

# Port of Southampton



## ABP Southampton Maintenance Dredge Protocol: Habitats Regulations Test for Likely Significance

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ABP Southampton

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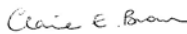
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## Summary

ABP Marine Environmental Research Ltd (ABPmer) has been commissioned to determine whether ongoing maintenance dredging undertaken by ABP Southampton will have a likely significant effect (LSE) on designated sites either alone or in-combination with other relevant plans and projects. In the context of Southampton Water and the surrounding area, designated sites include Natura 2000 sites (also known as European sites) under the Habitats Directive (92/43/EEC) and other nature conservation sites, namely Ramsar sites, compensatory sites and candidate Marine Conservation Zones (cMCZs).

The Conservation Assessment Protocol for maintenance dredging states that the expectation will be that a maintenance dredge proposal will not have a LSE on a European site when there is evidence to demonstrate that maintenance dredging is not causing deterioration in the condition of the site. Where this is the case it will not be necessary for the Competent Authority to require further information or to carry out a more detailed assessment for the purposes of the Habitats Regulations. The aim of this report, therefore, is to provide the relevant information to support the Competent Authority's test of significant effect (the Significance Test) in consultation with Natural England.

In parallel to this study, ABPmer has produced a Maintenance Dredge Baseline Document to comply with the requirements of the Conservation Assessment Protocol for maintenance dredging. The Baseline Document provides current and historical information on all maintenance dredging activities in the ABP Southampton harbour area and synthesizes existing relevant information about the environmental status of the area. The Baseline Document is available separately and should be read alongside this report.

This report concludes that ABP maintenance dredging has **no LSE on any designated sites and interest features either alone or in-combination with other plans or projects**. An outline of the evidence base and main reasons for reaching this conclusion are structured below according to the potential pathways that could result in a LSE:

### Disturbance of Sediment and Smothering

- There is no direct overlap between the boundary of ABP's maintenance dredge area and designated sites. There is therefore no direct physical damage to designated habitat or loss of benthic organisms;
- The amount of suspended sediment that is released into the water column from ABP maintenance dredging is relatively small per load and remains local to the dredger. Any material that settles is very short-lived and within the existing natural variability of the system. Benthic communities are considered to have a low sensitivity to these changes. Furthermore, these habitats have been historically exposed to these changes for over two centuries in some places; and
- The designated sites that occur in the vicinity of the licenced Nab Tower Deposit Ground have been characterised by the regular disturbance (over variable time periods and for many years) of ongoing maintenance dredging, intermittent capital dredge campaigns, aggregate dredging and past sewage sludge disposal, and these activities have not raised any concerns to date. Habitats and associated species are considered to be accustomed to these variable conditions above the natural background variability of an already highly dynamic area.

## **The Potential Remobilisation of Contaminated Sediments**

- The limited contaminated material that has been detected occurs at isolated spots and therefore comprises a negligible proportion of the total volume of maintenance dredge material, which could be redistributed and deposited during dredging and disposal. Furthermore, the successful receipt of Marine Licences indicates that the observed contamination is not considered to present an unacceptable risk to the marine environment.

## **Changes in Water Quality Affecting the Migration of Atlantic Salmon**

- The temporary increase in suspended sediments entering the water column as a result of ABP maintenance dredging is small at any one time, localised and within the limits of natural variability experienced within the estuary and as such these changes will not hinder the migratory passage of Atlantic salmon.

## **Potential for Disturbance Caused by Interruption of Possible Line of Sight and Noise**

- Maintenance dredge and disposal activities have taken place at the same locations for many years at varying times throughout the year. Bird interest features are therefore habituated to these low levels of visual and noise disturbance; and
- The underwater noise generated by ABP maintenance dredging is predicted to result in a mild behavioural response in a minority of Atlantic salmon up to a distance of 50m from the source of noise. This distance is considerably less than 50% of the available channel width at any given time and location of ABP maintenance dredging and, therefore, the migratory passage of Atlantic salmon will not be impeded.

## **Changes in Sediment Supply**

- All of the ABP maintenance dredged sediment is removed from the estuary system and deposited at the Nab Tower Deposit Ground. Despite this removal, the total sediment budget for the estuary remains in balance due to the import of material from the marine system; and
- There is no evidence that the existing maintenance dredging activity is detrimentally affecting the habitat interest features in Southampton Water.

## **In-Combination Effects**

- On the basis that all developments will be completed in the future, the maximum predicted increase in annual maintenance dredging could be in the order of 30,400 m<sup>3</sup>, which represents a 6% increase over the present average commitment.

## Abbreviations

AA	Appropriate Assessment
ABP	Associated British Ports
ABPmer	ABP Marine Environmental Research Ltd
AL	Action Level
BMW	Bayerische Motoren Werke
BP	British Petroleum
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CHA	Competent Harbour Authority
cMCZ	Candidate Marine Conservation Zone
cSAC	Candidate Special Area of Conservation
DAS	Disposal at Sea
dB <sub>ht</sub>	Decibels Hearing Threshold
DCLG	Department for Communities and Local Government
Defra	Department of Environment, Food and Rural Affairs
DP	Dubai Ports
EC	European Commission
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIFAC	European Inland Fisheries Advisory Commission
FARL	Fawley Aquatic Research Laboratories Ltd.
HMNB	Her Majesty's Naval Base
HRA	Habitats Regulations Assessment
JNCC	Joint Nature Conservation Committee
IECS	Institute of Estuarine and Coastal Studies
LSE	Likely Significant Effect
MarLIN	Marine Life Information Network
MCZ	Marine Conservation Zone
MDP	Maintenance Dredge Protocol
MMO	Marine Management Organisation
MPA	Marine Protected Areas
NE	Northeast
NPPF	National Planning Policy Framework
P&O	Peninsular and Oriental
PSA	Public Service Agreement
pSAC	Possible Special Area of Conservation
pSPA	Potential Special Protection Area
Ramsar	The Convention on Wetlands (Ramsar, Iran, 1971)
SAC	Special Area of Conservation
SACD	Southampton Approach Channel Dredge
SHA	Statutory Harbour Authority
SCI	Sites of Community Importance
SCT	Southampton Container Terminals
SPA	Special Protection Area



SSSI	Site of Special Scientific Interest
SW	Southwest
TEU	Twenty-foot Equivalent Units
TSHD	Trailing Suction Hopper Dredger
UK	United Kingdom
UKD	UK Dredging
VTS	Vessel Traffic Services
WID	Water Injection Dredging

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.



# ABP Southampton Maintenance Dredge Protocol: Habitats Regulations Test for Likely Significance

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## 1. Background

### 1.1 The Port of Southampton

The Port of Southampton, owned and operated by Associated British Ports (ABP), is located at a strategic position on the central south coast of England in close proximity to the international shipping lanes and mainland Europe (ABP, 2013). The Port has shipping links with over 100 countries and is one of the busiest and most diverse in the UK, handling around 40 million tonnes of cargo every year. The Port is a premier global gateway for international seaborne trade and is of national strategic importance to the UK.

The Port of Southampton has a range of trades of national importance in the following trade sectors:

- **Cruise:** The Port is the cruise capital of the UK and Northern Europe. It handles more than 440 cruise ships and around 1.7 million passengers a year. The Port has four dedicated cruise terminals which are regularly used by the industry's world cruise leaders including Royal Caribbean, Celebrity Cruises, Fred Olsen and Saga. Both Cunard and P&O Cruises, part of the Carnival Group, base their UK fleets in Southampton;
- **Containers:** The Dubai Ports (DP) World Southampton container terminal is the UK's second busiest container port, handling more than 1.5 million twenty-foot equivalent units (TEUs) in 2012. ABP has invested some £100 million creating and equipping a new container terminal berth capable of accommodating and servicing the world's largest container ships;
- **Oil/Petro-Chemicals:** The Exxon Marine Oil Terminal at Fawley is the largest in the UK. It has a mile-long marine terminal that handles around 2,000 ship movements and 22 million tonnes of crude oil and petrochemical products every year. The refinery processes around 330,000 barrels of crude oil a day and provides 20% of UK refinery capacity (ExxonMobil, 2014). The Terminal, with a jetty of over a mile in length, has nine berths and is able to accommodate some of the world's largest (partly laden) crude oil tankers. The BP Hamble Oil Terminal also handles oil and refined products. Crude oil is received from Wytch Farm in Dorset via a pipeline before being distributed globally by seagoing tankers. Refined products are distributed onwards by road tanker, pipeline or vessel;
- **Motor Vehicles:** Southampton is the UK's premier port for trade vehicle traffic. Prestige makes such as Jaguar, Land Rover, Rolls-Royce, BMW, Bentley and Aston Martin feature prominently among the vehicles handled every year. ABP caters for this expanding trans-oceanic trade by providing five separate multi-deck compounds for secure and sheltered storage of new vehicles to optimise land usage. Southampton also acts as a European 'hub port' for Roll On, Roll Off (Ro-Ro) shipping on both deep-sea and short sea routes;
- **Bulks:** The Port handles in the region of 1.2 million tonnes of bulk cargoes per year. Predominantly these are handled at the Bulk Terminal operated by Solent Stevedores and also in the Itchen Wharves. The Terminal has dedicated handling facilities for a range of bulk products including animal feed, fertilisers, grain and scrap metal;

