

Non-Technical Summary

1. This chapter provides a summary of the Environmental Statement (ES) that accompanies Associated British Port's applications for approvals to carry out the Southampton Approach Channel Dredge. Each section of this Non-Technical Summary (NTS) summarises sequentially the chapters that appear in the full ES, in which can be found the results of the comprehensive investigations that have been undertaken, together with the analysis and conclusions that will be used to underpin the environmental assessment of the Southampton Approach Channel Dredge proposals.

Summary (Chapter 1)

2. In order to improve the access for vessels entering and leaving the Port of Southampton, Associated British Ports (ABP) propose to deepen and widen the navigation channel at various locations within Southampton Water and the Solent. Figure NTS1 shows a Solent-wide overview of the areas in which dredging is proposed.

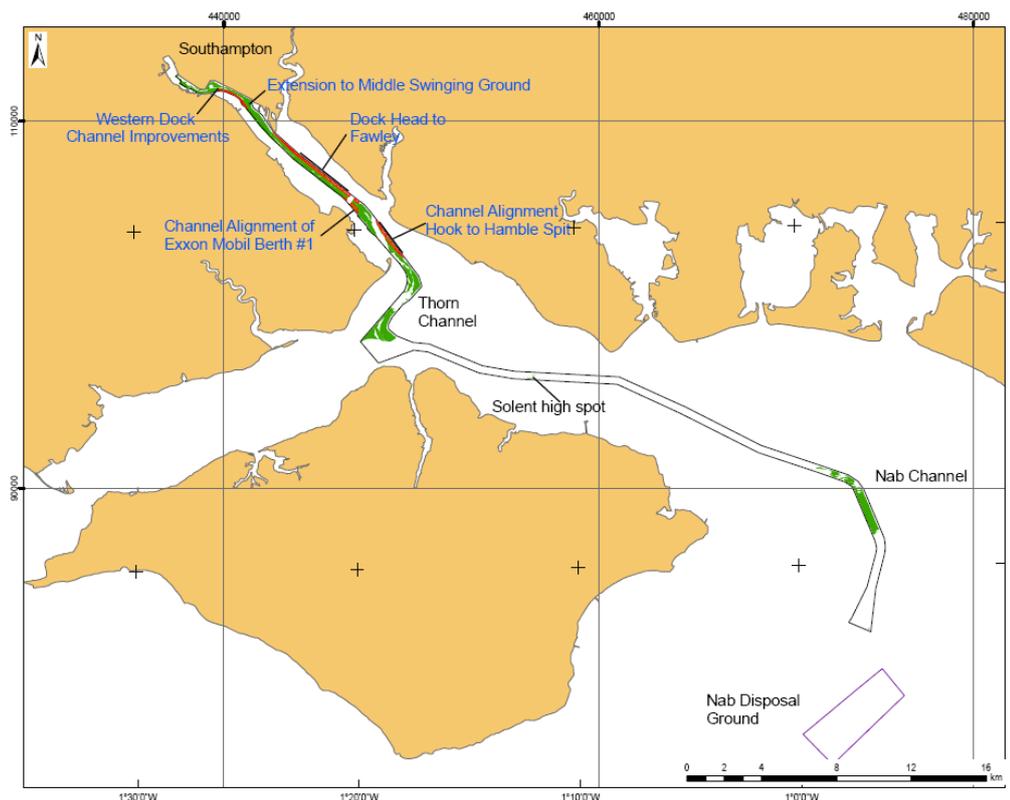


Figure NTS1. Proposed Dredge Areas of Main Navigation Channel Shown in Green. Widening Sections Shown in Red

3. Historically, the Port of Southampton has been able to handle the largest vessels in the world. The dredge now proposed to Southampton's navigation channel is necessary in order to improve access for the deep-draughted vessels that currently use the channel, including the large 15.5m draughted vessels that are now being brought into service by the world's major shipping lines.
4. The approach channel dredge will improve navigational access by increasing the duration of marine tidal access, known as the tidal window, for ships entering or leaving the Port of Southampton and will facilitate two way passing at strategic locations. This will ensure the continued safe and efficient navigation of vessels, including large container ships, oil tankers, cruise ships and Ro-Ro vessels.
5. In summary, this dredge is essential to secure the long-term viability of the Port.
6. The scheme comprises three components, namely the capital dredge, future maintenance dredging and the offshore disposal of dredged material. ABP has therefore selected a wide definition of study given the regional extent of the proposed works. The main study area extends from Hurst Spit at the western end of the Solent to Selsey Bill in the east and about 30km offshore. These southern and eastern extents cover the areas of potential effects that might arise from the relocation of dredged sediment at the Nab Deposit Ground. The area of the baseline assessment, however, extends from Southampton Water into the Test, Itchen and Hamble estuaries, whilst also taking account of the other estuaries and harbours within the Solent. Emphasis has also been given to the locality of the Nab Channel and the Nab Deposit Ground and its immediate surroundings.

Project Need and Alternatives (Chapter 2)

ABP and the Port of Southampton

7. The Port of Southampton is owned and operated by ABP. In ~~2007~~2011, the Port handled 43.8 ~~approximately~~ 40 million tonnes of cargo making it the fourth largest port in the UK by tonnage. The Port is of national strategic importance to the UK and services a wide range of trades, most notably in the cruise, containers, oil/petro-chemicals and motor vehicles sectors.
8. 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.

The Current Position

9. The existing channel inbound from Cowes to the Port is effectively a single capacity track for larger vessels with only two relatively short stretches where vessels can safely pass each other; namely between Town Quay and Dock Head, and between the ExxonMobil Marine Oil Terminal and Hamble. Once a large vessel has committed to entering Southampton Water

there is no opportunity for the ship to stop or turn around. These restrictions cause significant constraints, resulting in delays to the movement of both inward and outward vessels of all types.

Project Rationale

10. In order to accommodate both existing and future vessels and to reduce delays and congestion, ABP proposes to deepen and widen selectively the main navigational channel to the Port. The rationale for this is fourfold in that the dredge will:
 - Improve the tidal access window to the Port from the current asymmetrical (longer flood, shorter ebb) 22% for a 14.5m **Category 3** draught vessel, to a balanced entry/exit window of 47% over all tides **or from 12% to 36% for a Category 4 vessel**;
 - Increase the ability of vessels to pass in the approach channel to the Port by selectively widening the channel between Dock Head and Fawley; an area adjacent to the ExxonMobil Oil Terminal and between Hook and Hamble Spit;
 - Enable the Port to handle larger vessels of up to 15.5m draught; and
 - Further enhance navigational safety in the approaches to the Port.

Project Description

11. In summary, ABP's proposed improvements to the approach channel to Southampton comprise the deepening of the main navigational channel from the current minimum depth of -12.6m Chart Datum (CD) to -13.6m CD between the Port and Fawley and up to a minimum depth of -14.8m between Fawley and the Nab. In addition it is proposed to widen the channel by 30m adjacent to the Western Docks, by 100m between Dock Head and Fawley, and to widen the channel between Hamble and Hook. A number of other smaller-scale improvements are also proposed to improve the ability to turn vessels in the Port and to eliminate a small number of high spots in the Solent. Full details are provided in Chapter 2 of the main ES.
12. ABP's proposal has been optimised to avoid the relocation of various pipelines that cross beneath Southampton Water, as well as minimising the extent of the widening while maintaining high navigational standards and requirements.
13. It is estimated that a total of 11.6m cubic metres *in situ* of material will be dredged as part of this proposal.

Consideration of Alternatives

14. The EIA process requires the developer to consider alternatives to the proposed scheme, namely alternatives which will be able to meet the identified need, to increase the tidal window to accommodate deeper-draughted and wider vessels, and improve the navigational safety of all vessels using the harbour area, as well as consideration of the implications of not going ahead with the proposal i.e. 'do nothing'. **Two A number of** alternative options have been identified:
 - Do nothing – this has been discounted on the basis that this would lead to the commercial stagnation of the Port of Southampton, detrimentally affecting jobs and

commerce in the local community. Increasingly, the Port would only be able to accommodate smaller, aging vessels leading to a rapid decline in its attractiveness to users. This is especially the case with respect to container traffic where new, deeper-draughted ships are now coming into service.

- Dredging the North Channel (Brambles) – whilst this would meet the needs case, this option has been discounted because it would result in a greater capital dredge requirement in this part of the channel than that currently proposed, with consequently greater environmental impacts.
- Relaying of the oil pipelines beneath Southampton Water – whilst this would increase the navigational flexibility by creating a greater length of channel in which vessels could pass, and would also further increase the tidal access window for deeper draughted vessels, it has been excluded on the grounds of the cost of the pipeline works and the additional dredging as well as the potential for a greater environmental impact.
- Minimising the width of the proposed widening between Dock Head and Fawley – Although guidance suggests that the total width of a two-way (passing channel) should be wider than the proposed 300m design, ABP has undertaken vessel simulation modelling and, taking into account existing management procedures and prevailing weather conditions, concluded that a 300m wide channel is sufficient to meet the proposed need, thereby reducing the environmental impact.
- Widening adjacent to Fawley Marine Terminal – the decision not to relay the pipelines which lie beneath Southampton Water reduces the amount of widening required, thereby reducing the potential for environmental impact.
- Variance in Depth – The proposed channel deepening has been optimised so as to achieve a commercially acceptable solution whilst minimising the volume of material removed. Although deepening the channel by more than the proposed 1m in Southampton Water would be of benefit to deeper-draughted vessels, the increase in dredging costs would not result in a commercially viable project. Conversely, any reduction in the proposed depths would not meet the needs of the container lines in terms of flexibility of arrival or departure times.
- Widening the western side of the channel (Southampton Water) – Following consultation with the Harbour Master, it was determined that widening of the eastern side of the channel would provide the greatest improvement for navigational safety. Furthermore, widening the channel on its western side would result in a greater amount of dredging resulting in greater project costs and greater environmental potential impact. It could also be possible to widen the channel on both sides. Again, this would not be considered to be in the interests of navigational safety and is considered to require a greater amount of material to be dredged.

Conclusion

15. The proposed access channel improvements are essential if the Port of Southampton is to be able to accommodate existing and future deep draught vessels, whilst also being able to minimise delays and congestion in arriving and departing the Port. A failure to improve the marine access will directly jeopardise Southampton's current position as a premier global gateway for international trade with the rest of the world.

