper will be the principal release of sediment during the dredging process. Importantly, MHPA already have put in place a measure to restrict overflowing during dredging. Following studies in 2002 of sediment plumes caused by maintenance dredging at the Valero Refinery, Dragon LNG and VPOT (Hebog Environmental, 2005), MHPA implemented measures to mitigate against the potential for impacts on the receiving environment due to sediment plumes by restricting overflowing from TSHDs.

This measure is used to ensure that the majority of the dredged material, including the excess water that is used to dredge material, remains in the TSHD's hopper unless water densities are below a specified density (nominally 1.07t/m³). The adoption of this measure has significantly reduced the creation of sediment plumes during maintenance dredging within Milford Haven. Sediment plume monitoring during maintenance dredging campaigns in 2006 and 2010 showed that suspended solids concentrations were reduced such that they were 10-30mg/l higher than background concentrations approximately 100m downstream of dredging operations, and 5-10mg/l higher than background concentrations approximately 500m downstream of dredging operations.

Table 1
Sensitivity of Higher Priority Habitats to Indirect Physical Pressures associated with Maintenance Dredging (source: marlin.ac.uk; accessed 25/11/2021)

Physical Pressure	Resistance*	Resilience**	Sensitivity***
Subtidal kelp beds (based on A3.211 Laminaria digitata on moderately exposed sublittoral fringe rock)			
Changes in suspended solids (water clarity)	Medium	High	Low
Smothering and siltation rate changes (light)	High	High	Not sensitive
Smothering and siltation rate changes (heavy)	Medium	High	Low
Mussel beds (based on A1.221 Mytilus edulis and Fucus vesiculosus on moderately exposed mid eulittoral rock)			
Changes in suspended solids (water clarity)	High	High	Not sensitive
Smothering and siltation rate changes (light)	Medium	Medium	Medium
Smothering and siltation rate changes (heavy)	Medium	Medium	Medium
Intertidal seagrass beds (based on A2.6111 Zostera noltii beds in littoral muddy sand)			
Changes in suspended solids (water clarity)	Low	Low	High
Smothering and siltation rate changes (light)	medium	Medium	Medium
Smothering and siltation rate changes (heavy)	None	Very low	High

** Resistance indicates whether a receptor can absorb (tolerate) disturbance or stress without changing character*
*** Resilience indicates the ability of a receptor to recover from disturbance or stress*
**** Sensitivity indicates the likelihood of change when a pressure is applied to a receptor and is a function of the receptor's resistance to change and resilience to change*

2.5.7 Given the embedded mitigation measure regarding overflowing, maintenance dredging under the Dredging Strategy 2022-2031 will generate small-scale and short-term increases of suspended solids concentrations in the water column and, as a result, small-scale depositions of sediment on the sea bed. The increases in suspended solids concentrations will be well below the natural variations of suspended solids concentrations in Milford Haven, and will not cause a change in water clarity or turbidity of one rank on the WFD scale for one year, and are unlikely to cause light sediment deposition of up to 5cm and will not cause heavy sediment deposition of up to 30cm of fine material in a single, discrete event.

2.5.8 On the basis the embedded mitigation measure is well established for restricting overflowing during dredging with TSHDs, maintenance dredging is not expected to pose a significant risk to higher priority habitats within 500m of the dredging locations within the Milford Haven Outer water body and/or the Milford Haven Inner water body.

Water Quality - Potential to Disturb Sediment with Contaminants above Cefas Action Level 1

2.5.9 Water quality is scoped into the WFD assessment because analyses of samples collected from the dredging locations within Milford Haven identified that the sediment at the dredging locations contains contaminants at concentrations that are above Cefas Action Level 1.

2.5.10 The sediment in the dredging locations within Milford Haven has been analysed for a suite of metals, polyaromatic hydrocarbons (PAHs) and total hydrocarbon content (THC). The analytical results have been compared to sediment quality criteria that are used as a weight of evidence approach to support a determination on whether dredged material is suitable for disposal at sea. In essence, comparison to Cefas's action levels (Mason et al., 2020) and Gorham-Test's effect range levels (Gorham-Test, 1998) indicates that the dredged material is characterised by contaminants present at low concentrations that are generally suitable for disposal at sea (i.e. either below Cefas Action Level 1 or slightly above Cefas Action Level 1), and generally pose an acceptable risk regarding toxic effects (i.e. either below the Effects Range Low (ERL) or slightly above the ERL (**Appendix 4**), as follows:

- Metals – arsenic, cadmium, chromium, copper, mercury, nickel and zinc were present at concentrations below Cefas Action Level 1 in all samples.
- Metals - lead was present at concentrations below Cefas Action Level 1 in some samples and present at concentrations above Cefas Action Level 1 but below Cefas Action Level 2 in some samples.
- PAHs – acenaphthene, acenaphthylene, anthracene, C3-napthalenes, dibenz[a,h]anthracene, fluorene, naphthalene and perylene were present at concentrations below Cefas Action Level 1 in all samples.
- PAHs – benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[e]pyrene, benzo[k]fluoranthene, C1-napthalenes, C1-phenanthrenes, C2-napthalenes, chrysene, fluoranthene, indeno[1,2,3-c,d] pyrene, phenanthrene and pyrene were present at concentrations below Cefas Action Level 1 in some samples and present at concentrations above Cefas Action Level 1 in some samples.
- PAHs – anthracene, acenaphthene, acenaphthylene, benz[a]anthracene, benzo[a]pyrene, chrysene, dibenz[a,h]anthracene, fluoranthene, naphthalene, phenanthrene and pyrene were present at concentrations below the Gorham-Test ERL in all samples.
- PAHs – fluorene was present at concentrations below the Gorham-Test ERL in some samples and present at concentrations above the Gorham-Test ERL in some samples.

2.5.11 The potential for maintenance dredging to affect water quality relates largely to the potential releases of sediment and the contaminants associated with the sediment during the dredging process. Since the majority of the maintenance dredging will be undertaken using TSHDs, overflowing of excess water and fine-grained sediment within the water from the TSHD's hopper will be the principal release of contaminants during the dredging process. As noted above (refer to 'Biology (Habitats) - Potential to Affect Higher Sensitivity Habitat'), MHPA already have put in place a measure to restrict overflowing which have significantly reduced the creation of sediment plumes during maintenance dredging within Milford Haven such that suspended solids concentrations are 10-30mg/l higher than background concentrations approximately 100m downstream of dredging operations, and 5-10mg/l higher than background

concentrations approximately 500m downstream of dredging operations.

2.5.12 Given the relatively low concentrations of contaminants in the sediment to be dredged, and given the embedded mitigation measure regarding overflowing, maintenance dredging under the Dredging Strategy 2022-2031 will generate small-scale and short-term increases of contaminant concentrations in the water column but these increases will be localised to the water column within 500m of the dredging operations (i.e. they will not cause changes over significant areas within the water bodies), and will be short-term in duration (i.e. they will not cause a long-term changes to water quality).

2.5.13 On the basis the sediment contains low concentrations of contaminants and the embedded mitigation measure is well established for restricting overflowing during dredging with TSHDs, maintenance dredging is not expected to pose a significant risk of deterioration of water quality or jeopardise the Milford Haven Outer and Inner water bodies achieving good status.

Protected Areas - Potential to affect the Pembrokeshire Marine SAC

2.5.14 Protected areas are scoped into the WFD assessment because maintenance dredging will take place within the Pembrokeshire Marine SAC. The extent of the SAC is shown in **Figure 4** in **Appendix 1**.

2.5.15 The Pembrokeshire Marine SAC was designated to protect features (habitats) including estuaries (notably the Daugleddau estuary due to the species richness of sediment communities), large shallow inlets and bays (notably Milford Haven and the wide, shallow, predominantly sandy embayment of St Brides Bay), and reefs (notably the extensive areas of sublittoral rocky reef stretching offshore from the west Pembrokeshire coast, the limestone reefs that occur in the south of the SAC, and offshore areas of tide-swept kelp and species-rich red algal populations), and to protect species including grey seal *Halichoerus grypus* and shore dock *Rumex rupestris*.

2.5.16 The SAC's features (both habitats and species) are distributed throughout the SAC with no single feature occupying the entire SAC. The following features of the SAC are expected to be most at risk from physical pressures associated with the dispersion and deposition of sediment plumes associated with the maintenance dredging under the Dredging Strategy 2022-2031:

- Large shallow inlets and bays – Milford Haven is one of the best examples of a ria in the UK, and the species-richness of sediment communities throughout Milford Haven is particularly high, with intertidal sandy/muddy areas supporting extensive beds of narrow-leaved eelgrass *Zostera angustifolia*.
- Reefs - reefs extend through Milford Haven.

2.5.17 The potential for maintenance dredging to affect the SAC may arise due to physical pressures on the SAC's habitats (notably, the sediment communities of the large shallow inlets, and reefs), and relates largely to the potential releases of sediment during the dredging process. Since the majority of the maintenance dredging will be undertaken using TSHDs, overflowing of excess water and fine-grained sediment within the water from the TSHD's hopper will be the principal release of contaminants during the dredging process. As noted above (refer to 'Biology (Habitats) - Potential to Affect Higher Sensitivity Habitat'), MHPA already have put in place a measure to restrict overflowing which have significantly reduced the creation of sediment plumes during maintenance dredging within Milford Haven such that suspended solids concentrations are 10-30mg/l higher than background concentrations approximately 100m downstream of dredging operations, and 5-10mg/l higher than background

concentrations approximately 500m downstream of dredging operations.

2.5.18 As noted above (refer to 'Biology (Habitats) - Potential to Affect Higher Sensitivity Habitat'), given the embedded mitigation measure regarding overflowing, maintenance dredging under the Dredging Strategy 2022-2031 will generate small-scale and short-term increases of suspended solids concentrations in the water column and, as a result, small-scale depositions of sediment on the sea bed. The increases in suspended solids concentrations will be well below the natural variations of suspended solids concentrations in Milford Haven, and will not cause a change in water clarity or turbidity of one rank on the WFD scale for one year, and is unlikely to cause light sediment deposition of up to 5cm and will not cause heavy sediment deposition of up to 30cm of fine material in a single, discrete event.

2.5.19 On the basis the embedded mitigation measure is well established for restricting overflowing during dredging with TSHDs, maintenance dredging is not expected to pose a significant risk to the distribution and extent, the structure and function, and the typical species to the features within the SAC features and, therefore, within the Milford Haven Outer water body and/or the Milford Haven Inner water body.

Protected Areas - Potential to affect the Milford Haven Cleddau Shellfish Water

2.5.20 Protected areas are scoped into the WFD assessment because maintenance dredging will take place within 2km of the Milford Haven Cleddau shellfish water. The location of the shellfish water, which covers an area of 7.25 km^2 upstream of the Cleddau Bridge and is situated within the Milford Haven Inner water body, is shown in **Figure 9** in **Appendix 1**.

2.5.21 The shellfish water was designated to protect the growth and production of shellfish; in particular, native oysters. As with all shellfish waters, good water quality is important for production of high-qualify shellfish.

2.5.22 The potential for maintenance dredging to affect the shellfish water will be limited to maintenance dredging campaigns at the Pembroke Dock berths and approaches and the Pembroke Dock Ferry Terminal berths and approaches because only these dredging locations are within 2 km of the shellfish water. The potential for maintenance dredging to affect the shellfish water may arise due to physical pressures on water quality, and relates largely to the potential releases of sediment during the dredging process. Since the majority of the maintenance dredging will be undertaken using TSHDs, overflowing of excess water and fine-grained sediment within the water from the TSHD's hopper will be the principal release of contaminants during the dredging process. As noted above (refer to 'Biology (Habitats) - Potential to Affect Higher Sensitivity Habitat'), MHPA already have put in place a measure to restrict overflowing which have significantly reduced the creation of sediment plumes during maintenance dredging within Milford Haven such that suspended solids concentrations are 10-30mg/l higher than background concentrations approximately 100m downstream of dredging operations, and 5-10mg/l higher than background concentrations approximately 500m downstream of dredging operations.