- **Other:** Other major traffic flows handled at the Port include fresh produce and project cargo;
- **Passenger Traffic:** There are two main passenger services within Southampton Water and the Solent. White Horse Ferries operate the Hythe Ferry which operates a regular seven day service from the western shore of Southampton Water (from Hythe) to Town Quay. Red Funnel Ferries operates a regular and scheduled service between the Town Quay area of Southampton and East and West Cowes on the Isle of Wight. Red Funnel carries over 3 million passengers and 600,000 vehicles per annum as well as operating a freight service; and
- **Recreation:** The Solent and adjacent waters and harbours are some of the most popular and intensively used watersport areas in north-west Europe. The most popular watersport in the harbour area is sailing, but other sports, such as windsurfing, kayaking and water skiing, are also widely enjoyed. The region has an international reputation for hosting key events in the sailing calendar such as Cowes Week and the Little Britain Challenge Cup. The harbour and adjacent areas are home to a large number of marinas, yacht and sailing clubs and moorings.

## 1.2 Associated British Ports

In addition to being the owner and operator of the Port of Southampton, ABP is the Statutory Harbour Authority (SHA), the Competent Harbour Authority (CHA) for the provision of pilotage services, the Vessel Traffic Services (VTS) Authority and Local Lighthouse Authority for Southampton.

ABP's statutory powers and duties include:

- The discharge of its statutory duties of a Harbour Master;
- The safety of navigation and regulation of all vessel traffic including the provision of VTS services;
- The provision of pilotage services;
- The protection of flora and fauna;
- The conservancy of the harbour area including the provision of suitable navigational aids and the maintenance of obstruction free navigational channels;
- Responsibility for response to oil pollution incidents; and
- The regulation of dangerous goods in transit through the harbour area.

## 1.3 Description of Harbour Area

Southampton Water is a relatively narrow and spit-enclosed meso-tidal estuary, subject to very limited wave action and draining a catchment of around 1630km<sup>2</sup> (ABPmer, 2007). It was formed by the rivers Test, Itchen and Hamble which flow into it, and became an inlet of the sea at the end of the last ice age when sea levels rose, flooding many valleys in the south of England. Figure 1 shows the key locations within the study area that are referred to in the report.

Southampton Water has an artificially deepened channel for much of its length. The Test Estuary is bordered by existing developments, including the Ports of Southampton and Marchwood. An extensive dendritic marsh system occurs upstream of the bridges at Redbridge. The lower reaches of the Itchen Estuary are constrained by a mix of waterside developments. Upstream of the Woodmill Lane Bridge, the river is more natural in form, but is still confined by housing and/or small industry on the left and a recreation park on the right.

The statutory harbour area of the Port of Southampton comprises the central Solent, Southampton Water and the Test and Itchen Estuaries. The boundaries of the harbour are from Stansore Point to Egypt Point in the south west and from Old Castle Point to Hill Head in the east. The harbour area extends northwards to the navigable parts of the Test Estuary (below Redbridge Causeway) and Itchen Estuary (below Woodmill). The jurisdiction of the harbour authority is presented in Figure 1.

## **1.4 Dredging**

Maintaining safe port access for all maritime transport is an important function for Harbour Authorities. Routine maintenance dredging of the main channel, dock approaches and berths has been undertaken in Southampton Water for over two centuries to maintain depths against ongoing sedimentation.

Under the Southampton Harbour Act 1911, ABP has powers to carry out maintenance dredging to ensure the maintenance of water depths as advertised on Admiralty Charts for the safe navigation of vessels. These powers enable ABP to carry out maintenance dredging in the statutory harbour area with exemption from Section 34 of the Coast Protection Act 1949 (as amended), which would normally be required in order to dredge material from below mean low water.

Consent is required under the Marine and Coastal Access Act 2009 to deposit dredged material. A marine licence is required to dispose of dredged material, which is granted by the Marine Management Organisation (MMO). The current maintenance dredge licence held by ABP Southampton (L/2011/00233) permits ABP Southampton to deposit 600,000 tonnes of maintenance dredgings at the Nab Tower Deposit Ground (WI060) per annum up until September 2014.

For third parties wishing to undertake maintenance dredging in the ABP Southampton harbour area, an application to undertake those works must be made to both the MMO and ABP – the latter under Section 13 of the Southampton Harbour Act 1924, as amended by the Southampton Harbour Act 1939, Section 48 of the Southampton Harbour Act 1949, or Section 21 of the British Transport Docks Act 1966 as applicable.

## **1.5 Report Context**

It is the Government's view, supported by rulings in the European Court of Justice, that maintenance dredging should be considered as a 'plan or project' for the purposes of the EC Habitats Directive (92/43/EEC), and assessed in accordance with Article 6(3) of that Directive (Defra, 2007).

Under Article 6(3) of the Habitats Directive, as enforced in the UK through the Habitats Regulations<sup>1</sup>, an Appropriate Assessment (AA) is required where a plan or project is not directly connected with, or necessary for the management of Natura 2000 sites (also known as 'European sites') and where the possibility of a likely significant effect (LSE) on these sites cannot be excluded, either alone or in-combination with other plans or projects.

Section 4.1 of the Conservation Assessment Protocol (Defra, 2007) states that the expectation (in the absence of any conflicting evidence) will be that a maintenance dredge proposal will not have a LSE on a European site when:

- The Baseline Document shows that maintenance dredging is not causing deterioration in the condition of the site, and
- There will be little or no change to the situation described in the Baseline Document.

Where this is the case it will not be necessary for the Competent Authority to require further information or to carry out a more detailed assessment for the purposes of the Habitats Regulations.

In this context, ABP Marine Environmental Research Ltd (ABPmer) has been commissioned to produce a Maintenance Dredge Baseline Document to comply with the requirements of the Conservation Assessment Protocol for maintenance dredging. The Baseline Document provides current and historical information on dredging activities in the ABP Southampton harbour area and synthesises existing relevant information about the environmental status of the area. The Baseline Document is available separately (ABPmer, 2014), and should be read alongside this report which specifically reviews the available evidence and provides information to determine whether maintenance dredging undertaken by ABP Southampton is having a LSE. The test of significant effect (the Significance Test) must then be made by the Competent Authority in consultation with Natural England.

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<sup>1</sup> The following principal instruments (jointly referred to as the "Habitats Regulations") transpose the EC Habitats Directive into UK law: the Conservation of Habitats and Species Regulations 2010 (as amended); the Conservation (Natural Habitats, &c) Regulations 1994 (as amended); the Offshore Marine Conservation (Natural Habitats) Regulations 2007 (as amended).

## 2. Designated Sites

### 2.1 European/Ramsar Sites

European sites are defined in the Habitats Regulations as including the following:

- Special Areas of Conservation (SACs) designated under the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) for their habitats and/or species of European importance;
- Special Protection Areas (SPAs) classified under the EC Directive on the Conservation of Wild Birds (the Birds Directive) for rare, vulnerable and regularly occurring migratory bird species and internationally important wetlands;
- Sites of Community Importance (SCIs) that have been adopted by the European Commission but not yet formally designated by the government of each country; and
- Candidate SACs (cSACs) that have been submitted to the European Commission, but not yet formally adopted.

In England, it is also policy under the National Planning Policy Framework (DCLG, 2012) that the following wildlife sites should be given the same protection as European sites:

- Potential SPAs (pSPAs) and possible SACs (pSACs);
- Listed or proposed Ramsar sites under the 1971 Ramsar Convention on Wetlands of International Importance;<sup>2</sup> and
- Sites identified, or required, as compensatory measures for adverse effects on European sites (e.g. Medmerry).

These sites are therefore collectively referred to throughout this report as European/Ramsar sites.

The European/Ramsar sites occurring in Southampton Water and the surrounding area are shown in Figure 2 and include:

- Solent and Southampton Water SPA;
- Portsmouth Harbour SPA;
- Chichester and Langstone Harbours SPA;
- Solent and Southampton Water Ramsar site;
- Portsmouth Harbour Ramsar site;
- Chichester and Langstone Harbours Ramsar site;
- Solent Maritime SAC;
- South Wight Maritime SAC; and
- River Itchen SAC.

