Non-Technical Summary

Introduction

1. This chapter provides a summary of the Environmental Statement (ES) that accompanies Associated British Ports' (ABP) application for approvals to carry out the proposed dredging to widen the main channel at Marchwood. Each section of this Non-Technical Summary (NTS) summarises sequentially the chapters that appear in the full ES, in which the results of the comprehensive investigations that have been undertaken can be found, together with the analysis and conclusions that are used to underpin the environmental assessment of the proposed works.

Summary (Chapter 1)

2. As predicted by ABP in 2008, larger ships have entered both the cruise and container market and are now regularly visiting the Port of Southampton. In order to continue to allow the container and cruise trades to operate safely within the Port, ABP propose to widen the navigation channel at Marchwood. Figure NTS.1 shows an overview of the extent of the proposed channel widening and proposed disposal ground.

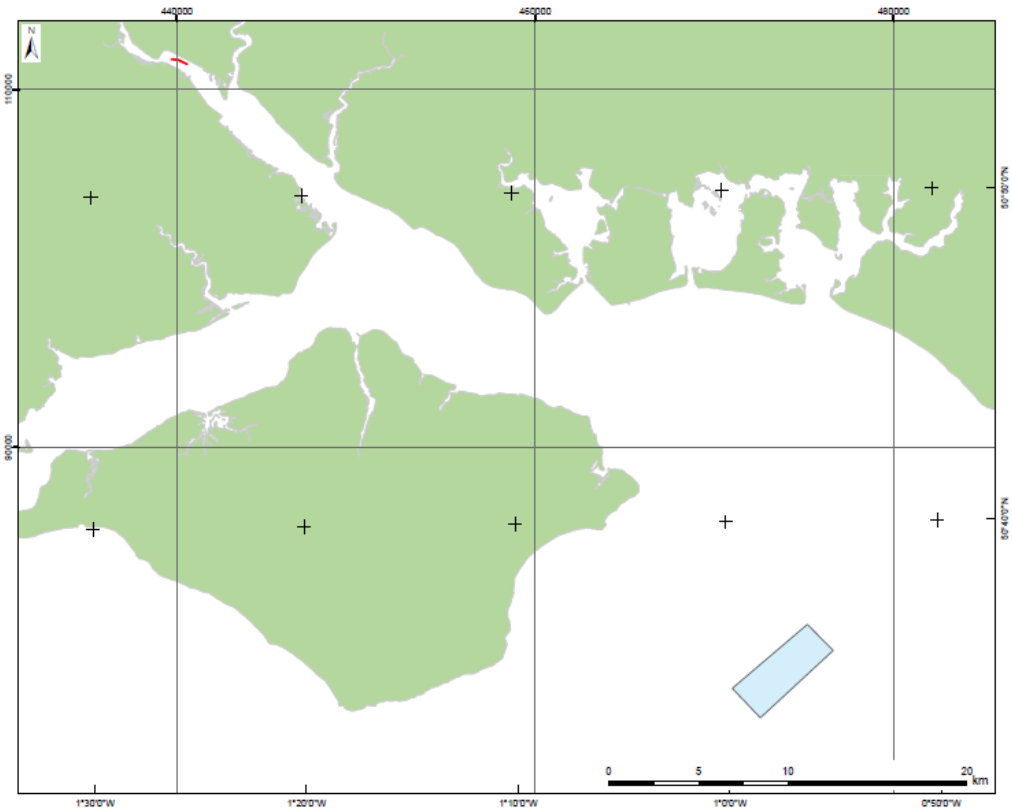

Figure NTS.1 Overview of proposed dredge area (red) and disposal ground (blue)

3. These works, referred to as the Marchwood Widening Works, were previously included within a much larger application by ABP to improve navigational access to, and safety within, the Port of Southampton, known as the Southampton Approach Channel Dredge (SACD), submitted in 2008. The Marchwood Widening Works are arguably the most critical component of the SACD application and the MMO has advised ABP to submit a separate application for these works as they are unlikely to be able to determine the application for the SACD before the end of 2012.

4. This dredge is essential to ensure the continuation of two of the key sectors of the Port — the container and cruise sectors. When approaching and leaving the Container Terminal, container vessels manoeuvre in a 180m-wide channel through the Western Docks whilst, at times, passing large passenger (cruise) vessels berthed at the Mayflower Cruise Terminal and adjacent berths. The resulting interaction forces have the potential to cause a moored vessel to part its mooring lines and disconnect its gangways/airbridges. Furthermore, the newest generation of container vessels have a turning (pivot) point situated in the first third part of the vessel which means that the stern of these vessels will swing and pass extremely close to any vessel berthed at the Mayflower Cruise Terminal, increasing the interaction effects. In light of this, it is now essential to monitor vessel arrivals in case it proves necessary to restrict either the use of the Mayflower Cruise Terminal by cruise vessels or the passage of container vessels wishing to access the container terminal.

5. Given the localised extent of the proposed works, the main study area extends from the Test Estuary down Southampton Water to the Hamble Estuary. In the area surrounding the proposed deposit ground at the Nab Tower, the study area extends from the coast of the Isle of Wight (e.g. Sandown Bay) to Selsey Bill.

6. This ES has been significantly informed by the extensive research, modelling and consultation undertaken for the SACD, updated with more recent information and informed by modelling studies specific to the current proposed works.