2.5.23 On the basis the embedded mitigation measure is well established for restricting overflowing during dredging with TSHDs, maintenance dredging at the Pembroke Dock berths and approaches and the Pembroke Dock Ferry Terminal berths and approaches is not expected to generate plumes that disperse and deposit sediment as far as the shellfish water; therefore, maintenance dredging is not expected to pose a significant risk to the growth and production of shellfish in the shellfish water within the Milford Haven Inner water body.

INNS - Potential to Introduce or Spread INNS

2.5.24 INNS is scoped into the WFD assessment because maintenance dredging will take place within the Milford Haven Inner and Outer water bodies using dredging plant and equipment that will have come from, have been used in, or travelled through other water bodies.

2.5.25 The potential for the dredging to introduce or spread INNS principally relates to the mobilisation and use of dredging plant and equipment (notably, a TSHD and, if needed, other types of dredgers) that will sail through and work at various dredging locations within Milford Haven.

2.5.26 Maritime transport stowaway vectors (e.g. ballast, biofouling and equipment), is one of the principal pathways for introducing and spreading marine INNS across water bodies (European Environment Agency, 2019). They can arise through the movement and activity of dredgers because dredgers, like other work vessels, are more likely to have marine INNS on their hulls because they tend to hold their positions for long periods of time at one site, and tend to move regularly from one site to another site (Cook et al., 2016). The potential for a dredger to introduce or spread marine INNS within a water body increases if it arrives from a water body coated with a biofouling and/or from a water body that has similar environmental conditions (i.e. temperature, salinity, etc), and/or from a water body that is known to be affected by marine INNS (Cook et al., 2016).

2.5.27 Previously, the potential risk of dredging at Milford Haven to introduce or spread marine INNS has been recognised and addressed through the undertaking of biosecurity risk assessments. These assessments have been undertaken and approved by NRW prior to the commencement of dredging campaigns, and have identified the following potential risk pathways for introducing or spreading marine INNS:

- Mobilisation of dredging plant from another port (i.e. within another water body in, for example, south Wales, southwest England or northwest England) to Milford Haven (i.e. the Milford Haven Inner and Outer water bodies).
- Transport of dredged material between Milford Haven (i.e. the Milford Haven Inner and Outer water bodies) and the disposal sites LU168 and LU169, which are situated beyond Milford Haven, and require passage through other water bodies (i.e. the Pembroke South water body).

2.5.28 These assessments have included one or more of the following mitigation measures for reducing the risk pathways for introducing or spreading marine INNS:

- Regular antifouling of dredgers prior to arriving at Milford Haven and the dredging locations; which is to be demonstrated through up-to-date log books.
- Exchange of dredgers' ballast / hopper water at sea prior to arriving at Milford Haven and the dredging locations.
- Thorough flushing of dredgers' hoppers before moving off disposal sites in order to minimise the risk of transporting INNS between disposal sites and dredging locations.

2.5.29 As for MHPA's previous dredging campaigns, maintenance dredging campaigns under the Dredging Strategy 2022-2031 will be subject to biosecurity risk assessments that will be approved by NRW.

2.5.30 On the basis that the risk pathways are well known and the mitigation measures are well established, maintenance dredging is not expected to pose a significant risk of

introducing or spreading marine INNS within the Milford Haven Outer water body and/or the Milford Haven Inner water body.

2.6 Impact Assessment – Disposal of Dredged Material

Water Quality - Potential to Disturb Sediment with Contaminants above Cefas Action Level 1

2.6.1 Water quality is scoped into the WFD assessment because analyses of samples collected from the dredging locations within Milford Haven identified that the dredged material to be disposed of contains some contaminants at concentrations that are above Cefas Action Level 1.

2.6.2 As described in **Section 2.5**, the dredged material is characterised by metals and PAHs present at low concentrations that are generally suitable for disposal at sea (i.e. either below Cefas Action Level 1 or slightly above Cefas Action Level 1), and generally pose an acceptable risk regarding toxic effects (i.e. either below the Effects Range Low (ERL) or slightly above the ERL (**Appendix 4**).

2.6.3 Numerical modelling has been undertaken by Cefas to evaluate how the disposal of dredged material within Welsh territorial waters is potentially impacting upon the receiving marine environment. The outputs of the modelling are shown in **Figure 10** in **Appendix 1**.

2.6.4 For the disposal of dredged material at LU168, the model results show that after six hours the majority (i.e. >80 per cent) of the sediment falls to the seabed and the plume of suspended sediment generally spreads to approximately 15km to the southeast of the disposal site; therefore, the footprint of the potential impact does not overlap with the Pembrokeshire South water body or the Grassholm Island & The Smalls water body (Clarke and Rees, 2020). Given that the sediment plumes do not overlap with the water bodies, disposal at LU168 is considered unlikely to pose a significant risk to water quality in these water bodies.

2.6.5 For the disposal of dredged material at LU169, the model results show that after six hours the majority (i.e. >80 per cent) of the sediment falls to the seabed and the plume of suspended sediment generally spreads to approximately 15km to the south of the disposal site; therefore, the footprint of the potential impact does not overlap with the Pembrokeshire South water body or the Grassholm Island & The Smalls water body (Clarke and Rees, 2020). Given that the sediment plumes do not overlap with the water bodies, disposal at LU169 is considered unlikely to pose a significant risk to water quality in these water bodies.

2.6.6 On this basis, the disposal of dredged material at LU168 and LU169 is not expected to pose a significant risk to water quality within the Pembrokeshire South water body and/or the Grassholm Island & The Smalls water body and, therefore, is not expected to pose a significant risk to the status of the Pembrokeshire South water body or the Grassholm Island & The Smalls water body.

Protected Areas - Potential to affect the Skomer, Skokholm and Seas off Pembrokeshire SPA and/or the Pembrokeshire Marine SAC

2.6.7 Protected areas are scoped into the WFD assessment because the disposal of dredged material (including the potential impacts of the disposal of dredged material) would take place within 2km of the Skomer, Skokholm and Seas off Pembrokeshire

SPA and the Pembrokeshire Marine SAC. The extents of the SPA and the SAC are shown in **Figure 4** in **Appendix 1**.

2.6.8 Disposal site LU168 is situated approximately 14km off the coast of Pembrokeshire. It is situated within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and approximately 2km to the southwest of the Pembrokeshire Marine SAC. Disposal site LU169 is situated approximately 25km off the coast of Pembrokeshire. It is situated within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and approximately 5km to the south of the Pembrokeshire Marine SAC.

2.6.9 The Skomer, Skokholm, and the Seas off Pembrokeshire SPA is designated as an extension to the Skokholm and Skomer SPA, which was designated to protect breeding populations of seabird species including Manx shearwater *Puffinus puffinus*, Atlantic puffin *Fratercula arctica* and lesser black-backed gull *Larus fuscus*, and the islands' small populations of red-billed chough *Pyrrhocorax pyrrhocorax* and short eared owl *Asio flammeus*.

2.6.10 The Pembrokeshire Marine SAC was designated to protect habitats including estuaries (notably the Daugleddau estuary due to the species richness of sediment communities), large shallow inlets and bays (notably Milford Haven and the wide, shallow, predominantly sandy embayment of St Brides Bay), and reefs (notably the extensive areas of sublittoral rocky reef stretching offshore from the west Pembrokeshire coast, the limestone reefs that occur in the south of the SAC, and offshore areas of tide-swept kelp and species-rich red algal populations), and to protect species including grey seal *Halichoerus grypus* and shore dock *Rumex rupestris*.

2.6.11 The following features of the protected areas are expected to be most at risk from the dispersion and deposition of sediment plumes associated with the disposal of dredged material at LU168 and LU169:

- The Skomer, Skokholm and the Seas off Pembrokeshire SPA - protected seabird species that dive to capture their prey are at risk from dispersing sediment plumes that could increase concentrations of suspended solids (and increase turbidity) which could disrupt their foraging behaviour (Clarke and Rees, 2020).
- The Pembrokeshire Marine SAC – protected reef habitat is at risk from dispersing sediment plumes that could increase concentrations of suspended solids which could cause abrasion, and/or at risk from depositing sediment plumes which could cause smothering (Clarke and Rees, 2020).

2.6.12 Numerical modelling has been undertaken by Cefas to evaluate how the disposal of dredged material within Welsh territorial waters is potentially impacting upon the receiving marine environment. The outputs of the modelling are shown in **Figure 8** in **Appendix 1**.

2.6.13 For the disposal of dredged material at LU168, the model results show that after six hours the majority (i.e. >80 per cent) of the sediment falls to the seabed and the plume of suspended sediment generally spreads to approximately 15km to the southeast of the disposal site; therefore, the footprint of the potential impact occurs within the SPA and potentially occurs (i.e. overlaps slightly) within the SAC (Clarke and Rees, 2020). Given the volumes of dredged material that are disposed of at LU168, and the area of overlap with the protected areas, disposal is considered unlikely to pose a significant risk to the features of these protected areas.

2.6.14 For the disposal of dredged material at LU169, the model results show that after six hours the majority (i.e. >80 per cent) of the sediment falls to the seabed and the plume

of suspended sediment generally spreads to approximately 15km to the south of the disposal site; therefore, the footprint of the potential impact occurs within the SPA and does not occur within the SAC (Clarke and Rees, 2020). Given small volumes of dredged material and the sporadic nature of disposal at LU169, and the area of overlap with the protected areas, disposal is considered unlikely to pose a significant risk to the features of these protected areas.

2.6.15 On this basis, the disposal of dredged material at LU168 and LU169 is not expected to pose a significant risk to the protected features of the SPA and/or SAC and, therefore, is not expected to pose a significant risk to the status of the Pembrokeshire South water body or the Grassholm Island & The Smalls water body.

3 Conclusion

3.1.1 A WFD compliance assessment has been undertaken in accordance with the 'Clearing the Waters for All' guidance. Overall, the assessment has found:

- There is unlikely to be a significant risk from maintenance dredging to the Milford Haven Outer water body or the Milford Haven Inner water body.
- There is unlikely to be a significant risk from the disposal of dredged material to the Pembrokeshire South water body or the Grassholm Island & The Smalls water body.

3.1.2 Therefore, it is concluded that MHPA's Dredging Strategy 2022-2031 will not cause or contribute to deterioration of the status of the water bodies and will not compromise the achievement of WFD objectives implemented via the RBMP.

4 References

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NRW (2015). Western Wales River Basin Management Plan 2015 – 2021. Summary. Published by Natural Resources Wales, December 2015.