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<sup>2</sup> pSPAs, pSACs and proposed Ramsar sites are sites on which Government has initiated public consultation on the scientific case for designation as a SPA, cSAC or Ramsar site.

There are four additional European/Ramsar sites that occur in the wider area but have not been considered further in this review of LSE given that there is no potential pathway linking the source of the change or pressure to the qualifying interest features. These are as follows:

- Pagham Harbour SPA;
- Pagham Harbour Ramsar site;
- New Forest Ramsar site; and
- New Forest SAC.

European Marine Sites is the collective term for SACs and SPAs that are covered by tidal water (continuously or intermittently). The following European Marine Sites and corresponding international designations are located in the study area:

- Solent European Marine Site, comprising:
  - Solent Maritime SAC;
  - Solent and Southampton Water SPA and Ramsar site;
  - Chichester and Langstone Harbours SPA and Ramsar site; and
  - Portsmouth Harbour SPA and Ramsar site.
- South Wight Maritime European Marine Site, comprising:
  - South Wight Maritime SAC

Natural England has statutory responsibility to advise relevant authorities as to the conservation objectives for European Marine Sites and operations which may cause deterioration or disturbance of natural habitats and species. This advice is provided under Regulation 35 of the Conservation of Habitats and Species Regulations 2010 (referred to as the Habitats Regulations within this document).

The role of the conservation objectives for a European Marine Site is to define the nature conservation aspirations for the features of interest, thereby representing the aims and requirements of the Habitats and Birds Directives in relation to the site. A detailed breakdown of the qualifying interest features and the associated conservation objectives for the European/Ramsar sites listed above can be found in Section 7 of the Baseline Document (ABPmer, 2014).

The March 2012 National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England confirms (in Paragraph 118) that "*sites identified, or required, as compensatory measures for adverse effects on European sites*" should be given the same protection as European sites (DCLG, 2012, p28). On this basis, all completed managed realignment or recharge sites that have been created for compensatory purposes were identified for the purposes of this review of LSE. These are included on Figure 2 and are as follows:

- Cobnor managed realignment;
- Lyminster recharge; and
- Medmerry managed realignment.



The qualifying interest features of the compensatory sites that occur in the study area are not known, however, it is considered that these will support features already designated by the other European/Ramsar sites (in particular coastal habitats and supporting species; and foraging and migratory birds).

## 2.2 Marine Conservation Zones

The UK has signed up to international agreements that aim to establish an 'ecologically coherent network of Marine Protected Areas (MPAs)' by the end of 2012. This network will be made up of current MPAs as well as a new type of MPA called a Marine Conservation Zone (MCZ). Within the south east region, the development of recommendations for MCZ has been coordinated by the Balanced Seas Regional MCZ Project (Balanced Seas, 2011).

In November 2013 Defra designated 27 new MCZs, none of which fall within the vicinity of the maintenance dredge operations. In February 2014, Defra announced that work on a second tranche of MCZs is currently underway with the aim of holding public consultation in early 2015 and designating sites by the end of that year (Defra, 2014). For the second tranche, 37 sites from the Regional MCZ Project recommendations have been identified as suitable candidates for consideration. Of these, there are five candidate MCZs (cMCZs) that could potentially be indirectly affected by the maintenance dredge operations, as a result of the disposal of maintenance dredge material at the Nab Tower Deposit Ground. Although these have not been formally designated, and the process for consideration of these sites is still under development, they have been included in this review on a precautionary basis and treated as though they were fully designated sites. These sites are as follows:

- Offshore Overfalls cMCZ Site 12;
- Utopia cMCZ Site 13;
- Bembridge cMCZ Site 14;
- Norris to Ryde cMCZ Site 15; and
- Yarmouth to Cowes cMCZ Site 16.

The features and draft conservation objectives that have been developed by Natural England and Joint Nature Conservation Committee (JNCC) advisors (Balanced Seas, 2011) for each of these tranche 2 cMCZs are outlined in Table 7.4 of the Baseline Document (ABPmer, 2014). A conservation objective set to 'maintain' means that the stated levels of activity currently occurring on the feature are considered acceptable, but features will be monitored and restrictions may have to be introduced if the condition declines. A conservation objective to 'recover' means that restrictions may be necessary on the activity causing the pressure, in order to allow the feature to recover to favourable condition. It does not necessarily mean that an activity will be prohibited, as other mitigation measures might be appropriate (e.g. change in fishing gear type, reduction in intensity, seasonal restrictions etc.).

It should be noted that the locations of tranche 2 cMCZs, the features proposed for designation and the conservation objectives for specified features may change prior to or following public consultation in 2015.

### 3. Likely Significant Effect on Interest Features of the Designated Sites

This section provides a review of the potential for LSE of ABP Southampton's maintenance dredge operations alone (Sections 3.1 to 3.3) and in-combination with other relevant plans and projects (including third party maintenance dredge operations) (Section 3.4), on the qualifying interest features of designated sites that were identified in Section 2. This review has been carried out in the context of the nature of the maintenance dredging activities, and the geographical locations of both the works and the interest features. It is also based on existing knowledge and evidence with no new analysis undertaken. The locations of ABP Southampton's maintenance dredge and disposal operations in the context of the relevant designated sites are shown on Figures 3 and 4. The locations of other plans and projects that have been considered in the in-combination assessment are shown on Figure 5.

There is no direct overlap between the boundary of ABP's maintenance dredge area and designated sites. There is therefore no direct physical damage to designated habitat or loss of benthic organisms. There may, however, be a potential LSE on designated sites and features as a result of the disturbance and dispersal of sediments outside of the footprint of the dredge and disposal areas or because of the mobile nature of some interest features (i.e. birds and fish). In general terms, depending on the nature, scale, timing, duration and magnitude of the change, the potential source-receptor pathways of maintenance dredging that could result in a LSE on the qualifying interest features of the designated sites could include:

- Disturbance of sediment by the creation of sediment plumes causing an increase in turbidity, suspended sediment concentrations, organic matter, and ultimately smothering of habitats associated with the dredging process and/or with the deposit of fine sediment at the disposal site;
- The potential remobilisation of contaminated sediments associated with suspended sediment as a result of dredging activity, which could in turn affect water quality;
- Changes in water quality resulting from re-suspension of material during the dredging process causing potential access restrictions to Atlantic Salmon entering Southampton Water;
- Potential for disturbance caused by interruption of possible line of sight and noise during the dredging process; and
- Changes in sediment supply.

Each of these potential pathways that could result in a LSE are reviewed in turn in the following sections.

#### 3.1 Disturbance of Sediment and Smothering

##### 3.1.1 During Maintenance Dredging

Maintenance dredging creates temporary sediment plumes which in turn can increase turbidity and the concentration of suspended organic matter. The scale of any changes in suspended

sediment concentrations will vary spatiotemporally depending on the tidal state, range of tide and material type, as well as location, rates and methods of maintenance dredging.

The method of maintenance dredging used by ABP Southampton is a small/ medium size Trailing Suction Hopper Dredger (TSHD) (e.g. UKD Bluefin<sup>3</sup>) and a dredging support vessel which is fitted with a plough unit to provide bed-levelling capability. Further information on the TSHD and plough dredging methods are included in Section 4.2.3 of the Baseline Document (ABPmer, 2014). The amount of suspended sediment that is released into the water column by a small/medium size TSHD is relatively small per load. Ploughing should not typically lead to significant re-suspension of sediment in to the upper water column, but if the sediment ploughed is soft it may be sufficiently disturbed to raise smaller sediment fractions into suspension.

During maintenance dredging, the material that is suspended into the water column disperses and re-settles, mainly onto the navigation channel and/or berths. Any material that settles is very short-lived, most likely only occurring during slack periods and being re-dispersed as tidal currents increase. Furthermore, the magnitude of any changes in depth are negligible or *de minimus* (i.e. not measurable). In other words, these periods of deposition are transient and the scale of any exposure is within the existing natural variability of the system.

Intertidal and subtidal estuarine habitats and associated benthic communities are naturally adapted to fluctuating conditions and the resuspension and deposition of sediments on a daily basis (through tidal action), lunar cycles (due to the differing influences of spring and neap tides) and on a seasonal basis (due to storm activity and conditions of extreme waves). Furthermore, the nature of the maintenance dredged material is similar to that which occurs in the less dynamic (low flow) areas where this material is most likely to settle (i.e. mainly muds).