Project Need and Alternatives (Chapter 2)

Project Rationale

7. As predicted by ABP in 2008, larger ships have entered both the cruise and container market and are now regularly visiting the Port of Southampton. When approaching and leaving the Container Terminal, vessels manoeuvre in a 180m-wide channel whilst, at times, passing large passenger (cruise) vessels berthed at the Mayflower Cruise Terminal. The amount of water that is displaced by a large vessel in this narrow part of the navigation channel causes interaction forces with any vessel at the adjacent berths. The resulting interaction forces have the potential to cause a moored vessel to part its mooring lines and disconnect its gangways/airbridges.

8. This part of the approach channel is also the turning position for vessels entering or leaving the container terminal which means that the stern of these vessels will swing and pass extremely close to any vessel berthed at 106; increasing the interaction effects. Widening the channel will reduce the potential for interaction with vessels berthed at the Mayflower Cruise Terminal and increase the ease with which container vessels can enter the upper swinging ground, resulting in an improvement to safety.

Project Description

9. The proposed dredging comprises three components, namely the capital dredge, future maintenance dredging and the offshore disposal of dredged material. The capital dredge will consist of the removal of material over approximately 900m at the western edge of the existing navigation channel in Southampton Water opposite berths 104-106. The channel base is proposed to be widened by around 30m at the existing maintained dredge level of 12.6m below Chart Datum (CD). The area to be dredged is subtidal with the depth of removal varying up to 11m. The total volume of material to be dredged is approximately 450,000m³ in situ (approximately 900,000 hopper tonnes). Unless a beneficial use can be identified, ABP proposes to dispose of the material at the licensed Nab Tower Deposit Ground, located to the south-east of the Isle of Wight.

Consideration of Alternatives

10. The extent of the proposed channel widening has been determined from analyses of vessel simulation studies and consultation with the Harbour Master and marine pilots. The resulting proposal is considered to be the minimum that is consistent with navigational safety. The potential dredge methods to be employed have been selected as those most appropriate and that will minimise disturbance and environmental impacts.

11. An alternative option must still meet the identified need to facilitate access for the wider vessels. For this proposal there are no available alternatives, which will not have discernibly greater environmental impacts.

12. The do nothing or 'zero option' has been discounted on the basis that this would lead to potential restrictions either on vessel movements or on the Mayflower Cruise Terminal. Such restrictions would make the Port far less attractive for cruise companies or container lines, and potentially lead to the loss of trade and a reduction in revenue. This would clearly have a detrimental impact on employment within the Port and local commerce, and potentially reduce private investment in local, regional and national infrastructure associated with the Port. It would also follow that ABP and other port related companies would not be able to justify continued investment in the Port.

13. The relocation of Mayflower Cruise Terminal within the current port estate has also been discounted for a number of reasons. There are no opportunities to provide sufficient berth space within the Port which would have available depth of water together with a sufficient land footprint adjacent to the quayside, without significantly compromising another existing trade or current development proposals. The discontinuance of the use of the Mayflower Cruise Terminal is also not an option as there is a pressing need for cruise facilities within the port, and the consequence of such a step would be that the Port would have to turn away customers as it would no longer be able to accommodate and service the needs of the cruise lines. In addition, it should be noted that even if it were possible to identify a suitable area of land in which to relocate the terminal, the design and construction costs of building the necessary infrastructure to support cruise operations would be in the order of £25-30 million. This would clearly be prohibitively expensive. By comparison, the cost of the proposed dredging is estimated at approximately £8-10 million (subject to tender).

Conclusion

14. The proposed dredging works are required to enable the nationally-important Port of Southampton to address pressing navigational safety issues. A failure to do so will directly jeopardise Southampton's current position as a premier global gateway for international trade with the rest of the world.

Project Description (Chapter 3)

15. 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.

16. An *in situ* volume of approximately 450,000 m^3 (900,000 hopper tonnes) of material is to be removed, which can be broadly categorised into three broad types:

- Soft–very soft clay (recent alluvial deposits);
- Gravel (Pleistocene); and
- Firm–very stiff silty/sandy clay and dense sand.

17. The method of dredging will be dependent on dredger availability and, therefore, the assessment has considered two options for the removal of sediment: firstly, the soft and granular sediments may be dredged using a Trailing Suction Hopper Dredger (TSHD) with the stiff clays and dense sand being dredged by a backhoe dredger with the material loaded directly into barges. Alternatively, all the material could be removed by means of a backhoe dredger.

18. Unless a beneficial use of the material can be found, it is proposed to dispose of all material at the licensed Nab Tower Deposit Ground, located to the south east of the Isle of Wight, a vessel transit time of around 5 hours from the dredge location.

19. It is anticipated that the dredging works will commence late in 2012 / early in 2013 and will take approximately 14 weeks to complete, with the dredge cycle operating 24 hours per day.

Consents and Approvals (Chapter 4)

20. An Environmental Impact Assessment (EIA) of the proposed dredge is required in accordance with the provisions of the Marine Works (EIA) Regulations 2007 (as amended). A Scoping Report was prepared and submitted to the Department for Environment Food and Rural Affairs (Defra), Marine Management Organisation (MMO) as a basis for consultation. The MMO then provided a formal Scoping Opinion, which confirmed the issues to be covered in the EIA.

21. Consent in the form of a Marine Licence for the disposal of dredged material at sea is required from the MMO under the provisions of the Marine and Coastal Access Act 2009 (as amended). Under the Southampton Harbour Act 1911, Board of Trade consent is also required from Defra (MMO) for both the dredge of the navigational channel and the disposal of the dredged material.

22. 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 of Habitats and Species Regulations 2010 (as amended), is required. The information to assist the MMO's evaluation has been provided in Appendix D of this ES.

23. It will be necessary to obtain consent from the Harbour Master for the Port of Southampton with respect to those areas which fall within his jurisdiction and from the Crown Estate in relation to the disposal of dredge arisings. ABP owns all of the seabed in respect of this application.