APPENDIX 1

FIGURES

Figure 1
Milford Haven Port Authority – Harbour Limits

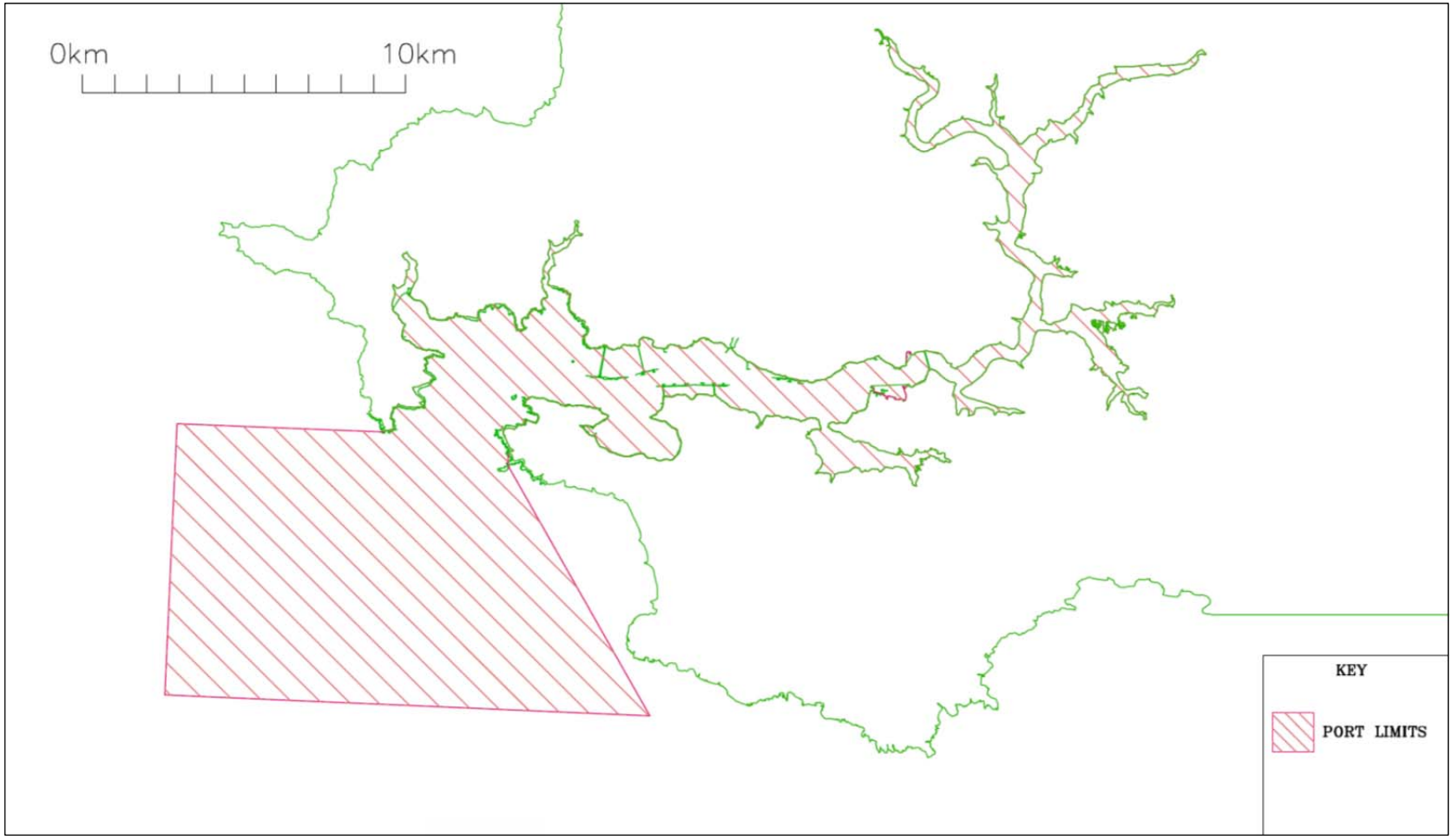
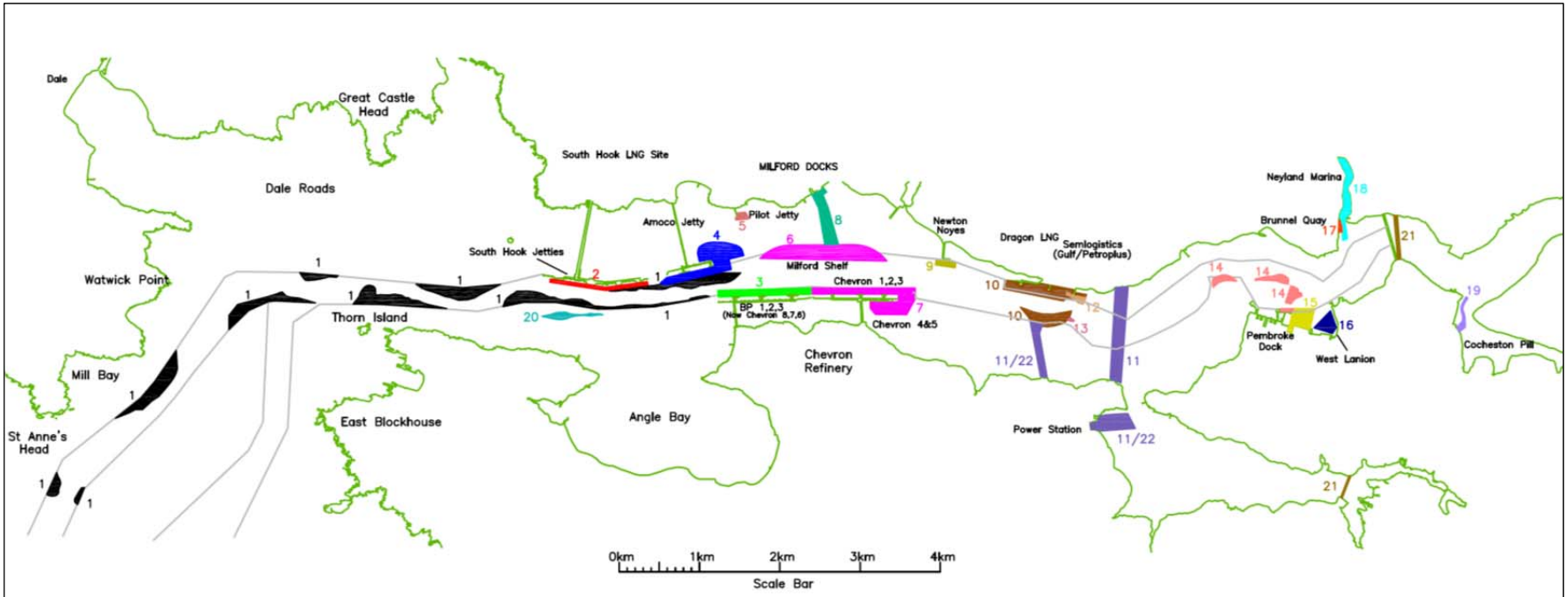


Figure 2
Historical Dredging in Milford Haven – Dredging Locations



1 Phase I & II Channel Widening 1967–1971	7 Texaco Jetty Construction 1964	13 Wear Spit Channel Widening 2006	19 Cosheston Pill Channel Dredging 1993
2 ESSO Berth Construction 1967 to 1971	8 Milford Dock Channel 1888	14 RoRo Terminal Upgrade 1998	20 South Hook Channel Widening 2006
3 BP Jetty Construction 1961	9 Newton Noyes Jetty Construction 1939	15 Pembrock Dock Construction 1986	21 Midland Oil Pipeline (1972)
4 Amoco Jetty Construction 1973	10 Gulf Oil Jetty Constuction 1968	16 West Lanion Pill Dredging 1990	22 Channels Re–instated (2010)
5 Pilot Jetty Construction 1962	11 Pembroke Power Station Construction 1971	17 Brunnel Quay Dredging 1986	
6 Turning Basin Milford Shelf 1964	12 Semlogistics Berth 3 Deepening 2007	18 Neyland Marina Construction 1985	

Figure 3
Historical Dredging in Milford Haven – Dredging Times and Volumes

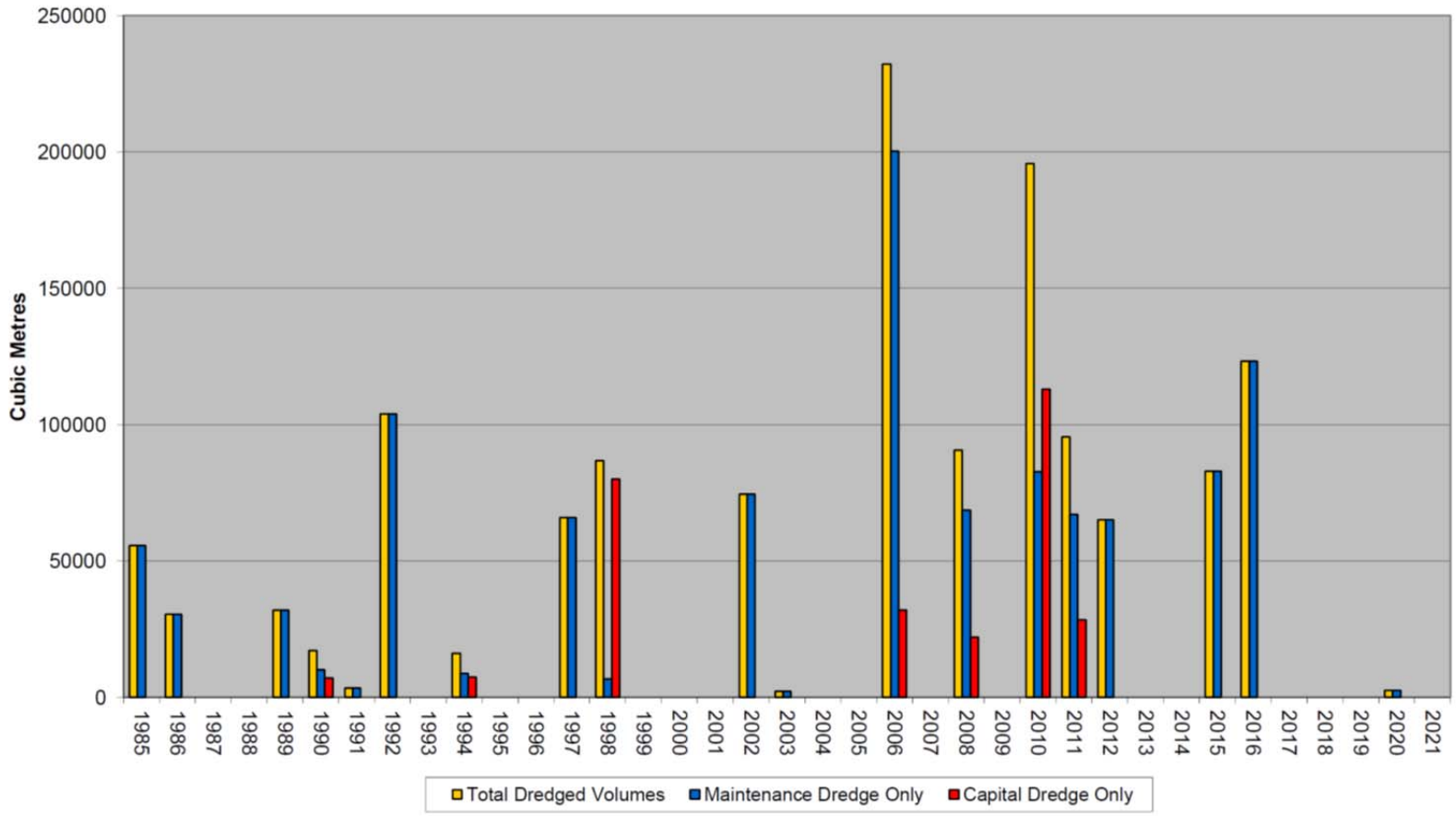


Figure 4
Dredged Material Offshore Disposal Site Locations and Pembrokeshire Marine SAC Boundary