Benthic communities within the Solent European Marine Site are considered to have a low sensitivity to changes in suspended sediments and minor fluctuations in sedimentation, particularly in areas with muddy sediments and those located adjacent to regularly disturbed areas, such as the main navigation channel, berths and marinas. These habitats have been historically exposed to changes in suspended sediments and sedimentation as a result of regular and ongoing maintenance dredging for over two centuries in some places. Overall, given the negligible level of exposure and the low sensitivity of interest features, this temporary disturbance is considered to result in no potential for LSE and will therefore not change the overall favourable condition status of interest features.

### 3.1.2 During Disposal of Maintenance Dredge Arisings

Disposal at Sea (DAS) records provided by Cefas from 1986 up to 2012 indicate that the mean volume of maintenance dredge arisings deposited at the Nab Tower Deposit Ground from all the estuaries and harbours in the Solent amounts to around 0.6 million m<sup>3</sup> per year (0.7 million wet tonnes). The Nab Deposit Ground was also historically used for disposal of sewage sludge at sea, until there was a ban on this form of disposal in 1998. The site and surrounding area

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<sup>3</sup> <http://www.ukdredging.co.uk/admin/content/files/Brochures/UKD%20Bluefin%20Brochure.pdf>

has, therefore, had a history of elevated levels of bacteria, albeit this is likely to have recovered in recent years.

The Nab Tower Deposit Ground is a highly dispersive site and given the fine-grained nature of maintenance dredge deposits, all the material is rapidly dispersed from this site. Based on modelling that has been undertaken of the dispersal and deposition of capital dredge sediments from the Nab Tower Deposit Ground for the Southampton Approach Channel Dredge Environmental Impact Assessment (EIA), the dispersal of maintenance dredge material occurs on a northeast (NE) to southwest (SW) axis (ABPmer, 2012). The sediment plumes generated by maintenance dredge disposals migrate westwards with time towards the Isle of Wight whilst suspended sediment concentrations continue to decay. The plumes therefore have the potential to overlap with the boundaries of the South Wight European Marine Site and also a number of cMCZs, particularly Bembridge cMCZ (Figure 2). Any disposed sediment that settles is negligible in magnitude (i.e. not measurable against background variability) and rapidly re-dispersed by ambient tidal currents within a very short period of time.

In terms of receptor sensitivity, apart from the maerl beds of the Bembridge cMCZ, all of the other habitat and species interest features comprising the South Wight Maritime European Marine Site and cMCZs are considered to have a negligible to low sensitivity to changes in suspended sediment concentration and deposition (MarLIN 2014). Maerl beds are considered to have a higher sensitivity to increases in suspended sediment because the key structural species within this habitat, either *Lithothamnion glaciale* or *Phymatolithon calcareum*, are photosynthetic and, thus, likely to be sensitive to increases in turbidity in the photic zone. Many of the other characterising species in this biotope live between the maerl nodules, which may benefit from minor increases in siltation (e.g. suspension feeders and species that use particles in construction), whilst others may decline if there are any subsequent changes in the sediment grain size of the habitat.

All the interest features of the above designated sites have been characterised by the changes brought about by this regular disturbance over variable time periods for many years (by ongoing maintenance dredging, intermittent capital dredge campaigns, aggregate dredging and past sewage sludge disposal) and these activities have not raised any concerns to date. Habitats and associated benthic communities have therefore developed to be accustomed to these variable conditions (a minor part of which comprise ABP maintenance dredge arisings) above the natural background variability of what is already a highly dynamic area. Overall, therefore, the disposal of ABP maintenance dredge arisings is not considered to result in a potential for LSE and will not change the overall favourable condition status of interest features of designated sites.

### 3.2 The Potential Remobilisation of Contaminated Sediments

There is strict legislation and water quality assessments in place that must be adhered to in order to obtain a maintenance dredging licence. If any contaminant concentrations are deemed too high then dredging and disposal of that material is restricted.

The sediment quality of material licensed for maintenance dredging in the Southampton Estuary has been routinely monitored by Cefas. In general, a review of contamination levels

within samples across the Port of Southampton's harbour area indicates that the levels are typically below Cefas ALs or slightly above Cefas AL 1. Any contaminant levels in dredged material below AL 1 are of no concern with respect to their potential to cause pollution, while the successful receipt of Marine Licences indicates that observed contamination slightly above Cefas AL 1 is not considered to present an unacceptable risk to the marine environment. More detailed information on the sediment quality of material licensed for maintenance dredging is provided within Section 5 of the supporting Baseline Document (ABPmer, 2014).

Generally, any contaminated material that has been detected occurs at isolated spots and therefore comprises a negligible proportion of the total volume of maintenance dredge material, which could be redistributed and deposited during dredging and disposal. Overall, therefore, there is not considered to be a potential for LSE on the condition of any European/Ramsar sites and features as a result of the re-suspension of sediments and associated contaminants associated with existing ABP maintenance dredging activities.

### 3.3 Changes in Water Quality Affecting the Migration of Atlantic Salmon

Migratory Atlantic salmon is an Annex II qualifying feature, but not a primary reason for the River Itchen SAC site selection. Salmon are anadromous fish species, migrating upstream from the sea to spawn in freshwater. They are thought to swim near the surface during migratory runs (Moore *et al.*, 1998), and adults display a strong behaviour to return to natal rivers.

Migratory fish are sensitive to any changes that act as a barrier to migration, which delay, reduce or prevent spawning. The sensitivity of salmonids in the area covered by ABP's maintenance dredge activities is highest in the Test Estuary upstream of Dock Head and in the lower reaches of the Itchen Estuary. This is due to the highly confined nature of the migratory passageway in these areas in which the ability of fish to freely move to avoid adverse conditions is more restricted. Sensitivity is lower in the relatively unconfined passageway of Southampton Water and throughout the Solent.

Because of their migratory behaviour and dependence on marine, brackish and freshwater conditions at different stages of their lifecycle, migratory fish are able to tolerate variations in a number of environmental parameters, including the full range of salinities and variable dissolved oxygen and turbidity. However, there are levels and durations of change that migratory fish are unable to tolerate. Lethal and sub-lethal responses may therefore, occur, such as avoidance, physiological stress and damage.

The sensitivity of different salmon populations also varies with the background suspended sediments that occur in the specific estuaries and rivers through which each population migrates. Salmon runs are known to occur against a wide range of background suspended sediment concentrations in UK estuaries, with salmon successfully passing through highly turbid estuaries, such as the Severn, Wye, Usk and Parrett, which contain concentrations of suspended sediments up to several thousand mg/l (EIFAC, 1965; cited in FARL, 1995). Concentrations as high as 9,000mg/l, for example, have been recorded in the path of salmon runs in the Usk Estuary (Alabaster, 1993).

Maintenance dredging within the Port of Southampton's harbour area has occurred for over two centuries in some places and therefore forms part of the background variability of the system which Atlantic salmon is already accustomed to. Overall, the temporary and short term increase in material entering the water column as a result of maintenance dredging is small at any one time and within the limits of natural variability and as such these changes are not considered to result in a potential for LSE on the Atlantic salmon interest feature.

### 3.4 Potential for Disturbance Caused by Interruption of Possible Line of Sight and Noise

A list of the bird species in the area qualifying under the Birds Directive can be found in Appendix B of the Baseline Document (ABPmer, 2014). Noise levels generated by the TSHD are no greater than noise generated by other vessels that routinely use the estuary throughout the year. The noise from the TSHD is continuous and, therefore, birds are considered to rapidly become habituated (Hill *et al.*, 1997). With regards to disturbance from movement, waterbirds are already accustomed to high levels of commercial and recreational activity in the estuary, and, therefore, the slow movements of the vessels involved in the dredging process are unlikely to cause significant disturbance. Dredging is not labour intensive on the deck of a vessel, and so the disturbance from human movement is considered negligible. Furthermore, machinery and vehicle movements are better tolerated than people at the source of the disturbance (Hill *et al.*, 1997; IECS, 1999). Disposal operations at the Nab Tower Deposit Ground occur a long distance from intertidal areas predominantly used by the interest features of the nearby European/Ramsar sites. In addition the counts of birds, which were deemed to warrant designation, occurred at a time when maintenance dredging of this site was already ongoing. Overall, disturbance is not considered to result in a potential for LSE on birds using the estuary and wider area.

Southampton Water forms part of the migratory route for Atlantic salmon which is a qualifying interest feature of the River Itchen SAC. Underwater noise measurements undertaken of a TSHD working in Southampton Water indicate that the 50dB<sub>ht</sub> (*Salmo salar*) threshold for mild behavioural avoidance would not exceed a distance of 50m (ABPmer, 2012). A distance of 50m is significantly less than 50% of the available channel width at any given time and location of maintenance dredging. The noise generated by maintenance dredging activities is therefore not considered to result in a potential for LSE on migratory salmonids.