Policy and Guidance (Chapter 5)

24. The Marine and Coastal Access Act 2009 makes clear that 'A public authority (which includes the MMO) must take any authorisation or enforcement decision in accordance with the appropriate marine policy documents, unless relevant considerations indicate otherwise'.

25. As part of the proposed works, ABP has taken into account all relevant national, regional and local planning policy and guidance.

26. The works are an example of sustainable development, a key theme running through policy and guidance at all levels, and accord with the relevant provisions of the Marine Policy Statement as required by the Marine and Coastal Access Act 2009. The works will safeguard economic benefits, whilst also having due regard to potential implications on society and the environment, limiting adverse effects through the use of mitigation.

27. Furthermore, the works are in accordance with the provisions of other relevant national policy considerations, particularly the National Policy Statement for Ports and including those contained within the statutory development plan for the area. The works are located at an existing gateway port facility that is recognised as being of national significance and will help to both maintain and enhance the role of the port by making best use of existing infrastructure.

Nature Conservation Designations (Chapter 6)

28. 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 study area, including Ramsar sites, Special Protection Areas (SPAs) and Special Areas of Conservation (SAC) and recommended Marine Conservation Zones (rMCZs).

29. 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 only 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.

30. The potential loss of UK BAP priority habitats and species, the non-statutory action plans and recommended MCZ areas that are relevant have also been considered in the impact assessment.

Impact Assessment Approach (Chapter 7)

31. This EIA has been facilitated by wide ranging consultations with stakeholders and interested parties including Natural England, the Environment Agency, Cefas, MMO, RSBP and local authorities. This consultation has helped to identify the scope of potential impacts and define appropriate impact reduction measures.

32. 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 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.

33. The EIA has been supported by a large resource of literature and data describing the existing (baseline) environmental conditions in Southampton Water and the Solent, the extensive research, modelling and consultation undertaken for the previous SACD EIA, and studies specific to the scope of the current application and to take into account the most recent legislation and guidance.

34. 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:

- Terrestrial effects;
- Coastal defences;
- Marine and coastal ornithology;
- Air quality;
- Landscape and visual impacts;
- Terrestrial ecology; and
- Underwater noise.

35. The works will not, in themselves, result in an increase in throughput or capacity of the Port. The Port will continue to operate 24 hours per day, 365 days per year. Vessel arrivals and departures will also reflect these operating hours.

Impact Assessment Methodology

36. 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.

37. 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

38. The following sections summarise the findings of the EIA process, which has been undertaken in accordance with the Marine Works (EIA) Regulations 2007 (as amended). 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 works). These pathways were identified from both the results of the Scoping Study and the Scoping Opinion provided by MMO. 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 20.

Physical Processes (Chapter 8)

39. A package of technical evaluations, based on standard practice, has been used to determine the magnitude and extent of physical changes that are likely to result from the proposed dredging works. The assessment is based upon conservative assumptions to offer a realistic worst-case scenario.

Dispersion of Sediment during Dredging

40. During dredging, heightened suspended sediment concentrations will occur due to local mechanical disturbance of sediments. The magnitude of the change, with respect to background conditions, is considered to be negligible to small. It is considered that these changes will not affect the physical functioning of the estuary. The impact on the estuary is therefore considered to be **insignificant**. Impacts on other receptors are considered elsewhere.

Changes to Sediment Regime Attributable to dredging

41. The proposed dredging works are predicted to result in a negligible change in sedimentation. With the exception of the areas where maintenance dredging is already required due to natural sedimentation, the amount of deposition of sediments disturbed by the dredge is for the most

part negligible, and short term in nature. The predicted changes to sedimentation are restricted to the vicinity of the widening area and are negligible in magnitude, with respect to natural variability. It is considered that these changes in sedimentation will not affect the physical functioning of the estuary. The impact is therefore considered to be **insignificant**. Impacts on other receptors are considered elsewhere.

Sedimentation and Dispersion of Sediment during Disposal

42. Modelling studies show that the deposit of the capital dredge sediments from the proposed dredging will be widely dispersed from the Nab Tower Deposit Ground, with all effects of the disposal returning to background conditions within one or two weeks after cessation of the disposal operations. The magnitude of the change is small, particularly given ongoing maintenance and capital dredge deposits at the site. Overall, the impact on physical functioning of the estuary is therefore considered to be **insignificant**. Impacts on other receptors are considered elsewhere.

Changes to Hydrodynamics Attributable to Dredging

43. Only small changes in tidal range are anticipated, which are confined to the widening area. Importantly, the assessment of water levels shows there is no predicted change along the lower edges of the designated Dibden Bay and Bury Marsh (areas of nature conservation). The overall effects are considered negligible compared to the normal cyclic variation of the tide and disturbance caused by episodic events such as storm waves and surges. The impact on the hydrodynamic regime of the estuary will therefore be **insignificant**. Impacts on other receptors are considered elsewhere.

Changes to Maintenance Dredging Commitment

44. The overall maintenance dredging requirement for Southampton Water is not predicted to increase. A greater dredging volume is likely to be required from the Western Docks area, with a reduced volume further up estuary (around the container terminal approaches). The change to the maintenance dredging commitment is considered to be **insignificant**.

Conclusion

45. The physical changes that are predicted to occur during capital and maintenance dredging operations associated with the proposed works are shown to be negligible and near impossible to measure directly in the field. The impact to the physical functioning of the estuary and coastal waters in the vicinity of the disposal site is therefore considered to be **insignificant**.