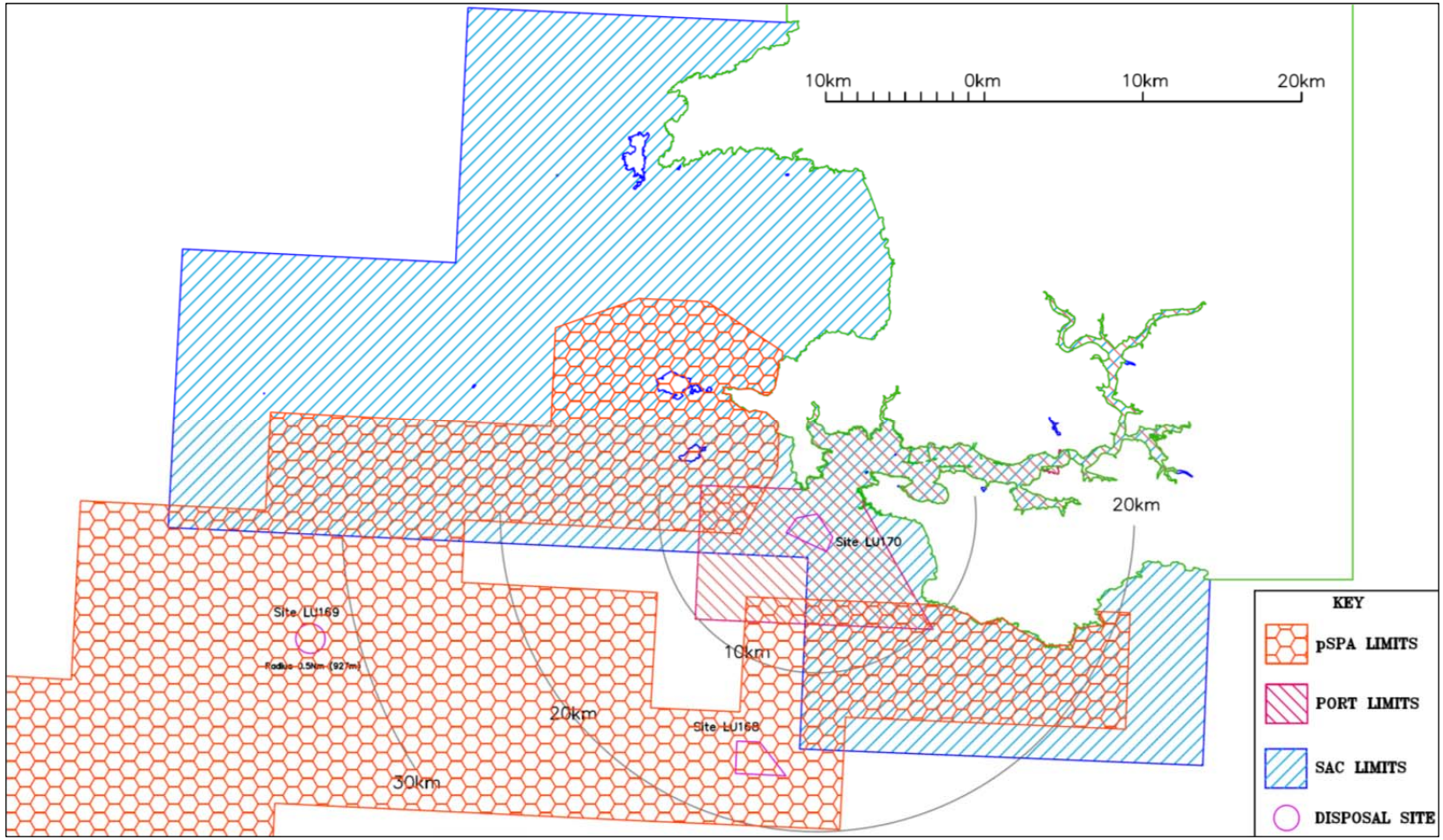
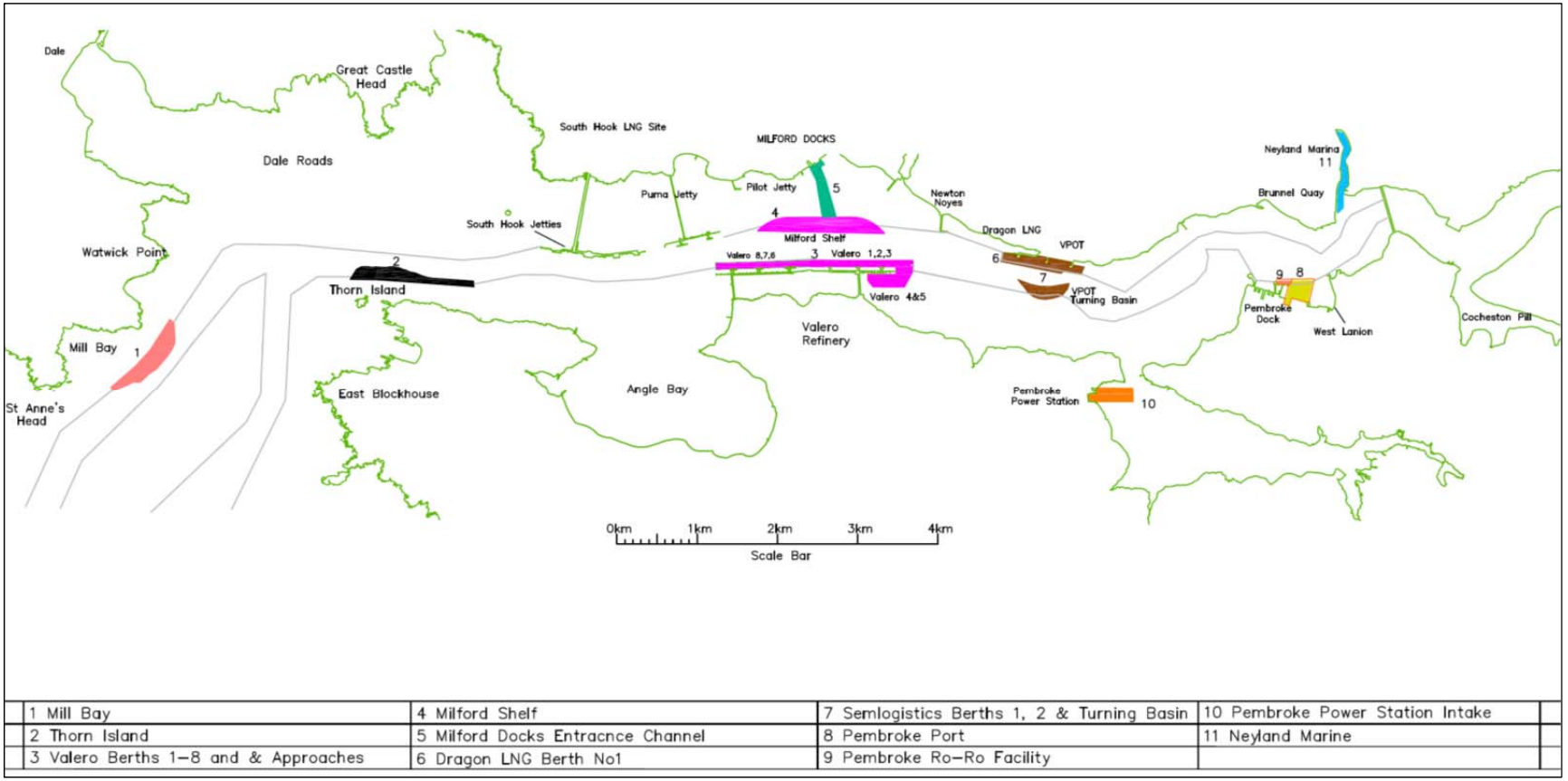


Figure 5
Proposed Maintenance Dredging in Milford Haven under the Dredging Strategy 2022-2031 – Dredging Locations



1 Mill Bay	4 Milford Shelf	7 Semlogistics Berths 1, 2 & Turning Basin	10 Pembroke Power Station Intake
2 Thorn Island	5 Milford Docks Entracnce Channel	8 Pembroke Port	11 Neyland Marine
3 Valero Berths 1–8 and & Approaches	6 Dragon LNG Berth No1	9 Pembroke Ro–Ro Facility	

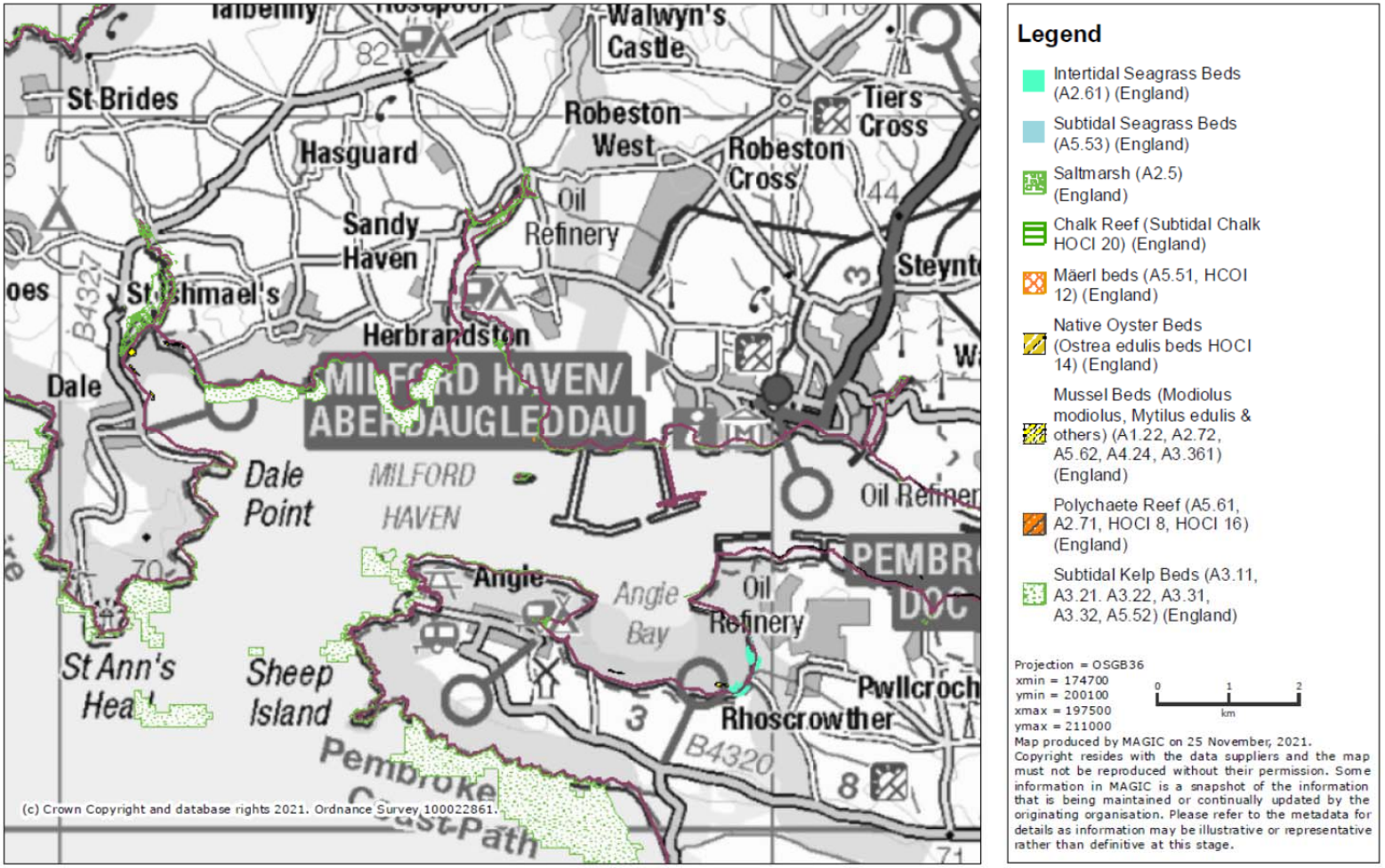
Figure 6
Proposed Maintenance Dredging in Milford Haven under the Dredging Strategy 2022-2031 – Estimated Dredging Times and Volumes