Project Methodology (Chapter 3)

16. The dredge methodology for the proposed scheme has been derived taking into account the characteristics of the materials that need to be removed, and the potential impacts of the dredging activity.
17. An *in situ* volume of approximately 11.6 million m³ of material is to be removed, which can be broadly categorised into three distinct types:
 - Recent soft sediments such as alluvium and peat;
 - Granular sediments such as sands and gravels; and
 - Stiff clays and dense sands.
18. The soft and granular sediments comprise approximately two-thirds of the total volume and are generally located downstream of Dock Head. This material will be dredged using a trailing suction hopper dredger (TSHD), by which the sediment is pumped from the bed into a hopper on board the dredger for transport to the disposal location. The stiff clays and dense sands cannot be dredged by a TSHD and will, therefore, have to be removed using a form of mechanical dredging. It is anticipated that a backhoe dredger will be used to excavate this material and load it into barges for transportation to the disposal site.
19. There is a requirement for the licensing authority to 'have regard to the practical availability of any alternative methods of disposal' of dredged material under the Food and Environment Protection Act (FEPA), in addition to considering the effects of disposal of the material at sea. Unless a beneficial use of the material can be found, it is proposed to dispose of the dredge arisings at the Nab Deposit Ground, located 8 nautical miles east of the Isle of Wight. ABP has consulted with a number of bodies, including local authorities, The Crown Estate, Natural England and the Environment Agency to determine whether a beneficial use of the material could be identified. ~~As a result, a number of proposals for beach nourishment schemes are currently being considered.~~ At the time of writing this document, no suitable uses of the dredged material has been identified.
20. It is anticipated that the dredging works will commence ~~early in 2010~~ in 2014 and will take 65 weeks to complete.
21. Following completion of the dredging works, it has been calculated that maintenance dredging in Southampton Water is likely to increase by approximately 8%, principally in the area of channel that is to be widened.

Consents and Approvals (Chapter 4)

22. An Environmental Impact Assessment (EIA) of the proposed dredge is required in accordance with the provisions of the Marine Works (EIA) Regulations 2007. A scoping document was prepared and submitted to the Department for Environment Food and Rural Affairs (Defra),

Marine and Fisheries Agency (MFA) as a basis for consultation. The MFA then provided a formal Scoping Opinion, which confirmed the issues to be covered in the EIA.

23. Under the Southampton Harbour Act 1911, before the commencement of works, consent will be required from Defra (Marine and Fisheries Agency) for both the dredge of the approach channel within the Port of Southampton harbour area and the disposal of the dredged material.
24. The areas between the Nab and Thorn Channel that require dredging fall under the powers and jurisdiction of Portsmouth Harbour and consent ~~will be sought~~ **has been granted** from the Queen's Harbour Master (QHM), Portsmouth, under the Dockyards Ports Act 1865 and the Dockyard Port of Portsmouth Order 2005.
25. Consent will also be required from the Harbour Master for the Port of Southampton with respect to those areas which fall within his jurisdiction and which require dredging, as well as The Crown Estate as owner of much of the riverbed.
26. Consent for the disposal or beneficial use of any dredged material at sea will be required from Defra, through the MFA, under the provisions of the Food and Environmental Protection Act 1985.
27. Natural England has determined that an Appropriate Assessment (AA), i.e. a study to assess whether the proposed works are likely to have a significant effect on designated nature conservation sites, under the Conservation (Natural Habitats etc) Regulations 1994 (Habitats Regulation) is required. The information to assist the MFA's evaluation has been provided in Appendix D of this ES.

Policy and Guidance (Chapter 5)

28. It is considered that the Southampton Approach Channel Dredge proposal is in accordance with the UK Marine Policy Statement (MPS) and the objectives set out in Figure 5.1. The SACD works will help achieve a sustainable marine economy because they ensure the safe and efficient operation of the Port, which will allow it to remain competitive. Impacts on marine and coastal habitats have been assessed and are shown to achieve the objective of living be within environmental limits. Good governance has been promoted through due regard being given to other legislative and regulatory regimes.
29. As a result of achieving these objectives the SACD works are considered to be an example of sustainable development and therefore are in accordance with the appropriate marine policy documents as required by section 58(1) of the Marine and Coastal Access Act 2009.
30. The need for unimpeded marine access for large vessels expected to use the Port is recognised in the National Policy Statement for Ports and the SACD proposal is also considered to be in accordance with the relevant sections of other national, regional and local policy. It is evident that the proposals assist in securing the Port's future and, in part, the sustainable growth of the region's economy whilst addressing the environmental impacts of the scheme. As such they are consistent with the aims of sustainable development.

31. The proposal accords with Policies RE1 and T10 of the South East Plan and the site specific Policy CS9 of the Southampton Core Strategy Policy. This is achieved by facilitating sustainable economic development and transport proposals and securing the role of the International Gateway Port of Southampton. Analysis of other regional and local plan policies does not indicate that the proposal is unacceptable.
32. It is concluded that the scheme is in general accordance with relevant policy, including the MPS and National Policy for Ports, the development plan and other relevant guidance.

Nature Conservation Designations (Chapter 6)

33. Southampton Water and the Solent have long been recognised as being of high biological and nature conservation importance. There are a number of sites of designated nature conservation interest in the area, including Ramsar sites, Special Protection Areas (SPAs) and Special Areas of Conservation (SAC). The proposed dredge and disposal areas lie outside all of the internationally, nationally and locally designated nature conservation sites and, therefore, any impact on designated sites will be via indirect pathways i.e. as a consequence of the effect of the proposed works on the hydrodynamic and sedimentary regime, for example erosion and accretion of intertidal sediments or the dispersal of sediments arising from the disturbance of bed material during dredging.
34. The potential loss of UK BAP priority habitats and species and the non-statutory action plans that are relevant have also been considered in the impact assessment.

Impact Assessment Approach (Chapter 7)

35. This EIA has been facilitated by wide ranging consultations with stakeholders and interested parties including Natural England, the Environment Agency, Cefas, MFA, RSPB, Hampshire and Isle of Wight Wildlife Trust, and local authorities. These discussions have helped to identify the scope of potential impacts and define appropriate impact reduction measures.
36. During the scoping stage of the EIA a range of environmental issues were identified that required investigation, including the effect on hydrodynamic and sediment transport regimes and the effect of disturbance (noise and water quality) on ecological receptors. These issues are considered and assessed within the ES. The proposals have been designed with the aim of minimising potential impacts both during construction and operations. Where potential impacts remain, impact reduction measures in the form of management controls and specific mitigation measures have been defined.
37. The EIA has been supported by a large resource of literature and data describing the existing (baseline) environmental conditions in the study area. Any gaps in information have been supplemented by additional studies, including:

- Hydrodynamic and sediment numerical modelling studies;
 - Benthic (seabed) invertebrate surveys;
 - Seabed sediment characterisation;
 - Seabed sediment contamination;
 - Underwater noise monitoring and modelling;
 - Bird surveys;
 - Navigation simulation study;
 - Ship wash study;
 - Airborne noise monitoring and sound propagation modelling; and
 - Archaeological Assessment.
38. Based on the nature of the proposed scheme and existing knowledge of the baseline conditions a number of issues were identified during the scoping stage and consultation process as not being relevant to the assessment process. As a result, the following topics for assessment were 'scoped-out' of the EIA:
- **Indirect Terrestrial Impacts;**
 - Air Quality;
 - Landscape and Visual Impacts;
 - Waste Management; and
 - Terrestrial Ecology.

Impact Assessment Methodology

39. Within the EIA, environmental issues are divided into distinct 'receiving environments' or 'receptors'. The effect of the proposed development on each of these has been assessed by describing in turn: the baseline environmental conditions of each receiving environment; the 'impact pathways' by which the receptors could be affected; the significance of the impacts occurring and the measures proposed to mitigate any significant adverse impacts, where these are predicted.
40. A standard approach has been applied to identify the significance of the impacts and impact levels were identified for each of the key issues. The key significance levels for either **beneficial** or **adverse** impacts are described as follows:
- (1) **Insignificant:** Insignificant change not having a discernable effect;
 - (2) **Minor:** Effects tending to be discernable but tolerable;
 - (3) **Moderate:** Where these changes are adverse they may require some mitigation measure; and
 - (4) **Major:** Effects are highest in magnitude and reflect the high vulnerability and importance of the receptor (e.g. to nature conservation). Where these changes are adverse they will require mitigation.

Impact Assessment

41. The following sections summarise the findings of the EIA process, which has been undertaken in accordance with the Marine Works (EIA) Regulations 2007. The significance of impacts have been assessed for each of the potential 'impact pathways' that occur both in the short-term during construction (capital dredging and disposal of dredged material) and in the long-term during operation (as a result of changes brought about by the proposed channel works). These pathways were identified from both the results of the Scoping Study and the Scoping Opinion provided by MFA. For any adverse impacts that are of a scale greater than minor, mitigation measures have been proposed and are presented at the end of this NTS, and in more detail in Chapter 21 of the main ES.

Physical Processes (Chapter 8)

42. The environmental conditions along the approach channel into the Port of Southampton progressively change from open coastal waters to an estuarine environment. Tides are the primary influence on water movements and control the erosion, movement and deposition of sediments. Waves tend to have their main influence at the shoreline and help to develop shoreline features such as the various shingle spits in the Solent. They also increase the energy at the bed, enhancing the potential for sediment disturbance either by eroding settled material or preventing sediment from settling, particularly in intertidal areas.
43. The more sheltered area within Southampton Water is conducive to the development of saltmarsh, especially along the western estuary margin, which is in the lee of prevailing winds. These saltmarsh features are mainly fed by fine sediment of marine origin and sediment 're-worked' from within the estuary. In the long-term, the consequence of increased rates of sea level rise will lead to a major loss of saltmarsh coverage due to "coastal squeeze".
44. The long-term analysis of the foreshore in Southampton Water suggests that the cause of the erosion in the lower and upper parts of the shoreline profiles is not directly related to the main channel deepening in 1996/97, but is the result of natural and possibly other anthropogenic ongoing occurring events.
45. A package of technical evaluations has been used to determine the magnitude and extent of physical changes that are likely to result from the proposed channel deepening. The assessment is based upon various conservative assumptions to offer a realistic worst-case scenario.

1) Construction Related Impacts

46. The primary issue during the construction period relates to sediment disturbance effects created during the dredging process, with particular focus on the possible effects of overflow from the TSHD. The nature of the sediment types to be excavated has guided the choice of dredging methods and defined appropriate source terms to model the fate of disturbed sediments. Heightened suspended sediment concentrations will occur locally around each dredger but across the wider area, excess concentrations will generally be comparable to

background levels. The dredging cycle will provide intervening periods of sufficient duration to reduce the excess sediment concentrations, which will mitigate any risk of cumulative increases. Once the full period of dredging is complete the levels of suspended sediment will return to near background levels within about a two-week spring/neap tidal cycle.