Sediment Quality (Chapter 9)

46. In order to determine the sediment contaminant status of the material to be dredged, sediment samples collected from the capital dredge area (both from the surface and at depth) were assessed against 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. With minor exceptions, the proposed capital dredge sediment contains negligible (i.e. around the limits of detection) chemical and microbiological

contamination. ABP is currently consulting with Cefas, who will ultimately inform the Marine and Coastal Access Act (MCAA) 2009 'Marine Licence' decision. It is anticipated that Cefas will require their own sampling and analysis for the full suite of chemical contaminants to determine the suitability of the material for dredging and subsequent disposal at sea.

47. The following potential changes to sediment quality 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 works:

During Capital Dredging

48. Given that any contamination in the proposed capital dredge sediment is on the whole negligible, the magnitude of any change in sediment quality during dredging is assessed as small and the probability of occurrence considered 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 of environmental receptors from sediment-bound contaminants will be negligible. The overall impact during dredging is, therefore, considered **insignificant**.

During Disposal of Capital Dredge Arisings

49. Due to the highly dispersive nature of the Nab Tower Deposit Ground, the disposal of dredged material is unlikely to result in a measurable change to the background quality of the seabed sediments. Furthermore, given the low proportion of any material containing elevated levels of contaminants relative to the total dredge volume, the exposure to changes in quality of sediments during the disposal of dredge arisings will be negligible and the impact will be **insignificant** in the area of the disposal ground and dispersion footprint.

In the Long-Term due to Predicted Effect to Sedimentary Processes

50. The scheme will result in the potential for localised changes to the sedimentation in the Test Estuary. The scale of these changes 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 capital dredge will, therefore, be negligible and the impact **insignificant**.

During Future Maintenance Dredging

51. The scale of impact during future maintenance dredging will be similar to existing levels. The potential for redistribution of contaminants during maintenance dredging is, therefore, negligible and the impact considered **insignificant**.

Conclusions

52. With some minor exceptions, the sediments removed by the proposed capital dredging will have negligible chemical and microbiological contamination. None of the sediments exceed

standards that would preclude dredge or disposal of material at sea under the MCAA Marine Licence for the range of contaminants tested for. Overall, the potential for impact to the environment from any sediment-bound contaminants which 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 requires mitigation.

Water Quality (Chapter 10)

53. 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, including the Water Framework Directive (WFD), Priority Substances Directive (PSD) and the Shellfish Waters Directive.

54. 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:

Potential Changes to Suspended Sediment Concentrations

55. The impact of changes in suspended sediment concentrations above existing background levels during dredging is **minor adverse significant** for the designated Southampton Water Shellfish Waters.

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

Potential Changes to Dissolved Oxygen Levels

57. The impact of changes to dissolved oxygen during dredging is **minor adverse significant** occurring for short periods at the designated Southampton Water Shellfish Waters.

58. 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 Tower Deposit Ground and thus is assessed as **insignificant**. There are no designated Shellfish Waters within 5km of the footprint of the impact.

Potential Changes to Levels of Chemical Contaminants in Water

59. 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 exist under the PSD and the WFD.

60. The impact of the disposal of dredge arisings on levels of chemical contaminants in the water column are assessed as being **insignificant** with respect to water quality standards under the PSD and the WFD.

Potential Changes to Nutrient Concentrations in Water

61. The overall significance of potential changes to nutrient concentrations in the water column during dredging is assessed as being **insignificant** with respect to the water quality standards under the WFD, the sensitive eutrophic areas designated under the Urban Waste Water Treatment Directive (UWWTD) and the favourable condition target for the Solent Maritime European Marine Site that applies under the Habitats Directive.

62. During disposal, any release of nutrients as a result of the disposal will be rapidly diluted to background levels and, therefore, the impact is assessed as being **insignificant** with respect to water quality standards under the WFD and the favourable condition target for the Solent Maritime and South Wight Maritime European Marine Sites.

Potential Changes to Microbiological Contaminants in Water

63. 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 both dredging and disposal activities with respect to both designated bathing waters and designated shellfish harvesting areas.

Potential Changes to Salinity

64. The new channel design is not predicted to significantly change the hydrodynamics of the estuary system or to cause a change to the general salinity regime. Therefore, the impact of the proposed scheme is considered to be **insignificant** in the long-term with respect to the favourable condition target for the Solent Maritime European Marine Site that applies under the Habitats Directive.

Potential Changes during Future Maintenance Dredging

65. The effects on future maintenance dredging requirements are expected to be small compared with existing annual variability, representing a redistribution of dredging effort rather than any overall increase. 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**.

Conclusion

66. The temporary changes to water quality will be temporary and highly variable (transient) in both time and space. The majority of impacts on water quality will be **insignificant**. Any greater impacts will be minor at worst.

Marine and Coastal Ecology (Chapter 11)

67. The marine and coastal ecology topic includes impacts of the proposed development on subtidal and intertidal habitats, benthic invertebrates and shellfish. Separate assessments are provided in relation to potential impacts on Natura 2000 sites and features (Appendix D) and recommended Marine Conservation Zones (rMCZ) and recommended Reference Areas (rRA MCZ) (Appendix G). The assessment in relation to Natura 2000 sites and features is also relevant to the consideration of impacts on Sites of Special Scientific Interest with which they overlap. Two areas of mud and shingle habitat on the Marchwood foreshore have been identified as Sites of Importance for Nature Conservation (SINC). These are not coterminous with other designated sites and the potential impacts to these sites are therefore considered in this section. A full list of relevant nature conservation sites in the study area is provided in Appendix F.

68. The following potential impacts to marine and coastal ecology features (are predicted to 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:

Potential Impacts due to Direct Removal of the Subtidal Habitat

69. The impact on marine invertebrates is considered to be **insignificant** given the exposure to direct impact will be low and the existing communities are in an already-disturbed environment.