### 3.5 Changes in Sediment Supply

Present day sedimentary processes vary significantly within the differing estuarine sedimentary environments throughout Southampton Water (Velegrakis and Collins, 2000). Sediment transport processes are dominated by tidal currents, especially on the western coast and in the inner estuary where fine sediments have accreted. The morphology of the estuary boundaries is reflected in the dominance of the tidal processes, and the variable wave climates. The west shore is almost totally sheltered from wave energy in comparison to the opposing east shore, leading to a higher dominance in saltmarsh. The east shore is then bordered by mudflats, which are backed by a series of low cliffs. As a result of the varying forcing controls, the sediment regime varies along the estuary.

Maintenance dredging results in the redistribution of sediments within the marine system. All of the ABP Southampton maintenance dredged sediment is removed from the estuary system and deposited at the Nab Tower Deposit Ground. The total sediment budget for the estuary was estimated based on monitoring data prior to and post the channel deepening capital project in 1996/97 (see Section 3.3.6 in the Baseline Document, ABPmer, 2014). The results of this analysis indicate there is a balance within the estuary, whereby the inputs (sources) equate to the outputs (sinks). This is due to the removal of maintenance dredged material being predominantly offset by the input of material from the marine system.

There is currently no evidence that the existing maintenance dredging activity is detrimentally affecting the habitat interest features in Southampton Water. This is supported by the condition statement assessment of the respective Sites of Special Scientific Interest (SSSI) Units which predominantly class the estuary as in favourable/unfavourable recovery condition, with over 98% of the area meeting the Governments Public Service Agreement (PSA) target (see Table 7.4 in the Baseline Document, ABPmer, 2014). Overall, therefore, there is not considered to be a potential for LSE on the condition of any European/Ramsar sites and interest features as a result of ABP maintenance dredging.

### 3.6 Mitigation Measures

The above review of LSE has not identified the need for new mitigation measures to be introduced. However, it should be noted that existing licence conditions include constraints on dredging, and such conditions thus form an important part of the baseline against which the potential for LSE have been reviewed. These conditions are set out in Marine Licence L/2011/00233/1 and include:

“The Licence Holder must ensure that at such time that the Environment Agency's Fishery Officer informs ABP's hydrographer that the Autumn salmon run has commenced, no dredging will take place North of the Dock Head for a period of three days. Subsequent to this condition, there will be no restrictions to dredging in the areas riverward of the Dock Head boundary; and  
The Licence **Holder** should ensure the best method of practice is used to minimise re-suspension of sediment during these works”.

### 3.7 In-Combination Effects

The Baseline Document (ABPmer, 2014) provides information on all maintenance dredge operations which are ongoing in the Southampton statutory harbour area and classified as 'maintenance' at the time of publication. This section summarises any known and publicised 'plans or projects' which could have implications for maintenance dredging and disposals within the study area if constructed in the future. After publication of the Baseline Document, any new proposed plans or projects which might give rise to an in-combination effect with respect of maintenance dredging should be assessed against the existing maintenance dredging regime described in the Baseline Document. The Maintenance Dredge Protocol (MDP) (Defra, 2007, p6) states that; *“the onus will also be on the developer [of a future project] to resource the updating of the Baseline Document”* in respect of the new plan or project which affects the context, assessment or detail within the Baseline Document and, as a result, this assessment.

Where such developments entail reclamation, dredging or the construction of infrastructure in tidal waters, potential impacts would be considered through an EIA that would be required to support an application for development permission. Where the development has the potential to affect a European/Ramsar site, the requirements of the Habitats Regulations would also need to be complied with. In such cases the capital works will require their own mitigation/compensation, prior to considering the future effects on maintenance dredging. To consider LSE for the estuary as a whole with respect to maintenance dredging, the existing third party dredging within the Southampton harbour area is also considered in-combination with the ABP commitment.

The following sections and Figure 5 summarise the known consented and unconsented projects within the Southampton harbour area and wider study area. The full environmental impacts associated with each of the schemes has been, or will be, addressed within the respective EIAs and as such only changes relevant to the existing maintenance dredge regime of the estuary have been considered within this review of LSE.

### 3.7.1 Known Consented Projects

**Southampton Approach Channel Dredge (SACD):** ABP has received consent from the MMO to improve the marine access to the Port of Southampton with an extensive programme of dredging. The work will involve deepening the main navigational channel used by commercial shipping from a current minimum depth of 12.6m, at various points along its length of 25 nautical miles. The channel will also be widened to 100m in some areas to allow vessels to pass one another as they enter and exit the port. The works will include dredging 11.6 million m<sup>3</sup> at various locations within Southampton Water and the central Solent, including the Nab Channel, and disposing of it at the Nab Tower Deposit Ground. The average maintenance dredging commitment following the capital dredge will be increased by about 30,000m<sup>3</sup> (8%) of which 90% will be from the new navigation channel downstream of Dock Head. The majority of the remaining increase will occur in the area of the berths in the Western Docks, which are already dredged by ABP.

**SCT 5:** The maintenance dredge analysis undertaken as part of the EIA indicates that the annual maintenance dredge commitment for SCT 5 will increase by the order of 400m<sup>3</sup>/year (ABPmer, 2011). This change is considerably smaller than the annual variability in the existing maintenance dredging requirements. Assuming the increased sedimentation is removed from SCT 5 by TSHD (with hopper capacity of 3,900m<sup>3</sup>), the number of dredger loads will increase by one over a ten year period. Therefore, overall, little noticeable change to the existing maintenance dredge practice will occur. Changes in sedimentation outside of SCT 5 will be so negligible that they will not be perceptible when the natural variability of the system is taken into account and, therefore, little or no additional dredging is predicted elsewhere.

### 3.7.2 Known Projects But Not Consented

**Portsmouth Harbour Approach Dredge:** There is a requirement for Her Majesty's Naval Base (HMNB) Portsmouth to accommodate larger vessels than present at Portsmouth. This will require navigational improvements including channel deepening, realignment, widening and



also disposal of arisings at the Nab Tower Deposit Ground. In addition to the navigation channel, deepening of vessel berths could also be required. The approximate timing of the Portsmouth Harbour Dredge is 2015-2016. The EIA that has been undertaken for this project assessed the effects of disposing approximately 3.2 million m<sup>3</sup> of material at the Nab Tower Deposit Ground (Royal Haskoning, 2010). Taking account of the disposal of other dredge deposits, including maintenance dredge arisings from Southampton Water, the assessment concluded that there would be no significant adverse effect on designated sites and interest features.

**Royal Pier Waterfront Development:** The land at Royal Pier and Mayflower Park has been identified for a major mixed-use development that is intended to provide:

- Residential, local needs convenience retail, business use, leisure, tourism and cultural development;
- A public waterfront destination of international quality;
- The provision of a water basin or basins that provides a visual and physical link between the Old Town and the waterfront;
- The recreation and reclamation of land to provide an extension to Mayflower Park;
- A permanent and improved home for the Southampton Boat Show;
- Landmark buildings that define the site as an international gateway;
- Relocation and integration of all the existing passenger and vehicle ferries within Town Quay which will involve capital (and maintenance) dredging;
- A public transport interchange between ferries and buses; and
- Improved pedestrian and cycle links to the city centre.

Pre-feasibility studies for this scheme have been undertaken. A Development Agreement has since been signed by all partners in March 2014, namely Southampton City Council, The Crown Estate and Associated British Ports (ABP). The next stage of the process will involve public consultation and the preparation and submission of a planning application for a comprehensive mixed-use development of the site. The development is expected to commence in 2015 and take place in five phases. Future maintenance dredging requirements associated with the Royal Pier Waterfront development are unknown, although it is anticipated that a maintenance dredge cycle of not less than five years will be sufficient (Morgan Sindall Investments Ltd., 2012).