47. The fate of the disturbed sediments is described by the patterns of siltation predicted by the model with berths and intertidal margins providing the major sinks. Maximum accumulations in these sinks are likely to occur during dredging of alluvium material within Southampton Water.

2) Post-Construction Related Impacts

48. The effects of the completed channel deepening on the hydrodynamic regime are considered to be negligible. The pattern of change is mainly demonstrated in a slight reduction in ebb and flood flows locally within the channel and a slight reduction in the concentration of suspended sediments within Southampton Water. Any changes, however, will be small and well within levels of natural variability.
49. The longer-term trends influencing the future development of Southampton Water remain dominated by sea level rise.
50. The further implications and significance of the construction and post-construction impacts are reviewed in the following sections in relation to their potential effects on sediment and water quality, nature conservation, fisheries, flood risk and commercial and recreational navigation.

Conclusions

51. The potential changes to physical processes have been assessed in accordance with best practice. The predicted hydrodynamic and sediment transport changes resulting from the Southampton Approach Channel Dredge are on the whole small in magnitude and for the most part remain in the sections of the system where direct changes to the channel are proposed. The changes predicted following the dredge would be almost impossible to measure directly in the field, mainly because they would not be able to be differentiated from natural variations and they would be close to (or below) the working accuracy of any standard recording instrument. During the dredging and disposal (construction) phase, the magnitude of change, particularly with respect to increase in suspended sediment concentrations in the water column, will be more notable, albeit short-term, but highly variable (transient) in time and space. Overall, the impact to the physical functioning of the estuary alone will be insignificant to minor adverse significant.

Sediment Quality (Chapter 9)

52. In order to determine the sediment contaminant status of the material to be dredged, sediment samples were collected from the proposed dredge areas (both from the surface and at depth) following the principles of OSPAR guidelines and, where applicable, compared to UK and internationally recognised sediment quality guidelines and standards. Samples were analysed using United Kingdom Accreditation Service (UKAS) testing methodology for a range of

contaminants. Cefas, who will ultimately inform the MMO's licensing decision has also undertaken its own sample analysis for the full suite of chemical contaminants to determine the suitability of the material for disposal at sea. With minor exceptions, the sediments of the proposed dredge contained negligible (i.e. around the limits of detection) chemical and microbiological contamination. ~~ABP is currently consulting with Cefas, who will ultimately inform the FEPA licensing decision by undertaking their own sample analysis for the full suite of chemical contaminants to determine the suitability of the material for disposal at sea.~~

1) During Capital Dredging

53. Given that any contamination in the dredged sediment is on the whole negligible, the magnitude of any change in sediment quality during dredging will be similarly small and the probability of occurrence will be low. Given the magnitude of change, the general background levels and the likelihood of exceeding sediment quality standards and guidelines, where they apply, the exposure from sediment-bound contaminants will be negligible. The overall impact during dredging is, therefore, considered **insignificant**.

2) During Disposal of Dredge Arisings

54. Given the low proportion of any material containing elevated levels of contaminants relative to the total dredge volume, the exposure of changes in quality of sediments during the disposal of dredge arisings will be negligible and the impact **insignificant** in the area of the disposal ground and dispersion footprint.

3) In the Long-Term Due to Predicted Effect on Sedimentary Processes

55. There will be a small increase in the amount of sediment transported into Southampton Water. The scale of change is so small that it is unlikely to be discernable from background conditions, particularly when taking account of the redistribution of material by natural and anthropogenic produced waves. The exposure of changes in the quality of sediments with the presence of the proposed channel will be negligible and the impact considered **insignificant**.

4) During Future Maintenance Dredging

56. The scale of impact during future maintenance dredging will be similar to existing levels. The potential for redistribution of contaminants during maintenance dredging is considered **insignificant**.

Conclusions

57. With some minor exceptions, the sediments to be removed by the proposed dredge have negligible chemical and microbiological contamination. None of the sediments exceed standards that would preclude disposal of dredged material at sea under a FEPA licence for the range of contaminants tested for. Overall, the potential for impact to the environment from any sediment-bound contaminants that are re-dispersed and deposited elsewhere as a result of the proposed works is considered insignificant in both the short and long-term, and none of the impacts are of a scale that require mitigation.

Water Quality (Chapter 10)

58. The impacts of the proposed development on water quality have been assessed against the relevant standards that currently exist through a range of European Directives. ~~Although this application has been made ahead of any formal guidance on the application of the Water Framework Directive (WFD), the assessment has taken account of standards proposed under the WFD as far as is currently applicable.~~ [An assessment in compliance with the guidance on the application of the Water Framework Directive \(WFD\) has been undertaken.](#)

59. The following potential changes to water quality will arise if sediment, and associated chemical and microbiological contaminants are released into the water column either in the short-term, during capital dredging and disposal, or in the long-term, as a result of hydrodynamic and sedimentary changes brought about by the proposed channel works:

1) Potential Changes to Suspended Sediment Concentrations

60. The impact of changes in suspended sediment concentrations above existing background levels during dredging ranges from **insignificant** for the majority of designated Shellfish Waters present in the Solent to **moderate adverse significant** for designated Shellfish Waters located within Southampton Water and the Test Estuary. With the proposed mitigation measures in place (Para 69), the residual effect is reduced to minor adverse significant.

61. During the disposal of dredge arisings, the impact of the changes in suspended sediment concentrations to the nearest designated Shellfish Waters in the Solent is considered to be at worst **minor adverse significant** for short periods during disposal.

2) Potential Changes to Dissolved Oxygen Levels

62. The impact of changes to dissolved oxygen during dredging will vary from **insignificant** for designated Shellfish Waters present in the Solent to **moderate adverse significant** occurring for short periods at the designated Shellfish Waters located within Southampton Water and the Test Estuary. With the proposed mitigation measures in place, the residual effect is reduced to minor adverse significant (Para 69).

63. Any changes in dissolved oxygen levels during disposal are likely to be very localised and short-lived given the highly dynamic nature of and water depth at the Nab Deposit Ground. There are no designated Shellfish Waters within the footprint of the impact.

3) Potential Changes to Levels of Chemical Contaminants in Water

64. Given the negligible to very low levels of contamination in the material to be dredged, the potential for enhancement of chemical contaminants in the water column is low during dredging. The impact is, therefore, considered **insignificant to minor adverse significant** with respect to water quality standards that currently exist under the Dangerous Substances Directive and those proposed under the WFD Priority Substances Directives.

65. The impact of the disposal of dredge arisings on levels of chemical contaminants in the water column have been assessed as being **insignificant** with respect to water quality standards under the Dangerous Substances Directive and ~~those proposed under the WFD.~~

4) Potential Changes to Nutrient Concentrations in Water

66. The overall significance of potential changes to nutrient concentrations in the water column during dredging have been assessed as being **insignificant to minor adverse significant** with respect to the water quality standards proposed under the WFD, the sensitive eutrophic areas designated under the Urban Waste Water Treatment Directive (UWWTD) and the favourable condition target for the Solent and Southampton Water Ramsar site that applies under the Habitats Directive.
67. During disposal of dredge arisings, any release of nutrients as a result of the disposal will be rapidly diluted to background levels. The impact is, therefore, assessed as being **insignificant** with respect to water quality standards ~~proposed~~ under the WFD and the favourable condition target for the Solent and Southampton Water Ramsar site.

5) Potential Changes to Microbiological Contaminants in Water

68. Due to the low levels of human microbiological contaminants in the sediments and the rapid die-off rates, the potential changes to the numbers of these contaminants in the water column will be **insignificant** during dredging and disposal activities with respect to both designated Bathing Waters and shellfish harvesting areas, designated under the Shellfish Hygiene Directive.

6) Potential Changes to Salinity

69. The new channel design is not predicted significantly to change the hydrodynamics of the estuary system or to cause a change to the general salinity regime. The impact of the proposed scheme is, therefore, considered to be **insignificant** in the long-term with respect to the favourable condition target for the Solent and Southampton Water Ramsar site that applies under the Habitats Directive.

7) Potential Changes during Future Maintenance Dredging

70. The effects on future maintenance dredging requirements are expected to be small when compared with existing annual variability. The levels of contamination in the materials extracted is likely to be less than at present as existing contamination will have been removed by the capital works. The impact of future maintenance dredging is considered to be **insignificant**.

Mitigation

71. For impacts that have been assessed as being moderate adverse significant to Shellfish Waters within Southampton Water, an adaptive management strategy ~~will be promoted~~ **has been agreed with the Environment Agency** as mitigation for the dredge. With the proposed

mitigation measures in place, the residual effect of changes in suspended sediment concentrations and dissolved oxygen is reduced to **minor adverse significant**.

Conclusions

72. The capital dredge will give rise to a number of changes in water quality parameters during the dredging and disposal operation. These changes will all be temporary both in time and space. Many of the changes are not predicted to affect existing levels of compliance with water quality standards in the study area. Some potentially more significant changes will occur for short periods during the construction phase (i.e. capital dredging and disposal of arisings), but this will mainly be restricted to within Southampton Water. For impacts that have been assessed as being moderate adverse significant, i.e. as a result of change in suspended sediment or dissolved oxygen concentrations in the Shellfish Waters within Southampton Water, an adaptive management strategy ~~is being discussed~~ **has been agreed** with the Environment Agency as mitigation for the capital dredge. With the proposed mitigation measures in place, the residual effect will be reduced to environmentally acceptable levels.

Marine and Coastal Ecology (Chapter 11)

73. The following potential impacts to nature conservation features will arise either in the short-term, during capital dredging and disposal, or in the long-term, as a result of hydrodynamic and sedimentary changes brought about by the proposed channel:

1) Potential Impacts Due to Direct Removal of the Subtidal Habitat

74. The overall impact to marine invertebrates will be **insignificant** given the low exposure to an already disturbed environment and the fact that the biological communities that establish following removal will be of a similar nature to that currently existing in the channel.
75. The impact to UK BAP subtidal sands and gravels is considered to be **insignificant** at the Nab Channel and **minor adverse significant** at the Thorn Channel, depending on the nature of the underlying substrate that will become exposed following the dredge.
76. There are unlikely to be any oysters in the proposed channel dredge areas due to the existing high levels of disturbance by shipping and/or maintenance dredging, therefore, the impact is considered to be **insignificant**.
77. The impact of the removal of a very small area of UK BAP subtidal chalk is considered to be **minor adverse significant**, given that the underlying substrate is the same and will rapidly be recolonised by similar fauna.