70. There are no oyster beds in the proposed dredge area and there is no impact to BAP habitats. Therefore the impact on shellfish is considered to be **negligible**.

Potential Impacts to Intertidal Areas due to the Predicted Effect on Hydrodynamic Processes

71. Chapter 8 found there will be no change to water levels or extent of intertidal areas in designated areas, and only negligible (millimetric) changes in non-designated areas. These changes will not be discernable from background variability and therefore the impact of changes to hydrodynamic processes on intertidal habitats, including those in the Marchwood SINC is considered to be **insignificant**.

Potential Impact due to Predicted Effect on Sedimentary Processes

72. There will be no change to the estuary tidal prism, sediment supply to the area or sediment balance of the estuary as a whole, with effects confined to an increase in sedimentation within the main channel and berths and a slight redistribution of sedimentation patterns opposite Marchwood. Given that the scale of the changes will be un-measurable and are unlikely to be discernable from natural variability in flow speeds and directions throughout the tide, during different weather conditions and vessel disturbance, the impact is considered to be **insignificant**.

Potential Impacts due to Deposition of Sediment (Smothering)

73. During dredging, the temporary impact of the small-scale, transient and short-term accumulation of fine material on benthic infaunal communities, including oysters and other shellfish, and the Marchwood SINC is considered to be **insignificant**.

74. During the disposal of arisings, the impact of deposition of material on reef and subtidal rocky habitats, maerl beds and fragile sponge and anthozoan communities, off the southeast coast of the Isle of Wight and in nearby rMCZ and rRA MCZ, is considered to be **insignificant** (see Appendix G).

Potential Impacts Arising as a Result of the Effects on Water Quality

75. During dredging, the impact of changes to water quality during dredging from suspended sediment, contaminants and nutrients on marine invertebrate communities is considered to be **insignificant**.

76. The impact of changes to water quality during dredging is considered to be **insignificant** to the oyster beds in Southampton Water.

77. The impact of changes to water quality on saltmarsh is considered to be **insignificant**, 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.

78. Reef and rocky habitats, including their associated fragile sponge and anthozoan communities, 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**. Maerl is more sensitive to changes in water quality. However, the scale of the changes is well within natural variation and the impact is also therefore considered to be **insignificant**.

79. The temporary exposure of features to increased nutrient levels during dredging and disposal and the potential depletion of oxygen due to the formation of algal blooms is considered **insignificant**.

Potential Impact during Future Maintenance Dredging

80. The overall maintenance dredging requirement is not expected to increase due to the works, but to be altered due to a slight redistribution of sedimentation patterns. As a consequence, the impact on the marine and coastal ecology is considered **insignificant**.

Potential Impacts to Indigenous Species through Introduction of Non-Native Species

81. Vessels arriving in the estuary very rarely exchange ballast water. The risk of introducing alien species in comparison to the existing situation is, therefore, negligible and the impact considered **insignificant**.

Conclusion

82. The scale of impacts to marine and coastal ecology features (subtidal and intertidal habitats, benthic invertebrates), including the mud and shingle habitat within the Marchwood SINC are predicted to be **insignificant**. During dredging, the impact of changes in water quality and smothering is considered to be **insignificant** for oysters occurring within Southampton Water.

83. Following the channel dredge, the impacts during the operational phase are considered to be **insignificant**.

Fish (Chapter 12)

84. The impacts of the proposed development on resident and migratory fish have been assessed. Impacts on fish features relevant to Natura 2000 sites are considered further in Appendix D.

85. The following potential impacts to fish are predicted to 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 works:

Potential Impacts due to Direct Removal of the Subtidal Habitat

86. The temporary impact of the direct removal of a small area of feeding habitat at the proposed dredge area is considered to be **insignificant** for all fish that frequent the study area.

Potential Impact due to the Predicted Effect on Hydrodynamic Processes

87. 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 will be **insignificant**.

Potential Impact to Habitat due to the Predicted Effect on Sedimentary Processes

88. The proposed dredge will result in a slight redistribution of sedimentation over the Marchwood Basin, 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**.

Potential Impact due to Deposition of Sediment (Smothering)

89. The temporary impact of deposition of material on benthic invertebrates during dredging is assessed as being insignificant and, therefore, the consequent impact to fish feeding grounds is considered to be **insignificant**. The potential effect of shellfish smothering on fish that frequent Southampton Water and eat such prey will be **insignificant**.

90. 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**.

91. The temporary impact to fish as a result of the falling plume of deposits at the Nab Tower 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.

92. 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, however, the scale is considered negligible and, therefore, the impact will be **insignificant**.

93. The temporary disturbance to subtidal habitats that provide a feeding resource, as well as nursery and spawning grounds for fish during disposal is considered to be **insignificant** to **minor adverse significant** to fish populations.

Potential Impact Arising as a Result of the Effects on Water Quality

94. 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,** and **insignificant** to **minor adverse significant** for fish of higher nature conservation importance.

95. During dredging, the temporary impact of enhanced suspended sediment concentrations on migratory fish (based on the proposed dredging period November to March) is considered to be **insignificant** for salmon and **minor adverse significant** for trout, eels and flounder. Should the dredging period need to be extended beyond March, the impact would increase to **moderate adverse significant** for fish of higher nature conservation importance (e.g. salmon) and remain as **minor adverse significant** for other migratory species (e.g. trout, eels and flounder).

96. The temporary impact of enhanced suspended sediment concentrations during dredging for spawning and juvenile fish is considered to be **minor adverse significant** for designated bass nursery areas within Southampton Water and **insignificant** for other spawning and juvenile fish activities in the estuary.