### 3.7.3 Third Party Dredging

ABP is the navigation and conservancy authority of the harbour and has extensive powers over the control of dredging in the estuary (see Section 1.2). Any third party wishing to dredge in the estuary must seek permission of the Harbour Master as well as secure a Marine Licence from the MMO (more information can be found in Section 4.4.2 and Figure 4a-f of ABPmer, 2014). Existing maintenance dredge commitments for the larger facilities are summarised as follows:

- Marchwood Sea Mounting Centre (SMC), which is dredged by Boskalis Westminster Ltd and has a Marine Licence to dispose of maintenance material at the Nab Tower (WI060) disposal site;

- Marina Developments Limited (MDL) Marinas, which include the Hythe Marina Village, Ocean Village Marina, Shamrock Quay and Saxon Wharf. Each marina has a separate Marine Licence for the maintenance dredge and disposal of material at the Nab Tower (WI060), Needles (WI090) and Hurst Fort (WI080) disposal site;
- Esso Marine Terminal, which has a Marine Licence for the dredge and disposal of material at the Nab Tower (WI060) disposal site;
- British Petroleum (BP) Hamble Marine Terminal, where dredging is carried out at the Hamble jetty box and approaches under licence for disposal at the Nab Tower (WI060) disposal site;
- Hythe Marine Park, which has a Marine Licence for the dredge and disposal of material at the Nab Tower (WI060) disposal site;
- Marchwood Wharf and Power Station, which are maintained by different operators, which all have a Marine Licence for the dredge and disposal of material at the Nab Tower (WI060) disposal site;
- Fawley Power Station, which had a licence for the water injection dredging (WID) of the cooling water intake channel; and
- Larfarge Tarmac Aggregates, who operate at Burnley Wharf and have a Marine Licence for the dredge and disposal of material at the Nab Tower (WI060) disposal site.

There are potentially further smaller and less frequent third party operators but available information at the time of writing (May 2014) indicates dredging is not undertaken.

#### **3.7.4 Likely Significant Effect Review**

Table 1 sets out the estimates of possible future maintenance dredging commitments which are likely from each of the individual developments that have been identified. The information has been obtained from public sources available at the time of writing. The total (throughout the estuary) existing maintenance dredging commitments for ABP and third parties is also shown in order to place the future development potential into context of the existing commitment and its variability. It should be noted in all these 'volumes', no account is taken of the difference in the material types being dredged and disposed.

On the basis that all developments will be completed in the future, the maximum predicted increase in annual ABP maintenance dredging from these could be in the order of 30,400 m<sup>3</sup>, which represents a 6% increase over the present average commitment. The majority of this volume (90%) will be downstream of Dock Head. Most of the rest of the increase will be from the area of the berths in the Western Docks. With regards to third party plans and projects, future maintenance dredge information is not available for the Royal Pier Waterfront development and can therefore not be considered further.

Assuming the increased sedimentation as a result of the ABP developments is removed from the estuary by a TSHD of a size suitable for the depths in the estuary the number of dredger loads will be increased by around 10-15 loads per year for the maintenance of the main channel and berths. To provide a sediment balance for the estuary, an increase of 48,000m<sup>3</sup> in net marine import will be required following completion of the ABP developments. This represents a 0.3mg/l increase in sediment settling from the water column which is so small that

it will not be measurable and is not considered to result in a LSE on European/Ramsar site interest features.

The EIAs that were undertaken for the SACD and SCT 5 projects assessed the effects of disposing 11.6 million m<sup>3</sup> and 185,000 m<sup>3</sup> of capital dredge material at the Nab Tower Deposit Ground respectively. Taking account of the disposal of other dredge deposits, including maintenance dredge arisings from Southampton Water and the proposed Portsmouth Harbour Approach Dredge (see Section 3.7.2), the respective assessments concluded that there would be no significant adverse effect on designated sites and interest features.

In summary, the further developments of the kind already planned will not result in a LSE on the qualifying interest features of European/Ramsar sites and tranche 2 cMCZs.

**Table 1. Predicted in-combination volumes of maintenance dredging**

Projects*	Capital Dredge	Maintenance Dredge
Southampton Approach Channel Dredge	11.6 million m <sup>3</sup>	30,000m <sup>3</sup>
SCT 5	185,000m <sup>3</sup>	400m <sup>3</sup>
Royal Pier Waterfront Development	Unknown	Unknown
<b>Total (max)</b>	<b>11.8 million m<sup>3</sup></b>	<b>30,400m<sup>3</sup></b>
<b>Existing Operations</b>		
<b>Maintenance Dredging from 2007 to 2013</b>		
ABP	Average:	409,438m <sup>3</sup>
	Max:	458,048m <sup>3</sup>
	Min:	283,105m <sup>3</sup>
Third Party	Average:	69,368m <sup>3</sup>
	Max:	137,145m <sup>3</sup>
	Min:	13,732m <sup>3</sup>
	<b>Total (max)</b>	<b>595,193</b>
<b>Grand Total (max)</b>		
	<b>Capital Dredge</b>	<b>Maintenance Dredge</b>
	<b>11.8 million m<sup>3</sup></b>	<b>625,593m<sup>3</sup></b>

\*Portsmouth Harbour Approach Dredge is not included in this table as it is outside the Southampton harbour authority area. However it is included in the list of known projects but not consented for the potential in-combination effects associated with disposals of dredge arisings at the Nab Tower Deposit Ground (see Section 3.7.2).

### 3.8 Summary

In the preparation of this report, it is concluded that ABP maintenance dredging does not result in a LSE on any European/Ramsar sites or tranche 2 cMCZs either alone or in-combination with other plans or projects.

The main reasons for this conclusion are as follows:

#### 3.8.1 Disturbance of Sediment and Smothering

- There is no direct overlap between the boundary of ABP's maintenance dredge area and designated sites. There is therefore no direct physical damage to designated habitat or loss of benthic organisms;
- The amount of suspended sediment that is released into the water column from ABP maintenance dredging is relatively small per load and remains local to the dredger.

Any material that settles is very short-lived and within the existing natural variability of the system. Benthic communities are considered to have a low sensitivity to these changes. Furthermore, these habitats have been historically exposed to these changes for over two centuries in some places; and

- All the associated interest features of designated sites in the vicinity of the Nab Tower Deposit Ground have been characterised by the plumes generated by the regular and intermittent disposal of maintenance dredge and capital dredge arisings (over variable time periods and for many years), as well as nearby aggregate dredging and past sewage sludge disposal. None of these activities have ever raised concern. Habitats and associated species are therefore accustomed to these variable conditions above the natural background variability of an already highly dynamic area.

### **3.8.2 The Potential Remobilisation of Contaminated Sediments**

- The limited contaminated material that has been detected occurs at isolated spots and therefore comprises a negligible proportion of the total volume of maintenance dredge material, which could be redistributed and deposited during dredging and disposal. Furthermore, the successful receipt of Marine Licences indicates that the observed contamination is not considered to present an unacceptable risk to the marine environment.

### **3.8.3 Changes in Water Quality Affecting the Migration of Atlantic Salmon**

- The temporary increase in suspended sediments entering the water column as a result of ABP maintenance dredging is small at any one time, localised and within the limits of natural variability experienced within the estuary and as such these changes will not hinder the migratory passage of Atlantic salmon.

### **3.8.4 Potential for Disturbance Caused by Interruption of Possible Line of Sight and Noise**

- Maintenance dredge and disposal activities (which are not near to the shore) have taken place at the same locations for many years at varying times throughout the year. Bird interest features are therefore habituated to these low levels of visual and noise disturbance; and
- The underwater noise generated by ABP maintenance dredging is predicted to result in a mild behavioural response in a minority of Atlantic salmon up to a distance of 50m from the source of noise. This distance is considerably less than 50% of the available channel width at any given time and location of ABP maintenance dredging and, therefore, the migratory passage of Atlantic salmon is not impeded.

### **3.8.5 Changes in Sediment Supply**

- All of the ABP maintenance dredged sediment is removed from the estuary system and deposited at the Nab Tower Deposit Ground. Despite this removal, the total sediment budget for the estuary remains in balance due to the import of material from the marine system; and

- There is no evidence that the existing maintenance dredging activity is detrimentally affecting the habitat interest features in Southampton Water.

### **3.8.6 In-Combination Effects**

- On the basis that all ABP developments will be completed in the future, the maximum predicted increase in annual maintenance dredging could be in the order of 30,400 m<sup>3</sup>, which represents a 6% increase over the present average commitment; and
- Future maintenance dredge information is not available for the Royal Pier Waterfront development and can therefore not be considered further.
- The Portsmouth Harbour Approach Dredge project will involve disposing approximately 3.2 million m<sup>3</sup> of material at the Nab Tower Deposit Ground. Taking account of the disposal of other dredge deposits, including maintenance dredge arisings from Southampton Water, the EIA/HRA for this project concluded that there would be no significant adverse effect on designated sites and interest features.