2) Potential Impacts to Intertidal Due to the Predicted Effect on Hydrodynamic Processes

78. There will be an overall gain in intertidal habitat across Southampton Water and the Solent. Although this is a potential benefit for intertidal nature conservation features, it is of a scale that is considered to be **insignificant** with respect to the entire study area.
79. The effects of the dredge will not exacerbate the existing predicted effects of future sea level rise and although there will be a negligible offset of predicted sea level rise in Southampton Water, the impact is of such a scale as to be considered **insignificant**.
80. The impact of the negligible changes in water levels is considered to be **insignificant** to benthic communities as they will not be discernable from background wave variability.

3) Potential Impact Due to Predicted Effect on Sedimentary Processes

81. The small increase in the net sediment import into Southampton Water and, therefore, potential sedimentation over shallow subtidal and intertidal areas in Southampton Water will be of marginal benefit for maintaining mudflat levels. However, given the changes are unlikely to be discernable from background, the impact is considered to be **insignificant**.

4) Potential Impacts Due to Deposition of Sediment

82. During dredging, the temporary impact of the small scale and transient accumulation of fine material on benthic infaunal communities will be **insignificant**.
83. Given the sensitivity of shellfish and nature conservation status of oysters, the impact although temporary and short-term, will be **moderate adverse significant** to beds within Southampton Water and **insignificant** to beds outside the estuary in the Central Solent. With the proposed mitigation measures in place (Para 94), the residual effect is reduced to **minor adverse significant** to beds within Southampton Water.
84. The exposure of eelgrass beds in the Hamble Estuary and along Calshot to Stanswood Bay to deposition during dredging will be negligible, and the impact is considered **insignificant**.
85. The temporary exposure of saltmarsh habitat to deposition during dredging will be transitory and rapidly re-eroded with the tide. The impact is, therefore, considered **insignificant**.
86. During the disposal of arisings, the impact of deposition of material on reef and subtidal rocky habitats off the southeast coast of the Isle of Wight is considered to be **insignificant to minor adverse significant**.

5) Potential Impacts Arising as a Result of the Effects to Water Quality

87. During dredging, the impact of changes to water quality on marine invertebrate communities is considered to be **insignificant to minor adverse significant**.

88. The impact of changes to water quality during dredging is considered to be **moderate adverse significant** to the oyster beds in Southampton water and **insignificant to minor adverse significant** to beds in the Central Solent. With the proposed mitigation measures in place, however, (Para 94) the residual effect will be reduced to **minor adverse significant** to beds within Southampton Water.
89. The negligible to low exposure of eelgrass beds to changes in suspended sediment levels during dredging is considered to be **insignificant to minor adverse significant**.
90. The impact of changes to water quality on saltmarsh is considered to be **insignificant to minor adverse significant**, given their low sensitivity to the predicted levels of suspended sediments and potential release of contaminants and organic material into the water column during dredging.
91. Reef and rocky habitats are not considered to be sensitive to the changes in water quality during disposal of arisings and, therefore, the temporary impact is considered to be **insignificant**.
92. The temporary exposure to increased nutrient levels during dredging and disposal and the potential depletion of oxygen due to the formation of algal blooms is considered **insignificant**.

6) Potential Impact During Future Maintenance Dredging

93. The change in future maintenance dredging work is expected to be small compared with existing annual variability and, therefore, the impact on the marine and coastal ecology is considered **insignificant**.

7) Potential Impacts Due to Ship Wash

94. The overall impact from ship wash is considered to be **minor beneficial significant**, with respect to potential bed and bank erosion effects and stability of shallow subtidal and intertidal habitats.

8) Potential Impacts to Indigenous Species Through Introduction of Non-Native Species

95. The overall number of shipping movements is not expected to increase above present levels, subject to annual fluctuations, given that the number of berths at the port is remaining the same. Furthermore, the deeper-draughted vessels arriving in the estuary are unlikely to be using any ballast water, and so the risk of introducing alien species in comparison to the existing situation is negligible and the impact considered to be **insignificant**.

Mitigation

96. For the water quality impacts that have been assessed as being of moderate adverse significance to oysters within Southampton Water, an adaptive management strategy is being discussed **has been agreed** with the Environment Agency as mitigation for the dredge. With

the proposed mitigation measures in place, the residual effect to oysters in Southampton Water will be **minor adverse significant**.

Conclusions

97. On the whole, the scale of impacts to marine and coastal features will be insignificant to minor adverse significant. During dredging, the impact of changes in water quality and smothering is considered to be moderate adverse significant for oysters occurring within Southampton Water and will be mitigated by the implementation of an adaptive management strategy, which will reduce the impact to acceptable levels. Following the channel dredge, the majority of impacts during operation are considered to be insignificant, with some impacts being minor beneficial significant, including a marginal reduction in the potential effects of ship wash.

Fish (Chapter 12)

98. The following potential impacts to fish will occur either in the short-term, during capital dredging and disposal, or in the long-term, as a result of hydrodynamic and sedimentary changes brought about by the proposed channel:

1) Potential Impacts Due to Direct Removal of the Subtidal Habitat

99. The temporary impact of the direct removal of poor quality feeding habitat at the proposed dredge areas is considered to be **insignificant** for the majority of fish that frequent the study area and are of lower nature conservation importance (e.g. gobies and sprat). For those fish of higher nature conservation importance (e.g. migratory salmon and juvenile bass), the impact is considered to be **insignificant to minor adverse significant**.
100. The temporary risk of direct uptake of fish and fish eggs during dredging is negligible to low. Consequently, the impact on fish and eggs is considered to be **insignificant**.

2) Potential Impact Due to the Predicted Effect on Hydrodynamic Processes

101. The very small (millimetric) changes to water levels and flow dynamics that are predicted to occur following the proposed dredge are so marginal that they are unlikely to be discernable from natural variability. Therefore, there is unlikely to be a change in the usage of areas by fish and the impact is considered to be **insignificant**.

3) Potential Impact to Habitat Due to the Predicted Effect on Sedimentary Processes

102. The small increase in the net import of sediment into Southampton Water, following the proposed dredge, will result in an increased potential for sedimentation over shallow subtidal and intertidal areas, and a negligible reduction in suspended sediment concentrations. Given the resulting insignificant impact to mudflat habitat levels the impact, with regards to the distribution of fish and overall feeding resource, will be **insignificant**.

4) Potential Impact Due to Deposition of Sediment

103. The temporary impact of deposition of material on bottom-dwelling (benthic) invertebrates during dredging is assessed as being insignificant and, therefore, the consequent impact on fish feeding grounds is considered to be **insignificant**. The potential effect of shellfish smothering on the majority of fish that frequent Southampton Water and eat such prey items will also be **insignificant**. For those fish features of higher nature conservation importance the impact is considered to be **minor adverse significant**, albeit transient during the dredge.
104. The exposure to changes in the quality of sediment is assessed as being negligible and, therefore, the temporary impact of any contamination being released and redistributed onto fish feeding grounds during dredging will be **insignificant**.
105. The temporary impact to fish as a result of the falling plume of deposits at the Nab Deposit Ground is considered to be **insignificant** for pelagic fish and **insignificant to minor adverse significant** for bottom-dwelling demersal fish that are less likely to be able to move rapidly and avoid the impact.
106. The initial disposal plume will impact on a very localised area of seabed and a relatively small number of fish may benefit from the potential food source. The scale, however, is considered negligible and, therefore, the impact will be **insignificant**.
107. The temporary disturbance to subtidal habitats that provide a feeding resource, as well as nursery and spawning grounds for fish during disposal will be **insignificant to minor adverse significant** to fish populations.

5) Potential Impact Arising as a Result of the Effects to Water Quality

Suspended Sediment Concentrations

108. The temporary impact of elevated suspended sediment concentrations during dredging for the feeding ability of the majority of fish that frequent the study area will be **insignificant to minor adverse significant**, and **minor to moderate adverse significant** for fish of higher nature conservation importance. With the proposed mitigation measures in place, however, (Para 115) the residual effect will be reduced to **insignificant to minor adverse significant** for fish of higher nature conservation importance.
109. During dredging within Southampton Water and the Test Estuary, the temporary impact for migratory patterns of fish is considered to be **moderate adverse significant** for fish of higher nature conservation importance (e.g. salmon) and **minor to moderate adverse significant** for other migratory species (e.g. eels and flounder). Outside Southampton Water, the impact to migratory fish is considered to be **insignificant to minor adverse significant**. With the proposed mitigation measures in place (Para 115), the residual effect is reduced to **insignificant to minor adverse significant**.
110. The temporary impact during dredging for spawning and juvenile fish is considered to be **minor adverse significant** for designated bass nursery areas within Southampton Water and **insignificant to minor adverse significant** for other spawning and juvenile fish activities in

the estuary. Outside Southampton Water, the impact will be **insignificant to minor adverse significant** for nursery and spawning grounds.

111. At the disposal ground, the temporary impact of enhanced suspended sediment concentrations to fish directly in the area of the deposit ground is considered to be **insignificant to minor adverse significant**. Away from the immediate vicinity of the deposit location, the impact on the feeding, nursery and spawning activity of fish in the surrounding area will be **insignificant** to fish populations. Given the unconfined nature of the migratory passageway, the impact to migratory fish is considered to be **insignificant to minor adverse significant**.

Organic Enrichment and Oxygen Depletion

112. During dredging within Southampton Water and the Test Estuary, the temporary impact of a reduction in dissolved oxygen for migratory patterns of high nature conservation value fish is considered to be **minor to moderate adverse significant** and **insignificant to minor adverse significant** for other migratory species. With the proposed mitigation measures in place (Para 115), the residual effect is reduced to **insignificant to minor adverse significant**. Outside Southampton Water, the impact of oxygen depletion to migratory fish of conservation value is considered to be **insignificant to minor adverse significant** and **insignificant** for other migratory fish.

Contaminants

113. The temporary impact from the potential release of contaminants associated with the dredged materials and any uptake by fish in the water column is considered to be **insignificant to minor adverse significant** for the majority of fish that frequent the area, and **minor adverse significant** for fish of higher nature conservation value.

6) Potential Disturbance Due to the Generation of Underwater Noise and Vibration

114. The temporary impact of backhoe dredging and trailer suction hopper dredging to migratory salmonids is considered to be **insignificant** and will not cause a barrier to migration. The impact to other fish species is also considered to be **insignificant** given that they will be able to avoid areas with temporary adverse conditions without any implications for the recruitment and sustainability of the population.