97. 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 is considered to be **insignificant** on fish populations. Given the unconfined nature of the migratory passageway, the impact to migratory fish is considered to be **insignificant**.

98. During dredging, the temporary impact of a reduction in dissolved oxygen for migratory patterns of high nature conservation value fish is considered to be **insignificant** to **minor adverse significant,** depending on timing of dredging relative to migratory events, and **insignificant** for fish of lower conservation importance.

99. 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** for all fish that frequent the area.

Potential Disturbance due to the Generation of Underwater Noise and Vibration

100. The temporary impact of underwater noise from backhoe dredging and TSHD dredging on all fish species, including migratory salmonids is considered to be **insignificant**.

Potential Impact due to Compounding Effects of Impacts

101. The compounding effects of several impacts acting together i.e. temperature, dissolved oxygen, suspended sediments and noise on migratory salmonids are considered to be **insignificant** to **minor adverse significant**, depending on timing of dredging relative to migratory events.

Potential Impact during Future Maintenance Dredging

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

Mitigation

103. For impacts that have been assessed as being moderate adverse significant to fish within Southampton Water, an adaptive management strategy is being discussed with the Environment Agency and will be adopted as mitigation for the dredge should the dredging works extend beyond March, i.e. when migratory salmonids are present in the estuary. With the proposed mitigation measures in place, the residual effect on all migratory fish in Southampton Water is considered to be at worst **minor adverse significant**.

Conclusion

104. The majority of impacts to fish will be temporary, occurring during the capital dredging and disposal of arisings, and **insignificant** to **minor adverse significant**. Any greater impacts that may occur during the short-term increase in the level of suspended sediments during dredging in Southampton Water, should the period of dredging extend beyond March, will be mitigated by the implementation of an adaptive management strategy. The impacts following the capital dredge are all considered to be **insignificant** to fish.

Commercial Fisheries (Chapter 13)

105. The following potential impacts to commercial fisheries will occur in the short and/or long-term:

Potential Disruption of Fishing Activities due to Vessel Movements

106. There will be a temporary increase in vessel movements in the main navigation channel between the proposed dredge area and the Nab Tower Deposit Ground. This is considered to be **insignificant** for all fishing activities. Outside Southampton Water, the exposure to disturbance from dredger and disposal operations is considered negligible and, therefore, the impact will be **insignificant**.

107. Following the dredge, the number of vessels using the channel is anticipated to remain the same, subject to present annual variations. The potential impact to fishing activities with the channel in operation is also considered **insignificant**.

Potential Disruption of Fishing Activities due to Disposal of Arisings

108. Fishing activities that occur in the area of the disposal ground are already characterised by the effects of regular disturbance through the disposal of maintenance dredge material. Fishermen are aware that the Nab is a licensed disposal ground and, therefore, fishing activities, particularly those that involve the use of static gear (e.g. potting), are unlikely to occur within the site. Maximum depths of accumulation of sediment of up to around 25mm are predicted at the deposit site with the sediment plume with SSC in excess of 400mg/l is expected to extend to a maximum of 12km by 2.5km. The disruption to commercial fishing activity is, therefore, considered to be **insignificant.**

Potential Disruption of Fishing Activities due to Formation of Algal Blooms

109. 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 commercial fishing activities.

Potential Impacts on Fin Fisheries

110. The temporary impact of deposition of material on the majority of the benthic invertebrate community 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 be **insignificant** due to the low level of impact.

111. The temporary impact of elevated suspended sediment concentrations during dredging within Southampton Water for the feeding ability and sustainability of commercial stocks will be **insignificant**.

112. During dredging, the temporary impact of changes to other parameters of water quality, including the release of contaminants associated with the dredged materials and any oxygen depletion, is considered to be **insignificant**.

113. The impact of underwater noise disturbance during dredging activities will be **insignificant** for commercial fish species.

114. 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 is also considered to be **insignificant**.

115. The temporary impact of enhanced suspended sediment concentrations to commercial fish stocks during disposal is considered to be **insignificant**.

Potential Impacts on Shellfisheries

116. The nearest commercial shellfisheries are 4km from the footprint of the dredge. During dredging, the deposition of sediments and water quality changes on the commercial shellfish beds are considered to be **insignificant**.

117. During disposal activities, it is not considered that the crustacean shellfish resource surrounding the disposal site 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 is also considered to be **insignificant**.

Potential Impacts during Future Maintenance Dredging

118. 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.

Conclusion

119. The main of impacts on commercial fisheries are assessed as being **insignificant**. Following the channel widening, the impacts to commercial fishing activities and fish resource, including future maintenance dredging and shipping movements, will be **insignificant**.

Commercial Navigation (Chapter 14)

120. The overall benefit of the proposed works to reduce the potential for Terminal or vessel movement conditions as well as improving navigational safety is concluded to be considerable. The potential impacts have been summarised as follows:

Potential Impact due to Presence of Dredging Plant during Capital Dredging

121. The dredge will be carried out by a backhoe dredger, discharging direct to barges, and possibly a Trailing Suction Hopper Dredger (TSHD). There is an increased risk of collision with other

vessels during dredging operations although the dredge area is outside the existing main channel. The impact of the capital dredge on commercial traffic in terms of the increase of collision risk is considered to be of temporary nature and **minor adverse significant**, reducing to **insignificant** during maintenance dredging given the management procedures that will be implemented.