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# Figures





- Southampton Port Boundary
- Statutory Harbour Authority
- Nab Tower Deposit Ground
- Hurst Fort Deposit Ground
- Needles Deposit Ground

Date	By	Size	Version
May14	NMW	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
Scale		1:235,000	
QA		DLW	
4209 Fig_AA_1_Locations.mxd			
Produced by ABPmer			



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## Southampton Water Locations and Boundaries

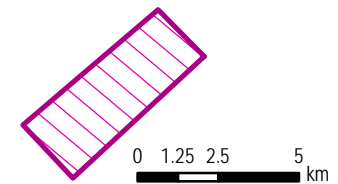
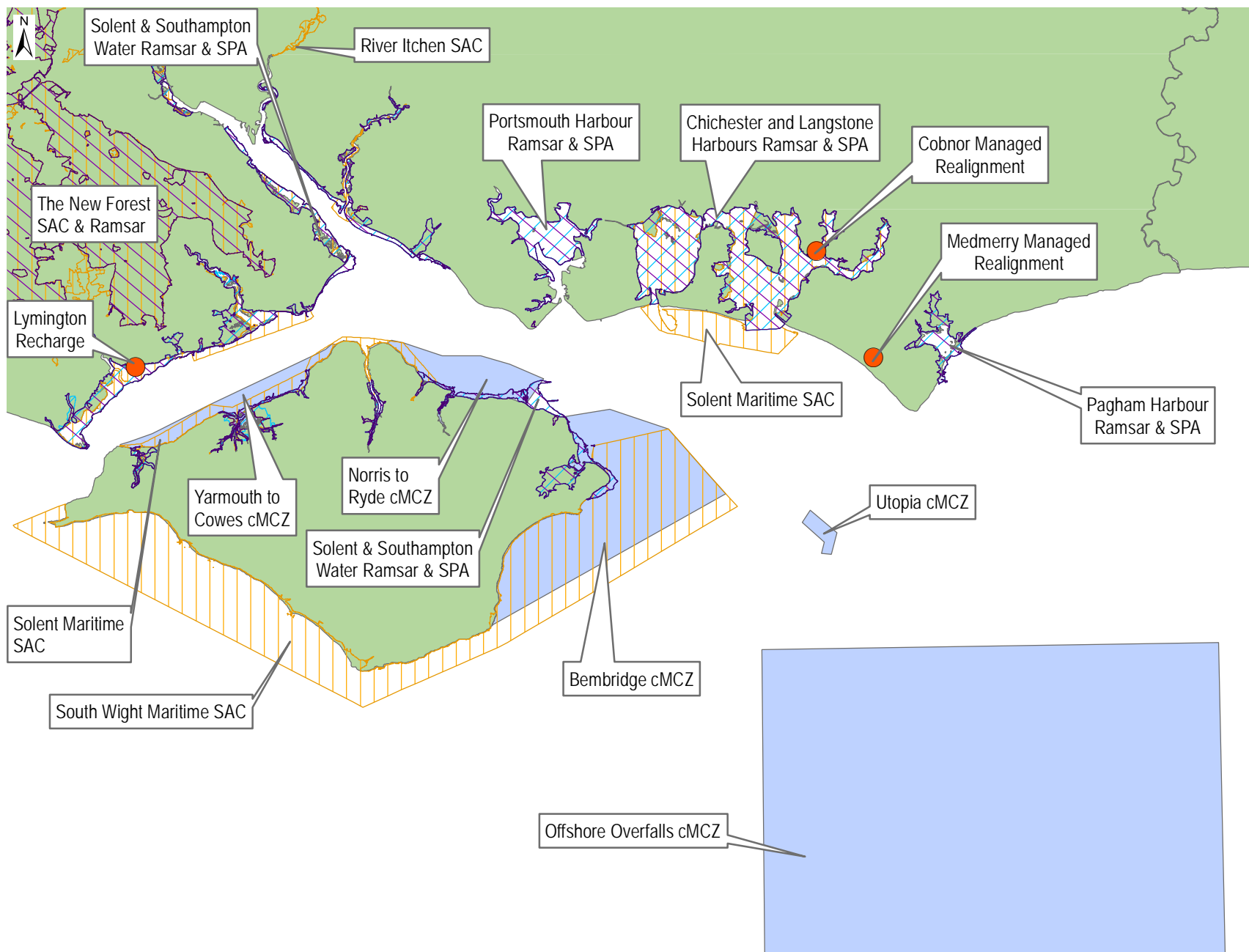





Figure 1



-  Special Area of Conservation
-  Special Protection Area
-  Ramsar
-  Compensatory Site
-  candidate Marine Conservation Zone

Date	By	Size	Version
May 14	NMW	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
Scale		1:360,000	
QA		DLW	
4209 Fig_AA_2_Designations.mxd			
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Designated Sites

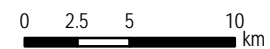
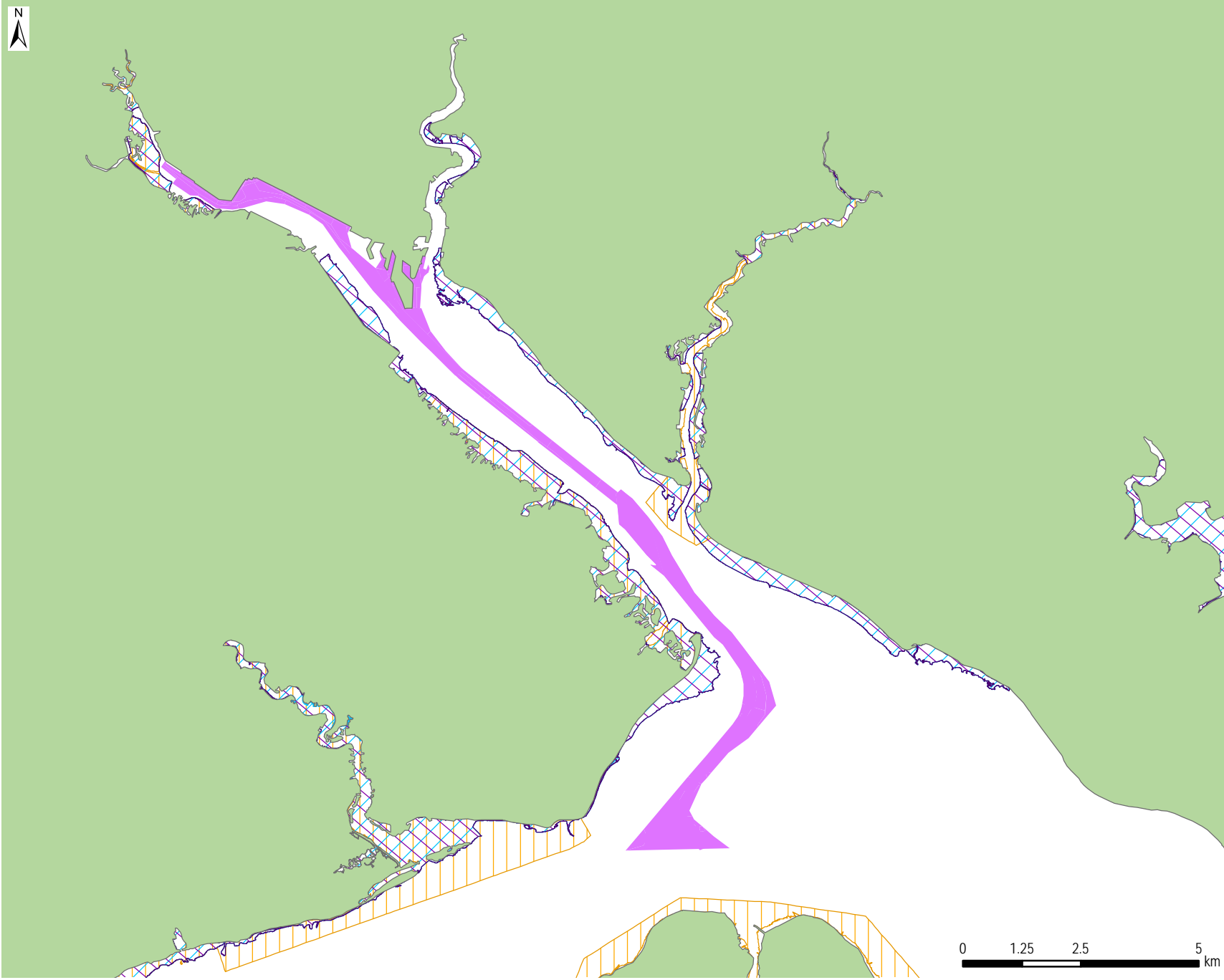






Figure 2



-  Special Area of Conservation
-  Special Protection Area
-  Ramsar
-  ABP Maintenance Dredge Sites