7) Potential Impact Due to Compounding Effects of Impacts

115. The compounding effects of several impacts acting together i.e. temperature, dissolved oxygen, suspended sediments and noise on migratory salmonids are considered to be **moderate adverse significant** in Southampton Water and **minor adverse significant** outside Southampton Water and in the Test and Itchen Estuaries. With the proposed mitigation measures in place (Para 115), the residual effect is reduced to **minor adverse significant** in Southampton Water.

8) Potential Impact During Future Maintenance Dredging

116. The change in future maintenance dredging work is expected to be small compared with existing annual variability and, therefore, the impact on fish is considered **insignificant**.

Mitigation

117. For impacts that have been assessed as being moderate adverse significant to fish within Southampton Water, an adaptive management strategy ~~is being discussed~~ **has been agreed** with the Environment Agency and will be adopted as mitigation for the dredge. With the proposed mitigation measures in place, the residual effect on fish in Southampton Water is considered to be **minor adverse significant**.

Conclusions

118. The potential impacts to fish have been assessed according to the Marine Works (EIA) Regulations 2007. As a qualifying feature for the River Itchen SAC, the assessment of the potential impacts to migratory Atlantic salmon have also informed the Appropriate Assessment signposting document (Appendix D) for the purposes of the Habitats Regulations.
119. The main impacts to fish will be temporary, occurring during the capital dredging and disposal of arisings. The scale of the majority of the potential impacts to fish will be temporary and insignificant to minor adverse significant. The short-term increase in the level of suspended sediments, and subsequent depletion of dissolved oxygen during dredging in Southampton Water are considered to result in a potential temporary impact up to moderate adverse significant for the feeding ability and migratory patterns of fish of higher nature conservation importance, namely Atlantic salmon and juvenile bass. This will be mitigated by the implementation of an adaptive management strategy during the capital dredge.
120. Following the capital dredge, the impacts of the changes to the hydrodynamic and sediment regime brought about by the proposed channel, including the impacts during future maintenance dredging, are all considered to be insignificant with respect to fish.

Marine and Coastal Ornithology (Chapter 13)

121. The following potential impacts to waterbirds will occur either in the short-term, during capital dredging, or in the long-term, as a result of hydrodynamic and sedimentary changes brought about by the proposed channel:

1) Potential Impact Due to the Predicted Effect of Hydrodynamic Processes

122. The overall potential gain in intertidal habitat across Southampton Water and the Solent will provide a marginal benefit to birds as an additional feeding resource. Given the very small scale of change predicted, however, the impact is considered to be **insignificant**.

2) Potential Impact Due to the Predicted Effect of Sedimentary Processes

123. The small increase in the net import of sediment into Southampton Water following the proposed dredge will result in an increased potential for sedimentation over shallow subtidal and intertidal areas. This will help to maintain mudflat levels and, thus, offer a potential additional feeding resource for waterbirds. Taking account of the transient nature of this sedimentation and the likely redistribution by waves, however, the scale of change is unlikely to be discernable from background variability and the impact to waterbirds is, therefore, considered **insignificant**.

3) Potential Impact Due to Deposition of Sediment

124. The overall impact to waterbirds as a result of the change in the availability of prey species from the transient and short-term deposition of fine material during dredging is considered to be **insignificant to minor adverse significant**.
125. The temporary impact of the deposition of contaminated material, released and redistributed during dredging, on intertidal and subtidal habitats is considered to be **insignificant** with respect to feeding birds.
126. The overall potential gain in intertidal habitat due to the accumulation of material following the works will be of slight potential benefit as an additional feeding resource for waterbirds, but the scale is so marginal that the impact is considered to be **insignificant**.

4) Potential Disturbance Due to Noise and Movement

127. The short-term impact of noise during dredging activities is considered to be **insignificant to minor adverse significant** to waterbirds that are closest to the dredging in the Test Estuary.
128. Waterbirds using Southampton Water are not sensitive to mechanical activity and vessel movements during dredging activities and the temporary impact is considered to be **insignificant**.

5) Potential Impact During Future Maintenance Dredging

129. The change in future maintenance dredging work is expected to be small compared with existing annual variability and, therefore, the impact on waterbirds is considered **insignificant**.

6) Potential Disturbance Due to Ship Wash

130. The overall changes to ship wash as a result of the proposed channel dredge will marginally reduce the disturbance to waterbirds and result in an impact that is **minor beneficial significant**.

Conclusions

131. The potential impacts to marine and coastal ornithology have been assessed in accordance with the Marine Works (EIA) Regulations 2007. As there are populations of birds qualifying

under the Birds Directive that use the Solent European Marine Site (SEMS), the assessment has also informed the Appropriate Assessment signposting document (Appendix D) for the purposes of the Habitats Regulations.

132. The most significant impacts to waterbirds will occur during the capital dredging due to the potential effect on shellfish prey as a result of the intertidal deposition of sediment, as well as the short-term disturbance from elevated noise levels, particularly upstream in the more constrained part of the channel around the container terminal.
133. Following the dredge, the impacts during the operational phase, including the changes to the hydrodynamic and sediment regime brought about by the proposed channel, will be insignificant, and in some cases there is likely to be a marginal benefit. The benefits include a gain in intertidal habitat and, as a consequence, potential feeding resource across Southampton Water and the Solent, and the reduction in ship wash and, thus, disturbance to waterbirds on the foreshore.

Commercial Fisheries (Chapter 14)

134. The following potential impacts to commercial fisheries will occur in the short and/or long-term:
 - 1) **Potential Disruption of Fishing Activities Due to Vessel Movements**
135. During the channel dredge within Southampton Water, there will be a temporary increase in vessel movements in the main navigation channel between the areas proposed for dredging and the Nab Deposit Ground. This will be **insignificant** for fishing activities of lower importance to the local economy (e.g. cod and whiting), and **minor adverse significant** for fishing activities of higher importance to the region (e.g. sole and bass). Outside Southampton Water, the exposure to disturbance from dredger and disposal operations is considered negligible and, therefore, the impact will be **insignificant**.
136. Following the dredge, the overall number of shipping movements is not expected to increase above present levels, subject to annual fluctuations, given that the number of berths at the port is remaining the same. The potential impact to fishing activities with the channel in operation is, therefore, considered **insignificant**.
 - 2) **Potential Disruption of Fishing Activities Due to Disposal of Arisings**
137. The exposure to the change at the bed of the deposit ground will be high during the 65 week period of the disposal for the dredge. Although any fishing activities that occur in the area of the deposit ground are already characterised by the effects of regular disturbance through the disposal of maintenance dredge material, the disposal of capital dredge arisings will result in temporary mounds at the site. Fishermen are aware that the Nab is a licensed deposit ground and, therefore, fishing activities, particularly those that involve the use of static gear (e.g. potting), are unlikely to occur within the site. Any trawl activity over the deposit ground (should this activity be taken) will, however, be affected by the temporary disposal effects (e.g. mounds). The disruption to fishing activity is, therefore, considered **minor adverse significant**

over the site itself, and **insignificant to minor adverse significant** further afield, depending on the commercial value of the species exploited.

3) Potential Disruption of Fishing Activities Due to Formation of Algal Blooms

138. The negligible to low risk of nutrient levels being elevated during dredging and resulting in the formation of algal blooms is considered to be **insignificant** with respect to fishing activities.

4) Potential Impacts to Fin Fisheries

139. The temporary impact of deposition of material on the majority of the benthic invertebrate communities within Southampton Water has been assessed as being insignificant and, therefore, the impact to fish feeding grounds and subsequent impact to commercial fish catch is also considered **insignificant**. The impact of smothering the more sensitive bivalve shellfish in Southampton Water on the commercial fish feeding resource is considered to range from **insignificant to minor adverse significant**, depending on the economic value of the finfish species.
140. The temporary impact of elevated suspended sediment concentrations during dredging within Southampton Water on the feeding ability of the majority of commercial fish species will range from **insignificant to moderate adverse significant**, depending on their commercial importance to the fishing industry. With the proposed mitigation measures in place, the residual effect is reduced to **insignificant to minor adverse significant**. With respect to the sustainability of commercial stock, the temporary impact of increased suspended sediment levels during dredging will range from **insignificant to minor adverse significant**.
141. During dredging, the temporary impact of changes to other parameters of water quality will range from **insignificant to minor adverse significant** in Southampton Water, depending on the commercial value of the fish. Outside Southampton Water, the impact of deposition of material and changes to water quality to fish reduces to **insignificant**.
142. The impact of underwater noise disturbance during dredging activities will be **insignificant** for commercial fish species.
143. During disposal of arisings, the actual impact of the initial plume is considered **insignificant**, and could be beneficial by providing a potential food source for some fish. The temporary deposition to subtidal habitats further away from the immediate vicinity of the disposal site will have a potential impact on stock that ranges from **insignificant to minor adverse significant**, depending on the economic value of the fish.
144. The temporary impact of enhanced suspended sediment concentrations to commercial fish stocks during disposal is considered to be **insignificant to minor adverse significant** directly in the area of the deposit ground, reducing to **insignificant** with distance.

5) Potential Impacts to Shellfisheries

145. During dredging, the temporary impacts of the deposition of sediments and water quality changes on the commercial shellfish beds within Southampton are considered to be

insignificant to minor adverse significant. Outside Southampton Water, the scale of change that has been predicted is low to negligible and, therefore, despite the fact that certain shellfish in the Solent are of high economic value, the temporary impact will be **insignificant to minor adverse significant**.

146. During dredged material disposal activities, it is considered very unlikely that the crustacean shellfish resource will be at risk, given that the magnitude of change outside the area of the deposit ground will be similar to existing and previous deposits at the site. With a negligible exposure to change, the temporary impact to crab and lobster fisheries is considered to be **insignificant**. The overall impact for the nearest commercial shellfish beds will range from **insignificant to minor adverse significant**, depending on the economic value of the species.

6) Potential Impacts During Future Maintenance Dredging

147. The effects on future maintenance dredging requirements are expected to be small compared with existing annual variability. The impact of changes to water quality and additional maintenance traffic during maintenance dredging is, therefore, considered to have an **insignificant** impact on the commercial fisheries in Southampton Water and the Solent.