Potential Impact due to Reduction in Terminal and Vessel Operating Conditions and Improvements to Navigational Safety

122. Simulation work demonstrates that, following the proposed dredging, conditions relating to the use of the Mayflower Cruise Terminal and vessel movements could be reduced whilst maintaining and improving standards of navigational safety. In addition, the approach manoeuvre for vessels entering and departing the Upper Swinging Ground will be improved. This is assessed to be of **major beneficial significance**.

Potential Impact due to Changes to Maintenance Dredging Commitments

123. No additional increase in maintenance dredging commitment is anticipated, therefore the impact of additional maintenance traffic is considered to be **insignificant**.

Mitigation

124. A Notice to Mariners will be issued by Vessel Traffic Services (VTS), as required, during the dredging works to maintain a high level of safety. Co-ordination of operations by VTS and application of the Port's established Marine Safety Management System (Marine SMS) will maintain a high level of navigational safety.

Conclusion

125. The proposal will have clear and significant beneficial impacts for navigation and removing the potential to consider either Terminal and/or vessel movements conditions.

Recreation (Chapter 15)

126. Potential impacts on recreational navigation have been assessed for both the short term, during capital dredging and disposal, and for the long term, after the dredging has been completed.

Loss of Moorings

127. The proposed area of channel widening encompasses a number of moorings of the Marchwood Yacht Club. ABP has committed to re-lay the affected moorings, which will have the effect of reducing the impact of the scheme to **insignificant**.

Changes to Tidal Regime

128. The hydrodynamic regime associated with a widened and deepened channel has been modelled and it has been predicted that the position of the main flow stream in the channel will adjust slightly, resulting in flows adjacent to the dredged area, local to the remaining Marchwood moorings, being reduced by around 0.2m/s. There will be no change to directional flow patterns in the area. Accordingly, this impact will be **insignificant**.

Presence of Dredging Plant

129. Dredging plant will present an increased risk of collision with recreational craft during the period of the dredge. With the existing use of Notices to Mariners, the effect of dredging on the recreational user community will be managed and the impact of this change is regarded to be **insignificant**.

130. After the capital dredge, the approach channel will require maintenance dredging, as currently, for short periods twice a year. With the existing use of Notices to Mariners, the effect of this dredging on the recreational user community will be managed and therefore the impact is considered to be **insignificant**.

Mitigation

131. With mitigation in place the residual effect will be reduced to **insignificant**.

Conclusion

132. The majority of the recreational community within Southampton Water and the wider Solent area are not expected to experience any impacts due to the works. The loss of moorings at Marchwood Yacht Club will be fully mitigated. The risks of collision and incidents are not expected to increase given that existing and continued management procedures implemented by the recreational clubs and ABP will be maintained.

Noise and Vibration (Chapter 16)

133. For the proposed works the baseline noise environment has been defined by reference to ambient noise surveys undertaken in August 2011 for the operational noise assessment for the Berth 201/202 development at the Port of Southampton and also by ambient noise surveys undertaken in June 2012, specifically for the present application. These measurements are summarised in this chapter and have been used to determine the current noise characteristics of locations potentially affected by the proposed dredge.

Impact Evaluation

134. Based on consultations with the 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 the proposed works.

Effects of Dredger Noise

135. Noise models of the dredging activities have been developed using previous noise test data for the two types of dredgers. The highest predicted noise level at any residential location is at Admiralty Quay, Marchwood, where a free field sound pressure level of 55 dB $L_{Aeq\ 1h}$ is predicted when a backhoe dredger is working at the most westerly point of the new side slope formation (where $L_{Aeq\ 1h}$ indicates the average noise level received over a one hour period). Noise from the TSHD is not predicted to be greater than 40 dB $L_{Aeq\ 1h}$ at any location. The noise models include the screening effects of some of the larger port buildings and these show that for much of the time during dredging operations these buildings will help to reduce noise levels in a direction towards some of the residential areas of Southampton. All noise predictions are calculated under meteorological conditions favourable for sound propagation. Received noise levels will less for other meteorological conditions.

136. The assessment of the predicted noise within the study area is generally **insignificant** to **minor adverse significant** with some limited **moderate adverse significant**, except in the vicinity of Admiralty Quay, Marchwood where the night-time noise impact, before mitigation, is considered to be of **major adverse significance** when the backhoe dredger is at the western extremity of the new side slope formation.

Mitigation

137. In order to mitigate the highest levels of noise from dredging operations it is proposed that side-slope formation at the western extremity of the works, using a backhoe dredger, will not be undertaken at night when meteorological conditions are favourable for sound propagation from the dredger in a direction towards Admiralty Quay, Marchwood, unless it can be demonstrated that the contracted dredger has significantly lower noise emission levels than the values used for the noise assessment.

Conclusion

138. It is concluded that with appropriate noise mitigation measures in place, the proposed works can be undertaken for the most part, with an impact that is **insignificant** to **minor adverse significant**, and only **moderate adverse significant** for limited periods of time.

Archaeology (Chapter 17)

139. The archaeological assessment was conducted by Wessex Archaeology on the behalf of ABP for 'area A2' (Western Docks) for the original SACD assessment and informed the archaeology assessment. It has been reviewed and approved by Wessex Archaeology.

140. Southampton Water is likely to have been subject to anthropogenic influences from the time of the earliest human occupation of Britain (c.700,000 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.

141. The study area extending from the container terminal to Dock Head has been the subject of a desk-based assessment for known and potential maritime archaeology and known and charted maritime losses, using information supplied by the UK Hydrographic Office, the National Monuments Record and county and local Historic Environment Records.

142. The study area was also subject to a meticulous Geotechnical and Geophysical survey using sidescan sonar, boomer and magnetometer techniques. In order to identify areas of prehistoric archaeological potential, sub-bottom and bathymetric surveys were conducted within the footprint of the proposed dredge. Borehole and vibrocores logs taken from in and around the proposed dredge area were also assessed for archaeological potential.