Date	By	Size	Version
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Coordinate System		British National Grid	
Projection		Transverse Mercator	
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4209 Fig_AA_3_Designs_Maint_Dredge			
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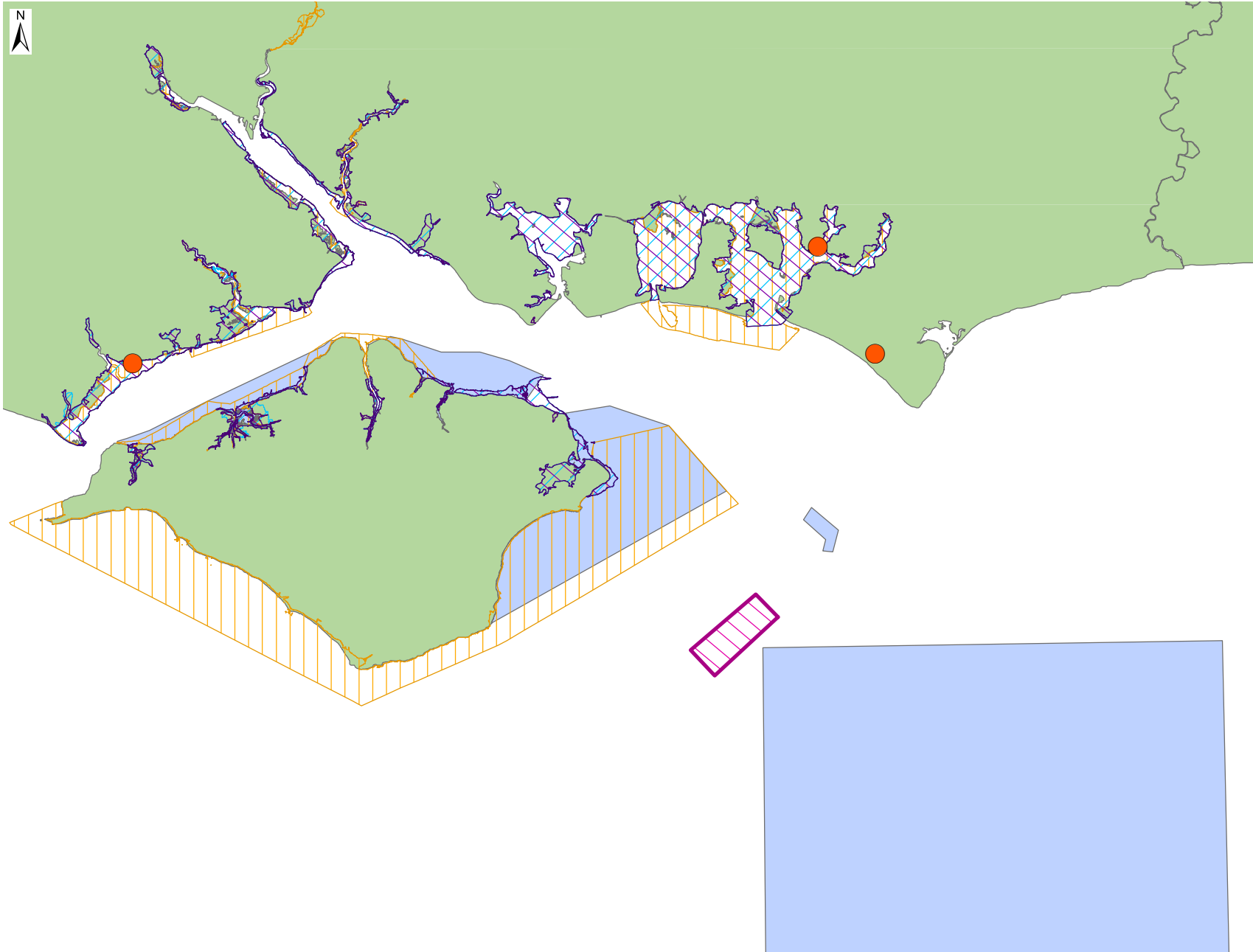



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### Designated Sites and Maintenance Dredge Sites

Figure 3



-  Special Area of Conservation
-  Special Protection Area
-  Ramsar
-  Compensatory Site
-  candidate Marine Conservation Zone
-  Nab Tower Deposit Ground

Date	By	Size	Version
May14	NMW	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
Scale		1:360,000	
QA		DLW	
4209 Fig_AA_4_Designs_Disposal.mxd			
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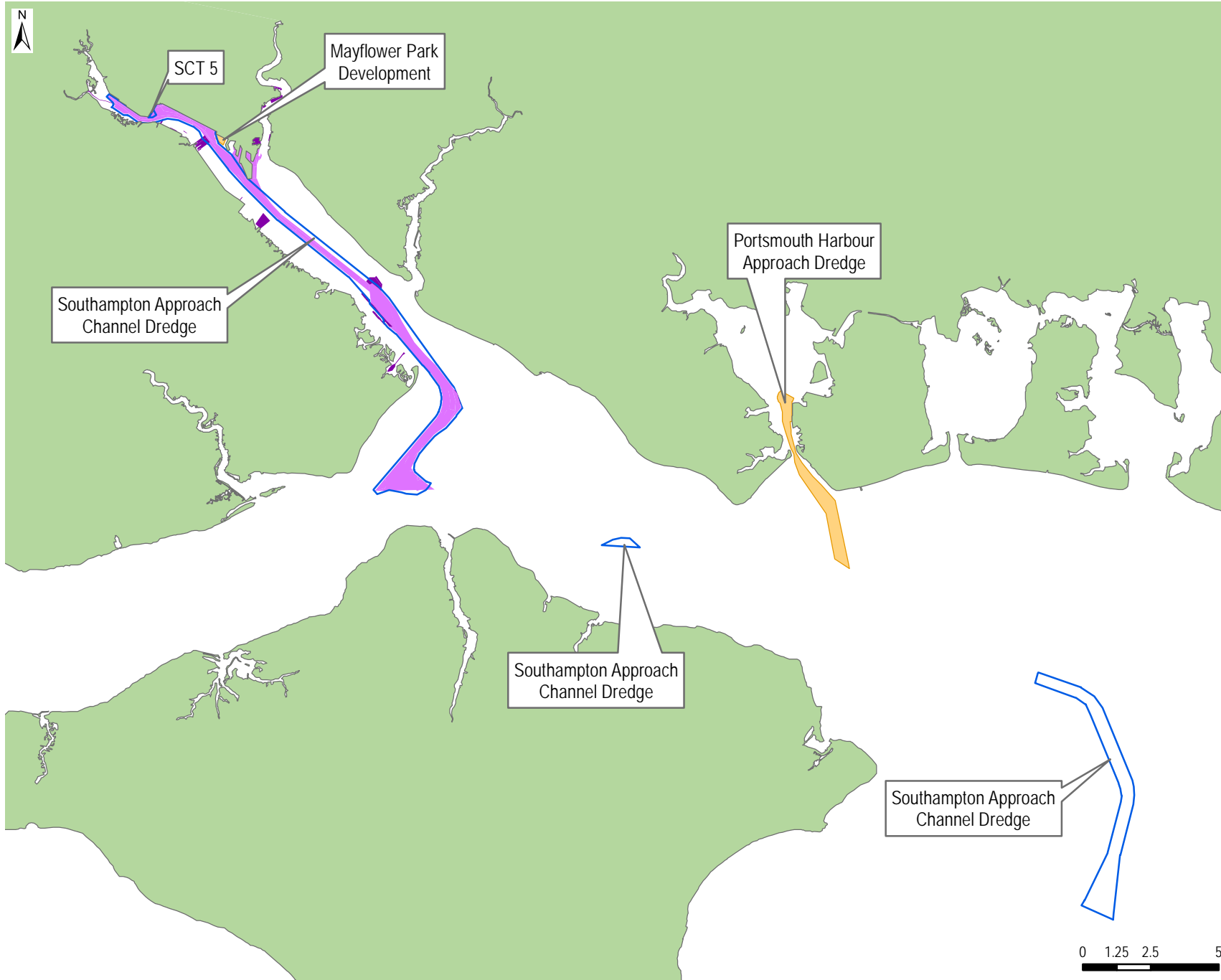
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### Designated Sites and Maintenance Disposal Site

0 2.5 5 10  
km

Figure 4



- ABP Maintenance Dredge Sites
- Third Party Maintenance Dredge Sites
- Consented Capital Dredge Projects
- Unconsented Capital Dredge Projects

Date	By	Size	Version
Jul 14	NMW	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
Scale		1:200,000	
QA		DLW	
4209 Fig_AA_5_Other_Projects.mxd			
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Other Plans and Projects in  
 Southampton Water and  
 the Solent

Figure 5