Mitigation

148. With the adaptive management strategy that ~~is being discussed~~ **has been agreed** with the Environment Agency as mitigation for the deposition of material and water quality changes occurring during dredging in Southampton Water, the residual impact to commercial fish and shellfish stocks that were assessed as being minor adverse significant will be reduced to **insignificant**, and those that are moderate adverse significant will be reduced to **minor adverse significant**.

Conclusions

149. The main impacts will occur during the capital dredging and disposal of arisings, where on the whole, the scale of impacts to commercial fisheries interests will be insignificant to minor adverse significant. Given the magnitude of change in suspended sediment concentrations during dredging within Southampton Water, albeit transient and short-term, the impact will reach moderate adverse significant for fish species of high commercial value in the estuary, such as bass and sole. With the adaptive management strategy that will be implemented as mitigation for the dredge, the residual impact to commercial stocks will be reduced to acceptable levels. Following the channel dredge, the impacts to commercial fishing activities and fish resource will be insignificant.

Coastal Defences (Chapter 15)

150. The proposed channel dredge is consistent with the policies **set out in National Planning Policy Framework** ~~set in Planning Policy Statement (PPS) 25~~, which sets out the Government's national policies on development and flood risk in England. None of the proposed works are

planned to take place upon land and, therefore, the chapter in the main ES can be considered to be a stand alone Flood Risk Assessment (FRA).

151. There will be no direct effects on any of the coastal defences in the study area as a result of the proposed works. The potential indirect impacts that will arise from the proposed scheme, either through changes to the hydrodynamic or sediment regime, were assessed as:

1) Potential Impact Due to Changes in Water Levels

152. The predicted changes in high water (HW) levels across Southampton Water and the Solent are millimetric and negligible in the context of natural variability in the wind-wave environment and will be nearly impossible to measure or observe in the field. The impact of changes in water levels across the study area is, therefore, considered to be **insignificant**. With respect to flood risk assessment, there will be no change to the risk of flooding as a result of the proposed dredge.

2) Potential Impact Due to Changes in the Flow and Sediment Transport Regime

153. In Southampton Water, there will be a marginal change in the flow dynamics that will result in minor changes to existing erosion and sedimentation patterns. The predicted level of these changes will not be measurable from natural variation and will be close to the accuracy of any recording instrument. In the Solent, the pattern of flow speed and directions will be largely unaffected and the only changes evident will occur within the areas proposed to be dredged (i.e. not along the coast). Although the changes to flows and sedimentary processes that are predicted in Southampton Water will potentially improve the situation with respect to coastal flood protection, the overall impact across the study area is considered to be **insignificant**.

3) Potential Impacts Due to Ship Wash

154. The total energy reaching the shore and seabed from vessel generated wave activity, water surface drawdown, backflow and vessel propeller wash will be marginally reduced. These changes in ship wash have the potential to reduce marginally intertidal erosion from existing conditions and the risk of overtopping existing sea defences, although this is unlikely to be discernable from background wind-wave energies reaching the shore. The overall impact of ship wash is, therefore, considered to be **minor beneficial significant** to the integrity of coastal defences, albeit marginal.

Conclusions

155. The proposed works are consistent with the policies set out in National Planning Policy Framework document [the policies set out in PPS25](#). There will be no direct effects on any of the sea defences in the study area as a result of the proposed works. Following the proposed dredge, the potential impacts from changes to the hydrodynamic and sediment regime brought about by the new channel design are considered to be insignificant with respect to coastal defences, and none of the impacts are of a scale that requires mitigation. There will be a marginal reduction in the existing impacts to coastal defences from ship wash, which is considered to be minor beneficial significant.

Commercial Navigation (Chapter 16)

156. The overall benefit of the scheme to navigational safety and management is concluded to be considerable. The following potential impacts have been summarised as a result of the main navigational channel deepening and widening.

1) Increased Tidal Window

157. The access window is projected to improve from 22% to 47% for a [typical \(Category 3\) 14.5m vessel draught ship](#) and from [approximately 12% to 36% for a larger, Category 4 container vessel](#). In addition the Port of Southampton will, for the first time, be able to accept vessels of 15.5m draught as a result of proposed dredge. These vessels are currently entering service with many of the container shipping lines that currently call at Southampton and the channel improvements will secure the viability of the Port for the future. The impact of this change is considered to be of **major beneficial significant**.

2) Passing Ships and Reduction in Risk of Groundings

158. The channel widening to allow passing opportunities between Fawley and Dock Head will provide a significant improvement when compared to the current situation. A wider and deeper channel will also reduce the potential for grounding incidents. The impact is therefore assessed to of **major beneficial significant**.

3) Collision Risk

159. The channel widening allows for two way passing of vessels, which causes a theoretical increase in collision risk. However, this must be considered against the current management of vessel traffic using radar (VTS), pilots and tugs This potential increase in risk of collision as a result of two way traffic movements is considered to be of **minor adverse significant**.

4) Ship Transit Planning

160. The channel widening and deepening reduces the time pressure on precise passing manoeuvres currently employed under the existing one way channel arrangement. The proposed deepening and widening provides an overall **moderate beneficial significant** improvement in navigational safety by reducing precise timing pressure and facilitating the safe planning of ship transits.

5) Business Continuity

161. The improved access window and the introduction of a deepened and widened channel from Dock Head to Fawley will be of benefit to the Estuary's business continuity and emergency plans. Access to the Port could still take place using the widened channel in the event of a partial blockage of the channel. In terms of Emergency Planning, the impact of the scheme is assessed to be of **major beneficial significant**.

6) Short-Term Increase in Dredging Risk in Southampton Water

162. The proposed dredge will be carried out by a combination of backhoe dredger, discharging into barges, and Trailing Suction Hopper dredger (THSD). There is an increased risk of collision with other vessels during dredging operations, particularly with the use of a backhoe dredger due to its restricted manoeuvrability. The impact of the dredge on commercial traffic in terms of the increase in collision risk is considered to be of temporary nature of **minor adverse significant** given the management procedures that will be implemented.

7) Short-Term Increase in Dredging Risk in the Solent and the Nab Channel

163. Areas in the Solent and the Nab Channel are likely to be dredged by a TSHD, which has the potential to cause disruption to commercial traffic providing an increased risk of collision with vessels navigating in these areas. However, given the available water depth combined with active control by VTS and liaison with onboard pilots, the potential impact will be **insignificant**.

8) Increase in Maintenance Dredging

164. It is anticipated that there will be a slight increase in maintenance dredging commitment, anticipated to be 30,000m³ per annum, which will extend maintenance campaigns by a few days. This will lead to an estimated 16-20 additional ship moves annually, which is considered to be **insignificant** compared to the current number of shipping movements.

9) Reduction in Ship Wash

165. The main channel widening and deepening creates a small improvement (reduction) in the wave energy generated by vessels and the impact is therefore considered to be of **minor beneficial significant**. [Studies presented in the Berth 201/202 ES and included in this ES demonstrate that the effect of an increased proportion of the largest vessels conclude that there would be a reduction in vessel-generated wave energy.](#)

10) Reduction in Drawdown

166. Due to the change in ratio between channel cross-sectional area and ship blockage coefficient, the proposed widening and deepening of the channel will reduce the magnitude of 'drawdown' and thus represents an impact of **minor beneficial significant** both with respect to underkeel clearance (UKC) and other potential environmental impacts such as bed and bank erosion effects.

11) Reduction in Ship Return Currents (Backflow)

167. The predicted changes in ship return current velocity with the new widened and deepened channel produces a reduction in current speeds by up to 30% which is **minor beneficial significant**.

12) Vessel Propeller Wash

168. Given that the main channel will be deeper, the effects of propeller wash are predicted to be reduced from the current level of effects. Overall, the change in propeller wash is predicted to be of **insignificant to minor beneficial significant** with respect to the current situation.

Mitigation

169. A range of mitigation measures will be incorporated during and after the dredging works to maintain a high level of safety. Additional procedures will be put in place and controlled by Vessel Traffic Services (VTS) to avoid/minimise disruption to existing users.

Conclusions

170. The proposal will have clear and significant beneficial impacts on the commercial navigation environment, in terms of access, safety and vessel management. Best practice procedures will be incorporated after the dredging works to maintain a high level of navigational safety and manage the potential risk of collision as a result of the two way passing channel. There will be a minor beneficial significant impact to ship wash, as the proposed deepening and widening will have the effect of reducing the wave energy reaching the shore. The temporary impacts to commercial navigation during dredging will be managed through a range of mitigation measures.

Recreation (Chapter 17)

171. Potential impacts on recreational navigation are assessed for both the short-term, during capital dredging and disposal, and for the long-term, after the dredging phase has been completed. The impacts result predominantly from the area of the proposed widening between Dock Head and Fawley and are listed below:

1) Direct effects on Recreational Watersports Areas

172. The area of widening is contained within an existing secondary, buoyed, navigation channel marked on the Admiralty Charts and used by smaller commercial craft, including fast passenger ferries, particularly when a large vessel is navigating within the adjacent main channel. Widening of the main channel will impact on 13% of the overall preferred sailing area for Southampton, Weston, Netley and Netley Cliff Sailing Clubs and 10.5% of the overall preferred sailing area for Hamble and Warsash Sailing Clubs. The impact of this change on the sailing area available for clubs is considered **minor adverse significant**.

2) Risk of Collision Associated With Craft Capsizing in or near the Main Channel

173. This risk of collision will be slightly increased when the main channel is widened without a review of existing risk management protocol by recreational watersports clubs. The impact of the proposed changes may be regarded as **minor adverse significant**.

174. With continued risk assessment and improved communication procedures by recreational users with VTS allowing more detailed scheduling of events, however, any increase in risk can be mitigated. With mitigation measures in place, the impact of this change is considered to be **insignificant**.

3) Risk Associated with Craft Becoming Disabled in or near the Main Channel

175. This risk will be slightly increased if the main channel were to be widened, without a review of existing risk management protocol by recreational watersports clubs. The impact of the proposed changes may be regarded as **minor adverse significant**.

176. However, any increased risk due to the channel widening can be mitigated by formalising protocols between recreational user clubs and the Harbour Master. With such procedures in place the risk in the case of disabled craft is considered to be **insignificant**.

4) Risk Associated with Inexperienced Dinghy Helmsmen Sailing Close to the Main Channel

177. The risk of inexperienced helmsmen sailing into the main navigation channel will slightly increase with a widened channel. Without a review of existing risk management protocols by recreational watersports clubs, the impact of the proposed changes may be regarded as **minor adverse significant**.