Dredged Areas	Approximate Surface Area m^2	Sediment Type*	Last Dredged	Approximate Annual Accretion	Provisional volumes to be dredged (m^3)									
					2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Mill Bay	40000	C Sand	2011	6500		42000							45500	
Thorn Island	15000	M-F Sand	2016	3800		5000				15200			11400	
South Hook Channel Widening	7000	PS	2006	150										
South Hook LNG Berths	0	PS	Pre 1985	Negligible										
Puma Berths	0	Silt	Pre 1985	3900										
Valero Berths 1 to 8	30000	Silt	2016	7000		24000				28000				28000
Valero Berths 4 & 5	60000	Silt	2016	12000		50000				48000				48000
Milford Shelf	10000	Silt	2016	1050		3000				3150				3150
Milford Dock Approach	49000	Silt	2010	1600		3200				3200				4800
Milford Docks		N/A	Pre 1985	Not measured										
Dragon LNG	5000	PS	2016	1000		5000				4000				4000
VPOT Berths 2 & 3 and MD approaches	35000	PS	2016	10200	45000	2500			40800					51000
Weir Spit 10m Channel widening	2400	PS	2006	Negligible										
Pembroke Power station outfall channe		Silt	2010	Negligible										
Pembroke Power station cold water intak	50000	Silt	2016	6500	32500				26000					32500
Pembroke Dock Ferry Terminal	2500	Gravel	2016	200		200				200				
Pembroke Dock	35000	Silt	2016	7900	7000	10000		2000		21700			15800	7900
Car Jetty		N/A	1986	Not measured										
Brunel Quay		N/A	1986	Not measured										
Neyland Marina (offshore disposal only	32000	N/A	2011	Not measured										
Cosheston Pill		N/A	1994	Not measured										
West Llanion Pill		N/A	1990	Not measured										
Marine & Port Services Slipway		N/A	1990	Not measured										
Pembroke Dock Channel Widening	2000	N/A	1998	200		1000			1000					1000
ESTIMATED TOTALS FOR YEAR to Site LU169 (m^3)				55500	84500	102900	0	2000	66800	123450	0	0	27200	179350
ESTIMATED TOTALS FOR YEAR to Site LU168 (m^3)				6500	0	42000	0	0	0	0	0	0	45500	0
ESTIMATED TOTAL DISPOSAL VOLUMES (m^3)				**62000**	**84500**	**144900**	**0**	**2000**	**66800**	**123450**	**0**	**0**	**72700**	**179350**

The above estimated program of dredging works is subject to change based on survey revisions, trade variations and plant availabi
Red = Disposal at LU168
Blue = Ploughing
* Sediment type based on D.M.Rostron 1982-198 C-Sand = Course Sand, M-F Sand = Medium to fine Sand, PS = Poorly sorted, N/A = Outside of sediment map area

Figure 7
Transitional and Coastal Water Bodies in and around the Disposal Site Locations under the Dredging Strategy 2022-2031 (source: waterwatchwales.naturalresourceswales.gov.uk; accessed 18/11/2021)

Figure 8a
WFD Higher Priority Habitat in Milford Haven Outer Water Body (source: magic.defra.gov.uk; accessed 25-11-2021)



Legend

- Intertidal Seagrass Beds (A2.61) (England)
- Subtidal Seagrass Beds (A5.53) (England)
- Saltmarsh (A2.5) (England)
- Chalk Reef (Subtidal Chalk HOCI 20) (England)
- Mäerl beds (A5.51, HCOI 12) (England)
- Native Oyster Beds (Ostrea edulis beds HOCI 14) (England)
- Mussel Beds (Modiolus modiolus, Mytilus edulis & others) (A1.22, A2.72, A5.62, A4.24, A3.361) (England)
- Polychaete Reef (A5.61, A2.71, HOCI 8, HOCI 16) (England)
- Subtidal Kelp Beds (A3.11, A3.21. A3.22, A3.31, A3.32, A5.52) (England)

Projection = OSGB36
xmin = 174700
ymin = 200100
xmax = 197500
ymax = 211000
0 1 2 km
Map produced by MAGIC on 25 November, 2021.
Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGIC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

Figure 8b
WFD Higher Priority Habitat in Milford Haven Inner Water Body (source: magic.defra.gov.uk; accessed 25-11-2021)

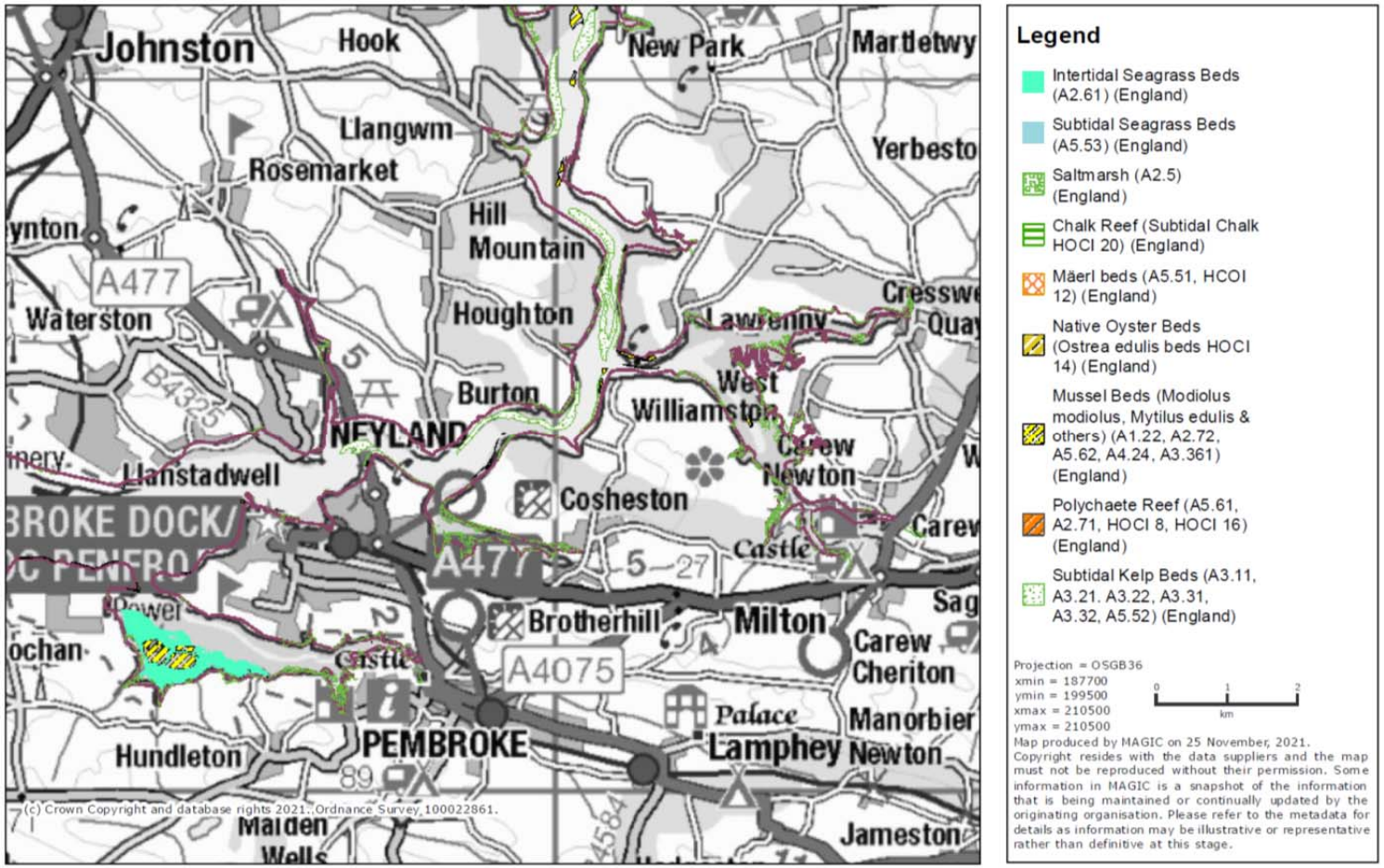


Figure 9
Milford Haven Cleddau Shellfish Water Boundary (source: magic.defra.gov.uk; accessed 26/11/2021)