178. There will, however, be no increase in risk providing the clubs are fully aware of vessel movement schedules and VTS are aware of the timing of sailing events. As such, adherence to existing rules and increased communication protocols should negate any increased risk as a result of the widening and the change can therefore be considered to be **insignificant**.

5) Risk Associated with the Passage of Fast Passenger Craft

179. Under a widened channel scenario, there would be an increased level of certainty that fast passenger craft would only operate inside the main navigation channel as the new channel width would allow for two way traffic. As such the impact of this change is regarded as **moderate beneficial significant**.

180. In terms of the wash created by fast passenger vessels, the increase in water depth along with the reduction in channel blockage at the point of wave generation will provide a minor reduction in wave height (and hence energy). The impact of the channel deepening will, therefore, provide an impact that is **minor beneficial significant**.

6) Changes to Tidal Flow and Effects on Recreational Sailing Craft

181. The hydrodynamic regime associated with a widened and deepened channel has been modelled and it has been predicted that current velocity will be reduced by 5% on peak flows and no change will occur to directional flow patterns. Accordingly, this impact will be **insignificant**.

7) Impact from Dredging

182. Dredging plant operating within the area of the proposed dredge will present an increased risk of collision with recreational craft during the period of the dredge and the impact of this change is regarded to be **minor adverse significant**.
183. After the capital dredge, the approach channel will require maintenance dredging for short periods twice a year. With increased communications protocols the effect of this dredging on the recreational user community should be able to be managed and therefore the impact is considered to be **insignificant**.

8) Impact on Recreational Slipways on the East Side of Southampton Water

184. The existing balance between wind generated waves and ship generated waves will not be significantly altered by the widening and deepening of the main channel. The contribution of the scheme on undermining recreational slipways, therefore, is considered to be **insignificant**.

9) Potential Loss of Moorings

185. The proposed area of channel widening in the vicinity of the Upper Swinging Ground encompasses a number of moorings at Marchwood Yacht Club. However, ABP is discussing the possible re-laying of moorings with Marchwood Yacht Club, which would have the effect of reducing the impact of the scheme to **insignificant**.

10) Ashlett Creek Siltation

186. Concern has been expressed that the proposed scheme will cause a further increase in the rate of siltation at Ashlett Creek. Analysis suggests any accretion is a continuation of a number of events and processes both natural and man-made, rather than as a direct result of the on going effects of previous channel deepening. Modelling analysis suggests, however, that widening and deepening of the channel may lead to a marginal (millimetric) increase in siltation at Ashlett Creek. Accordingly, the impact of this change is regarded as being **minor adverse significant** with respect to the potential for additional accretion after the dredge.
187. During the capital dredge, the act of dredging, particularly the fine alluvial material will increase suspended sediment concentrations over the intertidal areas, some of which will settle in the Creek and mooring areas. The effect on Ashlett Creek moorings is considered to be **minor adverse significant**

11) Siltation at Hythe and Hamble Marinas

188. During the dredging phase, there will be a localised increase in suspended sediment concentration in the water column causing a slight increase in sedimentation at both Hythe Marina and in the marinas in the River Hamble. The impact of this change during the dredging phase may be regarded as being **moderate adverse significant**, with respect to existing maintenance dredging commitments. Any increase in siltation will, however, only be confined to the dredging phase. Following the capital dredge, sedimentation in the Hythe Marina and River Hamble will not be increased. [ABP has agreed a specific monitoring package with the](#)

River Hamble Harbour Authority and, with associated mitigation in place where appropriate however, the residual effect will be reduced to **insignificant**.

12) Foreshore Siltation During the Dredging Phase

189. Modelling analyses have shown that accretion will be highly variable in time and space (transient), often with maxima at any location only lasting for minutes to hours on a tide. Apart from areas that are currently 'silt traps', the accumulations are generally eroded during the periods of peak ebb and flood flows, particularly on spring tides. With respect to launching and retrieving recreational craft, the impact from the temporary and transient sedimentation along the foreshore is considered to be **insignificant**.

Mitigation

190. A range of mitigation measures will be implemented during the dredging works and when the widened and deepened channel is in operation to minimise the impact on the recreational community. These procedures will be controlled by Vessel Traffic Services (VTS) in order to minimise disruption to existing recreational users. Sediment monitoring will be carried out before and after the proposed dredge at locations where significant sedimentation is predicted and concerns have been raised. ABP will take such steps as may be appropriate where it is demonstrated that the dredging works have caused a material increase in sedimentation, above naturally occurring rates of sedimentation, and which as a consequence, has had an adverse impact on marine operations. With mitigation in place where appropriate, however, the residual effect will be reduced to **insignificant**.

Conclusion

191. The majority of the recreational community within Southampton Water and the wider Solent area are not expected to experience any impacts due to the proposed Southampton Approach Channel Dredge. The loss of sailing area for the Sailing Clubs located on the Weston Shore of Southampton Water is considered to be minor adverse significant. The risks of collision and incidents are not expected to increase given that existing and continued management procedures implemented by the Clubs and ABP will be maintained and adapted to take account of the channel improvements. During dredging, any significant sedimentation will be investigated to reduce the impact to acceptable levels.

Noise (Chapter 18)

192. In order to establish the baseline position, actual noise measurements were taken at a variety of locations within the study area, which extends from the mouth of Southampton Water to Eling, a distance of approximately 18.5 km. The noise measurements were taken over a 6-week period at 3 locations in the case of long-term monitors. In addition short-term measurements were taken at 15 other locations throughout the study area. These measurements were used to determine the current noise characteristics of locations likely to be affected by the proposed dredge.

193. Based on consultations with local authorities, the key noise impact to be assessed was determined to be the effects of daytime, evening and night-time noise from dredging operations on residential locations in the vicinity of dredging operations.

1) Effects of Dredger Noise

194. A noise model of the dredging activities has been developed by using previous noise test data for the 2 different types of dredger. The highest predicted noise level is at Admiralty Quay, Marchwood, where a free field sound pressure level of 70 dB L_{Aeq} 1 hour is predicted, using a backhoe dredger (where L_{Aeq} 1 hour denotes the average noise generated over a one hour period). The highest noise from the TSHD is predicted to be 51 dB L_{Aeq} 1 hour when dredging nearest to Marchwood. Both predicted levels are calculated under conditions favourable for sound propagation.
195. The assessment of the predicted dredger noise within the study area is generally **insignificant to minor adverse significant**, with the exception of dredging in the vicinity of Admiralty Quay, Marchwood and the Holiday Inn, near Town Quay, Southampton where the noise impact of evening, night-time, Sunday and Bank Holiday dredging is considered to be **major adverse significant**. This impact will, however, be mitigated as described in Chapter 21 of the ES.

Mitigation

196. In order to mitigate high levels of noise from dredging operations, it is proposed that exclusion zones are set up within the areas to be dredged, whereby dredgers will be prohibited from working in these exclusion zones at certain times of the day and night.
197. The exclusion zones will be based on the impact of dredger noise being reduced to being no greater than moderate adverse significant and/or ensuring that noise from the dredging operations does not exceed the average background noise level + 5 dB. For the Admiralty Quay area this results in a night-time noise limit of 52 dB L_{Aeq} from dredging noise and an evening and Sundays/Bank Holidays limit of less than 62 dB L_{Aeq} .

Conclusion

198. It is concluded that with appropriate noise mitigation measures in place, the Southampton Approach Channel Dredge project can be undertaken for the most part, with an impact that is insignificant to minor adverse significant, and only moderate adverse significant when dredging very close to residential properties.

Archaeology (Chapter 19)

199. Wessex Archaeology was commissioned by ABP Southampton to undertake an archaeological assessment following best practice.
200. In summary, the Southampton Water and Solent area is likely to have been subject to anthropogenic influences from the time of the earliest human occupation of Britain (c.700,000

Before Present, BP) and, therefore, the area exhibits a high level of archaeological potential. This not only includes prehistoric archaeology but also more recent shipping and aircraft wrecks, both charted and uncharted. In addition, given the impact of successive rise and fall in sea level since the time of the earliest human occupation of Britain, it is likely that much evidence is now submerged.

201. The results of the desk-based assessment and targeted field surveys found that there are 88 anomalies of archaeological potential within the area of the proposed dredge, of which 51 occur in areas that have been dredged already, under recent capital and maintenance dredging campaigns since the 1960s. It is considered that these anomalies are most likely to be of recent origin and, therefore, exhibit very limited archaeological potential. There are also a residual 37 anomalies that occur within areas that will be subject to dredging activities and which have not previously been dredged. These exhibit the highest level of archaeological potential and, given the extent of the assessment undertaken to date, it is not possible to determine their significance. The majority of these anomalies occur in the areas of channel widening, primarily between Dock Head and Fawley.

1) Potential Direct Impact Due to Dredging Activity

202. The impact of the proposed dredge in areas that have previously been subject to capital and maintenance dredging activities is considered to be **minor adverse significant**, as the 51 recorded anomalies are likely to be of recent origin.
203. The impact of the proposed dredge on maritime archaeology in areas that have not been subject to previous dredging activities is considered to be **high**. With the implementation of suitable mitigation measures (Paras 204 to 205), however, the overall impact of the scheme on these anomalies is likely to be **low**.
204. The impact of the proposed dredge on prehistoric sediments and any archaeological materials they contain is considered to be **high**. With the implementation of proposed mitigation measures (Paras 204 to 205), the overall impact of the proposed dredge is likely to be **low**.

2) Potential Indirect Impacts From Changes to Sedimentation Regime Following Dredge

205. The physical processes assessment identified changes to sedimentation patterns, following the proposed dredge, to be small outside the immediate dredge areas and unlikely to be detectable from background variation. The indirect impact of changes to sedimentation regime on archaeological features is considered **insignificant**.

Mitigation

206. In order to mitigate the impact of the dredge, it is proposed to carry out:
- A further (Stage 3) archaeological assessment of five vibrocore samples displaying archaeological potential;
 - An archaeological assessment of a number of bulk sediment samples from locations and depths identified by the project archaeologist;

- A limited programme of diver ground-truthing of a sample of anomalies, with any significant results being reported to English Heritage; and
- The implementation of a Finds Reporting Protocol during dredging operations to ensure that any finds of significance are reported to the project archaeologist by the dredging team.

207. It is further proposed that these mitigation measures and additional investigations be detailed in a Written Scheme of Investigation (WSI) that is drawn up prior to dredging and which will be subject to the approval of local and national curatorial bodies. The WSI will set out the respective responsibilities of the developer, ABP, dredging contractors and archaeological contractors/consultants, including formal lines of communication between the parties and archaeological curators.

Conclusion

208. The proposed mitigation measures aim to offset the impact to archaeological features and to further investigate the areas of highest likely archaeological potential. Thus, the overall impact of the Southampton Approach Channel Dredge upon archaeological remains, after mitigation, is assessed as low.

Cumulative and In-Combination Effects (Chapter 20)

209. The cumulative and/or in-combination effects of the proposed Southampton Approach Channel Dredge have been assessed with respect to the following relevant plans and projects that are in the planning domain:

- Southampton Berths 201 and 202 dredge and quay wall works;
- Woolston, Redevelopment of Vosper Thorneycroft Site;
- Marchwood Marine Park;
- Cowes Breakwater and Marina Development;
- Hythe Marine Park;
- Capital Dredge at Berth 205;
- [Capital Dredge at Berth 206/7](#);
- [Capital Dredge at Berth 204/5](#);
- ~~Town Quay and Royal Pier~~ Mayflower Park Development;
- [Helius Biomass Generating Power Station](#); and
- Portsmouth Harbour Approach Dredge.

210. No evidence of any cumulative and/or in-combination effects on the hydrodynamic and sediment regime are predicted to occur from the projects and plans outside Southampton Water and the Southampton Approach Channel Dredge proposal were identified. The only significant interactive effects were with those developments that occur up estuary of Dock Head. Overall, the impacts on the marine environment with these developments will be **insignificant**.

211. During construction, however, there is the potential for in-combination impacts to occur to fish due to the interaction of underwater noise and water quality impacts between the Southampton Approach Channel Dredge and the Berth 201/ 202 construction activities should they occur at the same time. These impacts are assessed as **minor adverse significant**. The cumulative impact of all dredge arisings from other developments being disposed of at the deposit site at the same time as the arisings from the Southampton Approach Channel Dredge is considered **minor adverse significant**, and can be managed by ensuring deposits are distributed throughout, and made at widespread locations within, the deposit ground.
212. There is also the potential for a more significant cumulative environmental noise impact on residents at Admiralty Quay to occur between the [Marchwood widening element of the SACD proposal](#) and Berth 201/ 202 construction activities. ~~If backhoe dredging is required, mitigation by way of avoiding the vicinity of Admiralty Quay during periods of percussive piling operation for Berth 201/202 is proposed to reduce the impact to acceptable levels. construction, however, there is the potential for in-combination impacts to occur to fish due to the interaction of underwater noise and water quality impacts between the Southampton dredge and Berth 201/ 202 construction activities~~ It is also possible, but unlikely, that dredging of the 201 and 202 berths may occur at the same time as the remaining elements of the SACD proposal.
213. During the daytime, noise levels are likely to be relatively high at Admiralty Quay when percussive piling is taking place at the southern end of 202, however, there will be no additive effect from dredging. During the evening period, there could be a small additive effect of 1-2dB on total noise levels at Admiralty Quay assuming dredging at the nearest point of the side slope works to Admiralty Quay. This is not considered significant. At night there could be a significant in-combination effect at Admiralty Quay if dredging is taking place for the berthing pocket of 202 and dredging is also taking place at the western end of the Marchwood Widening element of the SACD proposal. It is considered likely that the Marchwood Widening element will have been completed before the dredging is undertaken for berths 201 and 202. These impacts are assessed as **moderate adverse significant** during the daytime and will be minimised by the provision of mitigation which will ensure that shrouding of the percussive piles is implemented and that night-time working of the side slopes is not undertaken at the western end particularly for downwind or calm conditions.

Summary of Impacts and Mitigation (Chapter 21)

214. In addition to optimising the channel design and dredge methodology with respect to potential environmental impacts, standard best practice procedures and impact reduction measures have been considered as part of the proposal to minimise the potential impact on different receiving environments. Some of these mitigation measures are recommendations of the impact assessment process, whilst others have been incorporated into the design of the proposals.
215. The following mitigation measures are proposed:

- **Identification of viable beneficial use schemes:** Any beneficial use schemes that become viable within the timescale of the project will be considered. This will limit the requirement for disposal at the Nab Deposit Ground.
- **Measures to remedy sedimentation of any berths and marinas during dredging:** Sediment monitoring will be carried out before and after the proposed dredge at locations where significant sedimentation is predicted and concerns have been raised. ABP will take such steps as may be appropriate where it is demonstrated that the dredging works have caused a material increase in sedimentation, above naturally occurring rates of sedimentation, and which as a consequence, has had an adverse impact on marine operations.
- **Minimising risk of water quality impacts during dredging:** An adaptive management strategy ~~will be established and~~ **has been** agreed with the Environment Agency, based around monitoring of suspended sediment concentrations and dissolved oxygen, to ensure that the sediment releases, particularly during dredging of fine alluvium sediments, are controlled. This will assist in maintaining water quality within Southampton Water and the Test Estuary and prevent potential for detrimental effects to shellfish beds and fish.
- **Measures to reduce noise disturbance during dredging:** A range of measures to reduce disturbance from construction noise will be established and agreed with the Environmental Health Officers of Southampton City Council, New Forest District Council and Eastleigh Borough Council, including:
 - Where necessary exclusion zones will be set up in the Admiralty Quay, Town Quay and Hythe Marina areas to limit dredger noise at certain times;
 - Consideration as to whether the orientation of the backhoe dredger can be optimised to reduce noise emission;
 - A contractual requirement on dredger operators to ensure engine silencers are fitted and effective in reducing engine exhaust noise levels to the lowest reasonably practicable level; and
 - A request that the dredger contractor ensures that the chosen dredgers are quietened to the lowest noise emission levels that are reasonably practicable and revisit the exclusion zones currently assumed accordingly.
- **Measures to manage commercial navigation during dredging:** Best practice management procedures will be followed during the dredging works to maintain a high level of navigational safety. The following management measures will be put in place and controlled by Vessel Traffic Service (VTS) to avoid and/or minimise disruption to existing users.
 - Dredging will be undertaken as efficiently as possible so that the number of dredger movements is minimised;
 - Dredgers will display the appropriate shapes and lights;
 - To reduce the risk to passing vessels, the dredging vessels will be managed within the critical areas by means of a specific risk assessment and a vessel traffic management plan;
 - Prior to and during dredging activities a 'Notice to Mariners' will be issued to commercial vessel operators and promulgated to stakeholders. These will

- give instructions on how to pass the dredger, details of speed restrictions and other guidance. These measures are regularly used in the capital dredging programmes and are therefore well known and understood by all regular users of the waterways;
- Specific procedures to contact VTS will be implemented so that commercial vessels will be able to maintain effective liaison with the VTS centre should additional information be required;
 - Masters of Dredgers (and barges if applicable) will be trained in local navigation and work towards Pilot Exemption Certificates (PEC) to improve their local knowledge; and
 - Navigation marks will be repositioned to mark the new main channel alignment.
- **Measures to manage commercial navigation during operations:** Best practice management procedures will be incorporated after the dredging works to maintain a high level of navigational safety.
- Pilots will undergo re-orientation training to familiarise themselves with the new channel layout and widening;
 - The Port will review its safety management system, business continuity and emergency response plans;
 - VTS personnel will be fully trained in the application and management of revised procedures; and
 - Port user navigational guidelines will be updated to reflect new operating parameters and procedures.
- **Control measures to manage recreational navigation during dredging works:**
- Recreational users will be informed by liaison meetings and through active communications with VTS to keep clear of the dredging plant;
 - Notices to Mariners will be issued by the Harbour Master's department during the dredging works to advise all users of plant operating in specified areas. Exclusion zones could be set around the dredgers to ensure small craft are not endangered;
 - Race and Training Officers will continue to communicate with the Harbour Master's department whilst the dredge plant is in the vicinity of the sailing club operating areas. It is the responsibility of the Race Officer to inform VTS of the intent to carry out racing, including active communication prior, during and on completion of racing;
 - Dialogue between the Southampton Water Sailing Clubs and ABP will significantly reduce the level of inconvenience to all parties. The Port should be informed of organized club sailing activities, as it may be possible to manage the phasing of the dredging programme so as to minimise the adverse impact on racecourses. This would supplement any existing management measures; and
 - Dredging plant will display the appropriate shapes and lights to warn all users of dredging operations.
- **Control measures to manage risks to recreational users during operations:**

- Review of existing risk management protocol. Dialogue between the Southampton Water Sailing Clubs and ABP will significantly reduce the level of inconvenience to all parties. The Port must be informed when large race regattas are scheduled as it may be possible to manage the phasing of commercial shipping so as to minimise the adverse impact on racecourses. This is an ongoing measure;
 - Improved communication procedures with VTS. The Harbour Master will issue guidance under the existing Port of Southampton Bye-Laws to instruct fast passenger craft not to operate outside the main navigation channel when two large vessels are passing in the area of Weston Shore. The fast craft will be instructed to wait until a passing opportunity presents itself rather than navigating outside the main navigation channel on the Netley side;
 - Use of temporary area markers to define sailing area boundaries. The existing moorings at Marchwood Yacht Club will be relocated.
- **Measures to offset potential impact to features of marine archaeological interest:**
A specification for archaeological impact reduction measures will be established, including:
- A further archaeological assessment of five vibrocore samples displaying archaeological potential;
 - An archaeological assessment of a number of bulk sediment samples from locations and depths identified by the project archaeologist;
 - A limited programme of diver ground-truthing of a sample of anomalies, with any significant results being reported to English Heritage; and
 - The implementation of a Finds Reporting Protocol during dredging operations to ensure that any finds of significance are reported to the project archaeologist by the dredging team.

Conclusions (Chapter 22)

216. The Southampton Approach Channel Dredge project is considered essential to maintain the Port of Southampton as one of the main international gateway ports for the UK. If the Port is not able to undertake the SACD project, as described in this ES, there is a considerable risk that the Port will become less attractive to the shipping lines and customers which use the Port to import and export goods. The consequence of such companies leaving the Port will be highly detrimental in terms of the potential for loss of jobs both directly and indirectly.
217. The design of the proposed Southampton Approach Channel Dredge has been optimised with a view to avoiding and/or minimising environmental impacts where possible. To achieve this, consultation with key stakeholders has been undertaken prior to and throughout the assessment, to identify potential problem areas and possible solutions. This was valuable for confirming that the scheme will meet the required technical and economic objectives, while also having the lowest environmental impact of any available alternative. The assessment has shown that in most cases the impacts will be insignificant or minor and that, where larger adverse impacts are likely to occur, they can be mitigated such that the residual impacts will be reduced to acceptable levels.