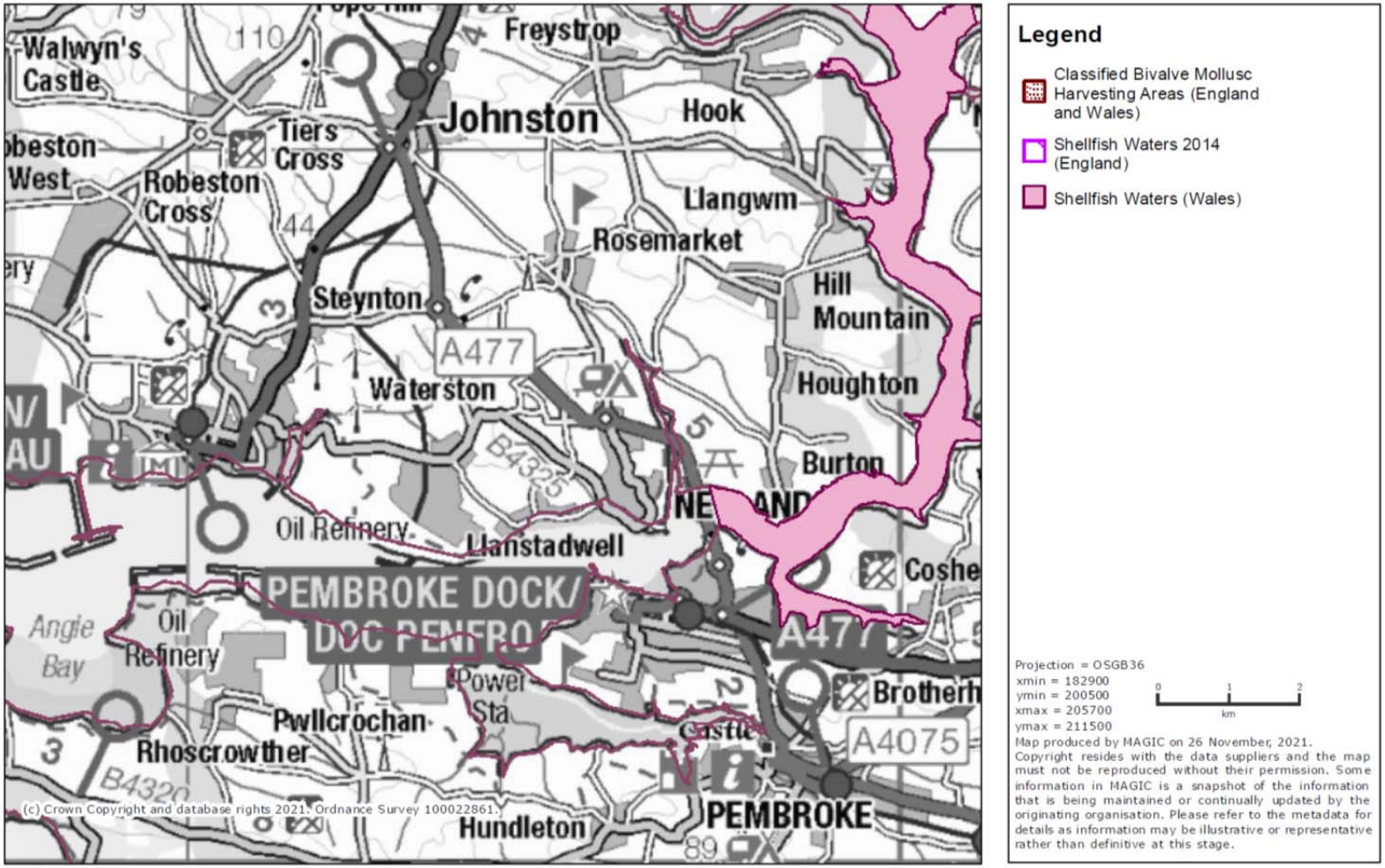
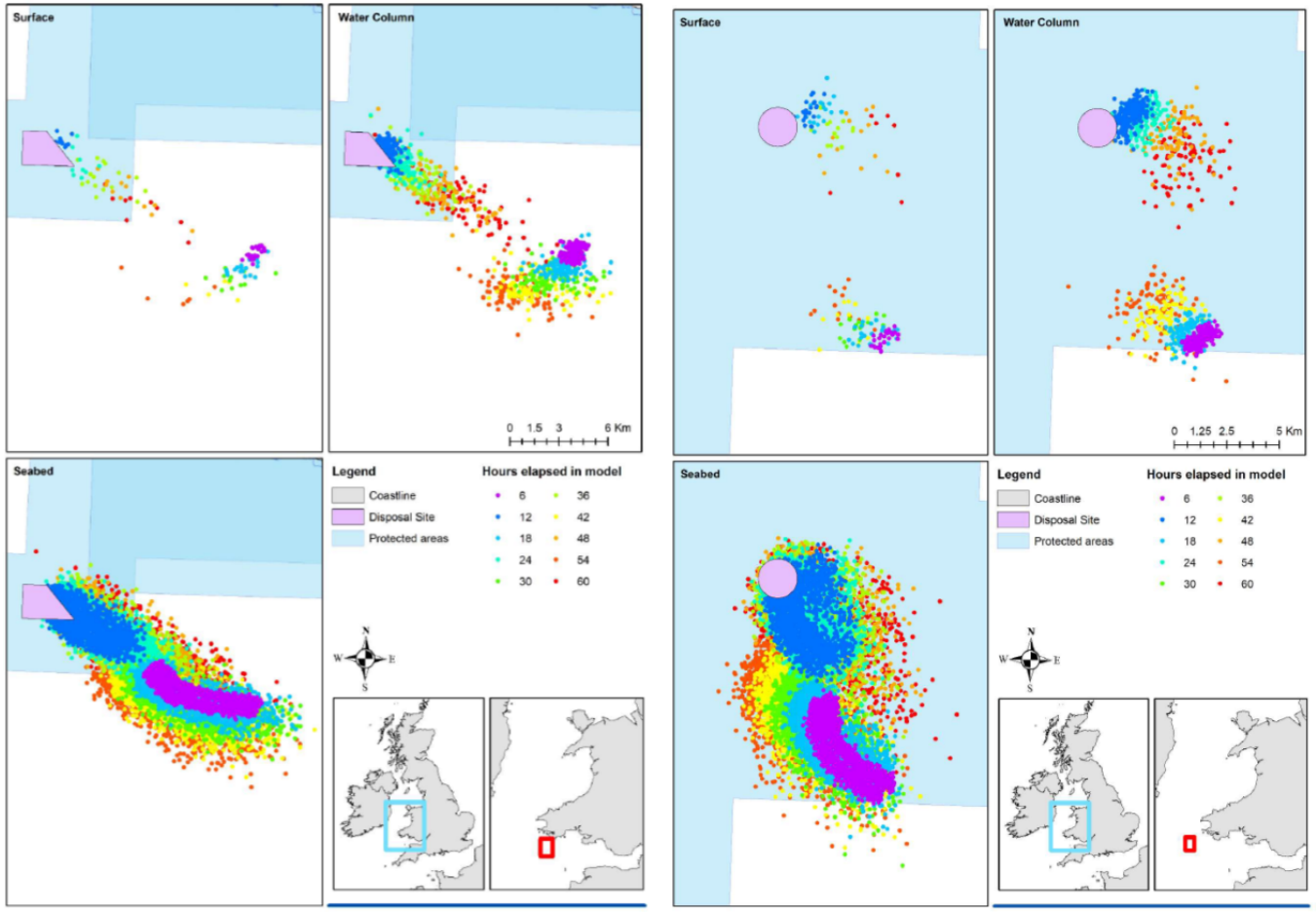


Figure 10
Numerical Modelling Results for Sediment Plumes associated with the Disposal of Dredged Material at LU168 (left) and LU169 (right) (source: Clarke and Rees, 2020)



APPENDIX 2

WFD COMPLIANCE ASSESSMENT
SCOPING OF MAINTENACE DREDGING UNDER MHPA'S DREDGING STRATEGY 2022-2031

Your activity	Description, notes or more information
Applicant name	Milford Haven Port Authority (MHPA)
Application reference number (where applicable)	TBC
Name of activity	Milford Haven Dredging Strategy 2022-2031
Brief description of activity	Maintenance dredging at various locations within Milford Haven.
Location of activity (central point XY coordinates or national grid reference)	The location of the various maintenance dredge areas are set out below. The co-ordinates are relative to WGS84. The reference numbers correlate to the dredge areas shown on Figure 5 1) Main approach channel at Mill Bay – 51° 41'.0214N 05° 09'.3787W 2) Main approach channel at Thorn Island – 51° 41'.7093N 05° 06'.9651W 3) Valero Refinery berths and approaches – 51° 41'.9052N 05° 01'.8952W 4) Main approach channel at Milford Shelf – 51° 42'.1715N 05° 02'.3275W 5) Milford Docks' approaches – 51° 42'.3784N 05° 02'.1437W 6) Dragon LNG's berth – 51° 41'.9871N 05° 00'.0265W 7) VPOT's berths and turning basin – 51° 41'.9413N 04° 59'.5826W 8) Pembroke Dock berths and approaches – 51° 41'.8323N 04° 56'.9508W 9) Pembroke Dock Ferry Terminal berths and approaches – 51° 41'.8996N 04° 57'.0728W 10) Pembroke Power Station cooling water intake – 51° 41'.0906N 04° 59'.0159W
Footprint of activity (ha)	The footprint of the activity will cover the footprints of the maintenance dredging locations, as listed below, and will extend beyond the footprints of the disposal sites due to the dispersion and deposition of sediment plumes. The numbers correlate to those defined on Figure 5 1) Main approach channel at Mill Bay – 4 ha (0.04 km^2).

	2) Main approach channel at Thorn Island – 1.5ha (0.015 km^2). 3) Valero Refinery berths and approaches – 9 ha (0.09 km^2). 4) Main approach channel at Milford Shelf – 1 ha (0.01 km^2). 5) Milford Docks' approaches – 4.9 ha (0.049 km^2). 6) Dragon LNG's berth – 0.5 ha (0.005 km^2). 7) VPOT's berths and turning basin – 3.5ha (0.035 km^2). 8) Pembroke Dock berths and approaches – 3.5 ha (0.035 km^2). 9) Pembroke Dock Ferry Terminal berths and approaches 0.25 ha (0.0025 km^2). 10) Pembroke Power Station cooling water intake – 5 ha (0.05 km2).
Timings of activity (including start and finish dates)	Maintenance dredging in Milford Haven will take place from 2022 to 2031.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	While the marine licence application proposes the disposal of up to 250,000m^3 of dredged material each and every year from 2022 to 2031, in reality the frequency and scale of the maintenance dredging activities will be less. Provisionally, MHPA estimate that maintenance dredging will be undertaken in seven of the ten years from 2022 to 2031 (2022, 2023, 2025, 2026, 2027, 2030 and 2031) and will generate between approximately 2,000m^3 and 179,350m^3 of dredged material in any one year.
Use or release of chemicals (state which ones)	Maintenance dredging will not include the use or release of chemicals.

Water body[1]	Description, notes or more information	
WFD water body name	Milford Haven Outer*	Milford Haven Inner*
Water body ID	GB641008220000	GB531006114100
River basin district name	West Wales	West Wales
Water body type (estuarine or coastal)	Coastal	Transitional (estuarine)
Water body total area (ha)	3540.4 ha (35.404 km^2)	2102.3 ha (21.023 km^2)
Overall water body status	Moderate	Moderate
Ecological status	Moderate	Moderate
Chemical status	Fail	Fail
Target water body status and deadline	Good status by 2021	Good status by 2021
Hydromorphology status of water body	Supports good	Supports good
Heavily modified water body and for what use	Not designated	Not designated
Higher sensitivity habitats present	No information	No information
Lower sensitivity habitats present	No information	No information
Phytoplankton status	High	High
History of harmful algae	Not monitored	Not monitored
WFD protected areas within 2km	Pembrokeshire Marine SAC	Pembrokeshire Marine SAC

* Water body information taken from waterwatchwales.naturalresourceswales.gov.uk/en/ (accessed 24/11/2021)

Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity. Use the water body summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	**Yes**	**No**	**Hydromorphology risk issue(s)**	
WFD water body name			Milford Haven Outer	Milford Haven Inner
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		Impact assessment not required	No, because this water body is not at high status.	No, because this water body is not at high status.
Could significantly impact the hydromorphology of any water body		Impact assessment not required	No, because the dredging will maintain (not change) the depths of the various dredging locations in accordance with existing navigation requirements and, therefore, will not affect the hydromorphology of this water body.	No, because the dredging will maintain (not change) the depths of the various dredging locations in accordance with existing navigation requirements and, therefore, will not affect the hydromorphology of this water body.
Is in a water body that is heavily modified for the same use as your activity		Impact assessment not required	No, because this water body is not a heavily modified water body.	No, because this water body is not a heavily modified water body.

Section 2: Biology

Habitats

Consider if habitats are at risk from your activity. Use the water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Higher sensitivity habitats [2]	Lower sensitivity habitats [3]
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

[2] *Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.*
[3] *Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.*

Consider if the footprint[4] of your activity is:	Yes	No	Biology habitats risk issue(s)	
WFD water body name			Milford Haven Outer	Milford Haven Inner
0.5km^2 or larger	Requires impact assessment		No, because the dredging will take place over a combined footprint of 0.244 km^2 which, when taking account of a dredging plume being 1.5 times the dredging footprint, would increase to 0.366 km^2 and, therefore, will not have a footprint that is 0.5km^2 or larger within this water body.	No, because the dredging will take place over a combined footprint of 0.0875 km^2 which, when taking account of a dredging plume being 1.5 times the dredging footprint, would increase to 0.13125 km^2 and, therefore, will not have a footprint that is 0.5km^2 or larger within this

			[Note: Main approach channel at Mill Bay (0.04 km^2) + main approach channel at Thorn Island (0.015 km^2) + Valero Refinery berths and approaches (0.09 km^2) + main approach channel at Milford Shelf (0.01 km^2) + Milford Docks' approaches (0.049 km^2) + Dragon LNG's berth (0.005 km^2) + VPOT's berths and turning basin (0.035 km^2) x 1.5 = 0.366 km^2.]	water body. [Note: Pembroke Power Station cooling water intake (0.05 km^2) + Pembroke Dock berths and approaches (0.035 km^2) + Pembroke Dock Ferry Terminal berths and approaches (0.0025 km^2) x 1.5 = 0.13125 km^2.]
1% or more of the water body's area			No, because although the dredging will take place over a combined footprint of 0.366 km^2 and, therefore, will have a footprint (1.03%) that is very slightly more than 1% of the water body's area (35.404 km^2), the dredging footprint is within existing artificial areas within the water body (i.e. approach channels and berths) that have been subject to routine maintenance dredging for many years (i.e. at least since 1985). [Note: 0.366 km2 of 35.404 km2 = 1.03%.]	No, because the dredging will take place over a combined footprint of 0.13125 km^2 and, therefore, will have a footprint (0.62%) that is not 1% or more of the water body's area (21.023 km^2). [Note: 0.13125 km2 of 21.023 km2 = 0.62%.]
Within 500m of any higher sensitivity habitat			Yes, because some of the dredging locations are within 500m of higher sensitivity habitat within the water body. In particular, the dredging locations within the main approach channel at Mill Bay and at Thorn	Yes, because some of the dredging locations are within 500m of higher sensitivity habitat within the water body. In particular, the dredging location at Pembroke Power Station is within 500m of some intertidal

			Island are within 500m of some subtidal kelp beds within this water body.	seagrass beds and some mussel beds in the Pembroke River in this water body.
1% or more of any lower sensitivity habitat			No, because although the dredging will take place over a footprint (1.03%) that is very slightly more than 1% of the lower sensitivity habitat within this water body, the dredging footprint is within existing artificial areas within the water body (i.e. approach channels and berths) in which the lower sensitivity habitats has been subject to (the effects of) routine maintenance dredging for many years (i.e. at least since 1985).	No, because the dredging will take place over a footprint (0.62%) that is less than 1% of the lower sensitivity habitat within this water body. Also, the dredging footprint is within existing artificial areas within the water body (i.e. approach channels and berths) in which the lower sensitivity habitats has been subject to (the effects of) routine maintenance dredging for many years (i.e. at least since 1985).

[4] *Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.*

Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	**Yes**	**No**	**Biology fish risk issue(s)**	
WFD water body name			Milford Haven Outer	Milford Haven Inner
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		Impact assessment not required	No, because although the dredging will take place in an estuary, it will only take place at certain dredging locations and will generate sediment plumes for limited durations that spread over limited footprints within the estuary, such that it will not affect fish entering	No, because although the dredging will take place in an estuary, it will only take place at certain dredging locations and will generate sediment plumes for limited durations that spread over limited footprints within the estuary, such that it will not affect fish entering or migrating

			or migrating through the estuary associated with this water body.	through the estuary associated with this water body.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		Impact assessment not required	No, because although the dredging will take place in an estuary, it will only take place at certain dredging locations and will generate sediment plumes for limited durations that spread over limited footprints within the estuary, such that it will not affect normal fish behaviour within this water body.	No, because although the dredging will take place in an estuary, it will only take place at certain dredging locations and will generate sediment plumes for limited durations that spread over limited footprints within the estuary, such that it will not affect normal fish behaviour within this water body.
Could cause entrainment or impingement of fish		Impact assessment not required	No, because although the dredging could (potentially) cause fish entrainment within this water body, the dredging footprint is within existing artificial areas within the water body (i.e. approach channels and berths) in which the fish resource – particularly the benthic fish resource - has been subject to (the effects of) routine maintenance dredging for many years (i.e. at least since 1985).	No, because although the dredging could (potentially) cause fish entrainment within this water body, the dredging footprint is within existing artificial areas within the water body (i.e. approach channels and berths) in which the fish resource – particularly the benthic fish resource - has been subject to (the effects of) routine maintenance dredging for many years (i.e. at least since 1985).

Section 3: Water quality

Consider if water quality is at risk from your activity. Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)	
WFD water body name			Milford Haven Outer	Milford Haven Inner
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle within this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle within this water body.
Is in a water body with a phytoplankton status of moderate, poor or bad		Impact assessment not required	No, because the dredging will take place in a water body with a high plankton status.	No, because the dredging will take place in a water body with a high plankton status.
Is in a water body with a history of harmful algae		Impact assessment not required	No, because the dredging will take place in a water body that does not have a history of harmful algae.	No, because the dredging will take place in a water body that does not have a history of harmful algae.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	**Yes**	**No**	**Water quality risk issue(s)**	
WFD water body name			Milford Haven Outer	Milford Haven Inner
The chemicals are on the Environmental Quality Standards Directive (EQSD) list		Impact assessment not required	No, because the dredging will not directly use or release chemicals into the water body.	No, because the dredging will not directly use or release chemicals into the water body.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment		Yes, because the dredging will disturb sediment with contaminants at concentrations above Cefas Action Level 1.	Yes, because the dredging will disturb sediment with contaminants at concentrations above Cefas Action Level 1.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	**Yes**	**No**	**Water quality risk issue(s)**	
WFD water body name			Milford Haven Outer	Milford Haven Inner
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list		Impact assessment not required	No, because the dredging will not directly use or release chemicals into this water body.	No, because the dredging will not directly use or release chemicals into this water body.

[5] *Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.*

Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas

Consider if your activity is:	Yes	No	Protected areas risk issue(s)	
WFD water body name			Milford Haven Outer	Milford Haven Inner
Within 2km of any WFD protected area[6]	Requires impact assessment		Yes, because the dredging will take place within the Pembrokeshire Marine SAC.	Yes, because the dredging will take place within the Pembrokeshire Marine SAC and within 2 km of the Milford Haven Cleddau shellfish water.

[6] *Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.*

Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	**Yes**	**No**	**INNS risk issue(s)**	
WFD water body name			Milford Haven Outer	Milford Haven Inner
Introduce or spread INNS	Requires impact assessment		Yes, because dredging will use dredging plant and equipment that will have come from, had been used in, or travelled through other water bodies.	Yes, because dredging will use dredging plant and equipment that will have come from, had been used in, or travelled through other water bodies.

Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	
Biology: habitats	Yes	The maintenance dredging in both the Milford Haven Outer and Inner water bodies may pose a risk to habitats because it will take place within 500m of any higher sensitivity habitat.
Biology: fish	No	
Water quality	Yes	The maintenance dredging may pose a risk to water quality because it will disturb sediment with contaminants at concentrations above Cefas Action Level 1.
Protected areas	Yes	Maintenance dredging in both the Milford Haven Outer and Inner water bodies may pose a risk to protected areas because it will take place within the Pembrokeshire Marine SAC. Maintenance dredging in the Milford Haven Inner water body may pose a risk to protected areas because it will take place within 2km of the Milford Haven Cleddau shellfish water.
Invasive non-native species	Yes	Maintenance dredging in both the Milford Haven Outer and Inner water bodies may pose a risk to INNS because it will have the potential to introduce or spread INNS.

APPENDIX 3

WFD COMPLIANCE ASSESSMENT
SCOPING OF DISPOSAL OF DREDGED MATERIAL UNDER MHPA'S DREDGING STRATEGY 2022-2031

Your activity	Description, notes or more information
Applicant name	Milford Haven Port Authority (MHPA)
Application reference number (where applicable)	TBC
Name of activity	Milford Haven Dredging Strategy 2022-2031
Brief description of activity	Disposal of dredged material arising from maintenance dredging to offshore disposal sites LU168 and LU169.
Location of activity (central point XY coordinates or national grid reference)	Disposal site LU168 is situated approximately 17km from the entrance to Milford Haven, and is defined by the polygon area formed by the following latitude / longitude coordinates: • 51° 31.10' North, 005° 10.75' West • 51° 31.10' North, 005° 13.50' West • 51° 32.20' North, 005° 13.50' West • 51° 32.20' North, 005° 12.25' West Disposal site LU169 is situated approximately 34km from the entrance to Milford Haven, and is defined by a circle of a radius of 0.5Nm centred on the following latitude / longitude coordinates: • 51° 35.0' North, 005° 37.0' West
Footprint of activity (ha)	The footprint of the activity will cover the footprints of the disposal sites LU168 and LU169, as described above, and will extend beyond the footprints of the disposal sites due to the dispersion and deposition of sediment plumes.
Timings of activity (including start and finish dates)	The disposal of dredged material associated with maintenance dredging in Milford Haven will

	take place from 2022 to 2031.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	While the marine licence application proposes the disposal of up to 250,000m^3 of dredged material each and every year from 2022 to 2031, in reality the frequency and scale of the disposal activities will be less. Provisionally, MHPA estimate that maintenance dredging will be undertaken in seven of the ten years from 2022 to 2031 (2022, 2023, 2025, 2026, 2027, 2030 and 2031) and will generate between approximately 2,000m^3 and 179,350m^3 of dredged material in any one year.
Use or release of chemicals (state which ones)	The disposal of dredged material will not include the use or release of chemicals.

Water body[1]	Description, notes or more information	
WFD water body name	Pembrokeshire South	Grassholm Island & The Smalls
Water body ID	GB611008590003	GB621008480000
River basin district name	West Wales	West Wales
Water body type (estuarine or coastal)	Coastal	Coastal
Water body total area (ha)	41,330 ha	5,151 ha
Overall water body status	Good	Good
Ecological status	Good	Good
Chemical status	Good	Good
Target water body status and deadline	Good status by 2015	Good status by 2015
Hydromorphology status of water body	High	High
Heavily modified water body and for what use	Not designated	Not designated
Higher sensitivity habitats present	No information	No information
Lower sensitivity habitats present	No information	No information
Phytoplankton status	High	Not monitored
History of harmful algae	Not monitored	Not monitored
WFD protected areas within 2km	Skomer, Skokholm and the Seas off Pembrokeshire SPA, and Pembrokeshire Marine SAC	Skomer, Skokholm and the Seas off Pembrokeshire SPA, and Pembrokeshire Marine SAC

* Water body information taken from waterwatchwales.naturalresourceswales.gov.uk/en/ (accessed 24/11/2021)

Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity. Use the water body summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	**Yes**	**No**	**Hydromorphology risk issue(s)**	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		Impact assessment not required	No, because this water body is not at high status.	No, because this water body is not at high status.
Could significantly impact the hydromorphology of any water body		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the hydromorphology of this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the hydromorphology of this water body.
Is in a water body that is heavily modified for the same use as your activity		Impact assessment not required	No, because this water body is not a heavily modified water body.	No, because this water body is not a heavily modified water body.

Section 2: Biology

Habitats

Consider if habitats are at risk from your activity. Use the water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Higher sensitivity habitats [2]	Lower sensitivity habitats [3]
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

[2] *Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.*
[3] *Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.*

Consider if the footprint[4] of your activity is:	Yes	No	Biology habitats risk issue(s)	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
0.5km^2 or larger		Impact assessment not required	No, because the disposal of dredged material will take place at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not have a footprint that is 0.5km$_2$ or larger	No, because the disposal of dredged material will take place at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not have a footprint that is 0.5km$_2$ or

			within this water body.	larger within this water body.
1% or more of the water body's area			No, because the disposal of dredged material will take place at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect 1% or more of this water body's area.	No, because the disposal of dredged material will take place at disposal sites that are situated 14km and 25km offshore and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect 1% or more of this water body's area.
Within 500m of any higher sensitivity habitat			No, because the disposal of dredged material will take place outside of this water body and at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not be within 500m of any higher sensitivity habitat within the water body; the nearest of which comprises the various patches of subtidal kelp beds fringing the shorelines of the mainland and islands.	No, because the disposal of dredged material will take place outside of this water body and at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not be within 500m of any higher sensitivity habitat within the water body; the nearest of which comprises the various patches of subtidal kelp beds fringing the shorelines of the mainland and islands.
1% or more of any lower sensitivity habitat			No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest

			therefore, will not affect 1% or more of the nearest lower sensitivity habitat within this water body which comprises areas of subtidal coarse sediment (gravels and cobbles), subtidal soft sediment (muds, sands and mixed muds and sands) and subtidal rocky reef (infralittoral and circalittoral rock).	coastline and, therefore, will not affect 1% or more of the nearest lower sensitivity habitat within this water body which comprises areas of subtidal coarse sediment (gravels and cobbles), subtidal soft sediment (muds, sands and mixed muds and sands) and subtidal rocky reef (infralittoral and circalittoral rock).

[4] *Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.*

Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	**Yes**	**No**	**Biology fish risk issue(s)**	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		Impact assessment not required	No, because the disposal of dredged material will not take place in an estuary; rather it will take place in open water outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not delay or prevent fish entering estuaries in or beyond this water body including Milford Haven.	No, because the disposal of dredged material will not take place in an estuary; rather it will take place in open water outside of this water body at disposal sites that are situated 14km and 25km offshore, , and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not delay or prevent fish entering estuaries in or beyond this water body including Milford Haven.

Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not impact on normal fish behaviour within this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not impact on normal fish behaviour within this water body.
Could cause entrainment or impingement of fish		Impact assessment not required	No, because the disposal of dredged material will have no means of entrainment or impingement.	No, because the disposal of dredged material will have no means of entrainment or impingement.

Section 3: Water quality

Consider if water quality is at risk from your activity. Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle within this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle within this water body.
Is in a water body with a phytoplankton status of moderate, poor or bad		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the phytoplankton status within this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the phytoplankton status within this water body.
Is in a water body with a history of harmful algae		Impact assessment	No, because the disposal of dredged material will take place outside of	No, because the disposal of dredged material will take place outside of

		not required	this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the situation regarding harmful algae within this water body.	this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not affect the situation regarding harmful algae within this water body.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	**Yes**	**No**	**Water quality risk issue(s)**	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
The chemicals are on the Environmental Quality Standards Directive (EQSD) list		Impact assessment not required	No, because the disposal of dredged material does not directly use or release chemicals into the water body.	No, because the disposal of dredged material does not directly use or release chemicals into the water body.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment		Yes, because the disposal of dredged material will deposit sediment with contaminants at concentrations above Cefas Action Level 1.	Yes, because the disposal of dredged material will deposit sediment with contaminants at concentrations above Cefas Action Level 1.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list		Impact assessment not required	No, because the disposal of dredged material does not directly use or release chemicals into this water body.	No, because the disposal of dredged material does not directly use or release chemicals into this water body.

[5] *Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.*

Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas

Consider if your activity is:	Yes	No	Protected areas risk issue(s)	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
Within 2km of any WFD protected area[6]	Requires impact assessment		Yes, because although the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, the disposal sites are situated within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and will generate sediment plumes that will be within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and will have the potential to generate sediment plumes that will be within the Pembrokeshire Marine SAC.	Yes, because although the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, the disposal sites are situated within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and will generate sediment plumes that will be within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and will have the potential to generate sediment plumes that will be within the Pembrokeshire Marine SAC.

[6] *Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.*

Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	Yes	No	INNS risk issue(s)	
WFD water body name			Pembrokeshire South	Grassholm Island & The Smalls
Introduce or spread INNS		Impact assessment not required	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not introduce or spread INNS within this water body.	No, because the disposal of dredged material will take place outside of this water body at disposal sites that are situated 14km and 25km offshore, and will generate sediment plumes that will be more than 10km and 20km away from the nearest coastline and, therefore, will not introduce or spread INNS within this water body.

Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	
Biology: habitats	No	
Biology: fish	No	
Water quality	Yes	The disposal of dredged material may pose a risk to WFD water quality because it will dispose of sediment with contaminants at concentrations above Cefas Action Level 1.
Protected areas	Yes	The disposal of dredged material may pose a risk to WFD protected areas because it will take place within the Skomer, Skokholm and the Seas off Pembrokeshire SPA, and will generate sediment plumes that will be within the Skomer, Stokholm and the Seas off Pembrokeshire SPA, and will have the potential to generate sediment plumes that will be within the Pembrokeshire Marine SAC.
Invasive non-native species	No	

APPENDIX 4

MILFORD HAVEN - SEDIMENT QUALITY DATA AND COMPARISON TO CEFAS ACTION LEVELS AND GORHAM-TEST EFFECT RANGES

Physical Data

Sample ID	Sample Location	Visual Appearance	Total Solids (% Total Sediment)
Site A	Mill Bay, Milford Haven Main Approach Channel	Odourless brown sand with shell fragments	88.40
Site B	Mill Bay, Milford Haven Main Approach Channel	Odourless brown sand with shell fragments	77.40
Site C	Thorn Island, Milford Haven Main Approach Channel	Odourless brown sand with shell fragments and organic matter	64.50
Site D	Valero Refinery	Brown mud with an anoxic odour	50.10
Site E	Valero Refinery	Brown mud with organic matter and an anoxic odour	47.50
Site F	Milford Shelf, Milford Haven Main Approach Channel	Brown mud with shell fragments and an anoxic odour	52.20
Site G	Valero Pembrokeshire Oil Terminal	Brown mud with an anoxic odour	46.10
Site H	Valero Pembrokeshire Oil Terminal	Brown mud with an anoxic odour	42.80
Site I	Port of Pembroke Dock	Brown mud with an anoxic odour	34.80
Site J	Pembroke Power Station Cooling Water Intake	Brown mud with an anoxic odour	36.40

Key to Data Comparison

Indicator	Data Comparison to Cefas Action Levels and Gorham-Test Effects Ranges
	Data is below Cefas Action Level 1 / Gorham-Test Effects Range Low
	Data is above Cefas Action level 1 and below Cefas Action Level 2 / above Gorham-Test Effects Range Low and below Gorham-Test Effects Range Median
	Data is above Cefas Action Level 2 / above Gorham-Test Effects Range Median

Metals Data (mg/kg dry weight)

Sample ID	Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc
Site A	7.1	0.06	12.4	7.7	0.02	16.1	7.8	31.8
Site B	6.5	0.06	9	7.8	0.01	12.5	7.7	29.4
Site C	6.6	0.07	14.5	7.5	0.03	9	9.9	27.1
Site D	9.7	0.11	18.8	14.6	0.07	16.7	25.4	76.6
Site E	12.7	0.14	27	20.5	0.1	22.8	31.1	92.3
Site F	9.6	0.12	23.6	18.4	0.1	20.8	31.6	90.5
Site G	13.1	0.16	26.1	19.9	0.12	22.3	34.2	99
Site H	13	0.13	26.2	20	0.12	22.6	32.9	99.8
Site I	15.8	0.22	31.5	24.6	0.12	25.7	41.7	121
Site J	16.6	0.21	30.7	26.4	0.13	25.9	45.4	125
Cefas AL1	20	0.4	40	40	0.3	50	20	130
Cefas AL2	100	5	400	400	3	500	200	800

Polyaromatic Hydrocarbons (PAHs) (µg/kg dry weight) and Total Hydrocarbons (mg/kg dry weight)

Sample ID	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[e]pyrene	Benzo[k]fluoranthene	C1-Napthalenes	C1-Phenanthrenes	C2-Napthalenes
Site A	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	1.48	1.41	1.59
Site B	<LOD	<LOD	<LOD	<LOD	1.24	1.45	1.4	1.24	<LOD	1	<LOD	<LOD
Site C	<LOD	<LOD	1.41	2.76	2.47	3.25	3.11	3.16	2.15	10	6.7	6.77
Site D	15.5	14.8	42.9	139	122	172	128	126	85.9	87.1	120	68.6
Site E	21.3	11.4	42.7	212	185	221	166	171	95.6	91.4	145	85.8
Site F	18.9	6.01	22.7	103	94.1	142	109	108	73.2	81.7	103	76
Site G	19.7	10.7	43.7	175	149	191	147	156	76.6	93.6	127	84.9
Site H	18.6	11.9	37.3	166	143	216	156	159	77.1	103	144	91.7
Site I	19.3	13	44.2	205	192	263	198	208	110	129	178	117
Site J	18.7	10.5	36.3	166	152	227	166	169	88.4	113	143	104
Cefas AL1	100	100	100	100	100	100	100	100	100	100	100	100

Sample ID	C3-Napthalenes	Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-c,d]pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene	Total Hydro-carbons Content
Site A	1.05	<LOD	<LOD	1.28	<LOD	<LOD	<LOD	<LOD	1.54	1.15	<LOD
Site B	<LOD	1.32	<LOD	1.99	<LOD	1.31	<LOD	<LOD	2.02	1.81	<LOD
Site C	4.22	4.27	<LOD	6.02	1.23	3.09	5.51	<LOD	6.64	5.34	1.53
Site D	51.1	160	32.3	216	31.4	148	53.5	44.7	159	178	11.5
Site E	61.2	229	43.4	296	34.4	185	54	59.3	182	250	20.8
Site F	54.3	105	22.9	170	32.1	126	43.9	36.4	108	142	3.59
Site G	64.7	193	38.1	242	32.6	177	52.3	56.3	131	195	19.9
Site H	72.4	193	42.3	243	35.6	183	56.9	55.1	152	196	18.5
Site I	89.5	239	52.6	324	40.4	237	69.5	70.5	195	268	16
Site J	74.2	196	38.5	243	37.1	198	63.3	58.7	153	204	19.6
Cefas AL1	100	100	100	100	100	100	100	100	100	100	n/a

Polyaromatic Hydrocarbons (PAHs) (µg/kg dry weight) and Total Hydrocarbons (mg/kg dry weight)

Sample ID	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[e]pyrene	Benzo[k]fluoranthene	C1-Napthalenes	C1-Phenanthrenes	C2-Napthalenes
Site A	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	1.48	1.41	1.59
Site B	<LOD	<LOD	<LOD	<LOD	1.24	1.45	1.4	1.24	<LOD	1	<LOD	<LOD
Site C	<LOD	<LOD	1.41	2.76	2.47	3.25	3.11	3.16	2.15	10	6.7	6.77
Site D	15.5	14.8	42.9	139	122	172	128	126	85.9	87.1	120	68.6
Site E	21.3	11.4	42.7	212	185	221	166	171	95.6	91.4	145	85.8
Site F	18.9	6.01	22.7	103	94.1	142	109	108	73.2	81.7	103	76
Site G	19.7	10.7	43.7	175	149	191	147	156	76.6	93.6	127	84.9
Site H	18.6	11.9	37.3	166	143	216	156	159	77.1	103	144	91.7
Site I	19.3	13	44.2	205	192	263	198	208	110	129	178	117
Site J	18.7	10.5	36.3	166	152	227	166	169	88.4	113	143	104
ERL	44	16	85	261	430	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ERM	640	500	1,100	1,600	1,600	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Sample ID	C3-Napthalenes	Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-c,d]pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene	Total Hydro-carbons Content
Site A	1.05	<LOD	<LOD	1.28	<LOD	<LOD	<LOD	<LOD	1.54	1.15	<LOD
Site B	<LOD	1.32	<LOD	1.99	<LOD	1.31	<LOD	<LOD	2.02	1.81	<LOD
Site C	4.22	4.27	<LOD	6.02	1.23	3.09	5.51	<LOD	6.64	5.34	1.53
Site D	51.1	160	32.3	216	31.4	148	53.5	44.7	159	178	11.5
Site E	61.2	229	43.4	296	34.4	185	54	59.3	182	250	20.8
Site F	54.3	105	22.9	170	32.1	126	43.9	36.4	108	142	3.59
Site G	64.7	193	38.1	242	32.6	177	52.3	56.3	131	195	19.9
Site H	72.4	193	42.3	243	35.6	183	56.9	55.1	152	196	18.5
Site I	89.5	239	52.6	324	40.4	237	69.5	70.5	195	268	16
Site J	74.2	196	38.5	243	37.1	198	63.3	58.7	153	204	19.6
ERL	n/a	384	63	600	19	n/a	160	n/a	240	665	n/a
ERM	n/a	2,800	260	5,100	540	n/a	2,100	n/a	1,500	2,600	n/a