Potential Direct Impact due to Dredging Activity

143. The results of the assessment concluded that there are no anomalies in the study area. The potential impact of the proposed dredge on maritime archaeology in areas that have not been subject to previous dredging activities is considered to be **major adverse significant**. With the implementation of suitable mitigation measures, however, the overall impact of the scheme on these anomalies is likely to be **minor adverse significant**.

144. The impact of the proposed dredge on prehistoric sediments and any archaeological materials they may contain is considered to be **major adverse significant**. With the implementation of proposed mitigation measures, the overall impact of the proposed dredge is likely to be **minor adverse significant**.

Potential Indirect Impacts from Changes to Sedimentation Regime following Dredging

145. The physical processes assessment identified no significant changes to sedimentation patterns following the proposed dredge. The indirect impact of changes to sedimentation regime on archaeological features is considered **insignificant**.

Mitigation

146. The following measures are designed to mitigate the impact of the development area on sites with known and unknown archaeological potential:

- An archaeological assessment of a number of bulk sediment samples from locations and depths identified by the project archaeologist; and
- The implementation of a Finds Reporting Protocol during dredging operations to ensure that any archaeological discoveries are reported to Hampshire County Council and English Heritage by the dredging team.

147. It is proposed that these mitigation measures 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

148. The proposed mitigation measures aim to investigate the areas of highest likely archaeological potential. The overall impact of the proposed dredging upon archaeological remains, after mitigation, is assessed as low.

Socio-Economic Aspects (Chapter 18)

149. A review of Southampton's socio-economic baseline position indicates that the area is facing a number of socio-economic challenges including low economic activity rates, high levels of unemployment, weak business demographics and relatively high levels of multiple deprivation. Against this background, the Port of Southampton specifically, and the marine sector in general, are valuable economic assets and key drivers for the local and sub-regional economies.

150. The works are strategically aligned to the local, sub-regional and national policy context. The proposed works will be a critical private sector investment which will allow the Port to remain competitive and to continue to be a key driver of the local economy as well as a major employer. The Port's continued success is reliant on continuous investment to ensure that Southampton can continue to meet the evolving demands of seaborne world trade in what is a very competitive market.

151. If ABP is unable to proceed with the works, there is a serious danger that the Container Terminal will become increasingly marginalised, being unable to service its existing customers and consequently being unable to attract new business, thereby losing market share and risking the loss of several hundred local jobs. In the context of Southampton's challenging socio-economic indicators, this would be a serious issue for the local and sub-regional economies.

152. Based on the above, it is concluded that the proposed works would have an economic impact of **major beneficial significance** to the local economy and would be strategically aligned to the area's socio-economic priorities and national, sub-regional and local policy objectives.

Cumulative and In-Combination Effects (Chapter 19)

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

- Southampton Approach Channel Deepening;
- Berth 201/202 Redevelopment;
- Portsmouth Harbour Approach Dredge;
- Woolston, Redevelopment of Vosper Thorneycroft Site;
- Marchwood Marine Park;
- Cowes Breakwater and Marina Development;
- Lymington Breakwater;
- Lymington Wightlink Ferry;
- Lymington Recharge Schemes;

- Hythe Marine Park;
- Royal Pier/ Mayflower Park Development;
- Capital Dredge of Berths 206/207;
- ABP 204/205 Dredging Works;
- Solent Shoreline Management Plans (SMP); and
- Helius Biomass Generating Station.

154. On its own the proposed works have negligible impacts on the hydrodynamic and sediment regime of Southampton Water. However, a number of cumulative and/or in-combination effects on the hydrodynamic and sediment regime are predicted to occur, particularly as a result of the SACD. Mitigation compensatory measures for SACD are being discussed separately as part of that application. Assuming these measures are effective, the cumulative and in-combination effects will be reduced to **insignificant**.

155. During construction, 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 proposed works and Berth 201/202 construction activities should they occur at the same time. These impacts are assessed as **minor adverse significant**.

156. There is also the potential for a cumulative environmental noise impact on residents at Admiralty Quay to occur as a result of the proposed works and Berth 201/ 202 construction activities. This impact arises as a result of the percussive piling activities proposed for Berth 201/202. It is predicted that there will be no additive effect of dredging noise from the proposed works during the day time and which is considered to be **insignificant**. During the evening period, there could be a small additive effect of 1–2 dB on overall noise levels at Admiralty Quay, assuming the dredging is taking place at the nearest point of the side slopes to Admiralty Quay. This is not assessed to be significant. Without mitigation measures, the resultant night time impact at Admiralty Quay properties is assessed to be of **major adverse significance** if the backhoe dredger was undertaking side slope works at the western extremity of the proposed works and under conditions favourable for sound propagation from the dredger to the properties. Night-time side slope working will not be undertaken at the western end of the works particularly for downwind or calm weather conditions unless it can be demonstrated that the noise impact would be acceptable for the actual dredger contracted for the works.

Summary of Impacts and Mitigation (Chapter 20)

157. In addition to optimising the 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.

158. 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 Tower Deposit Ground.

- **Minimising risk of water quality impacts during dredging:** An adaptive management strategy will be established and agreed with the Environment Agency for implementation if the dredge extends beyond end-March, based around monitoring of suspended sediment concentrations and dissolved oxygen, to ensure that the sediment releases 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 migratory salmon. It is proposed to establish fixed monitoring sites at strategic locations in relation to the proposed dredge works. At each location, dissolved oxygen levels and turbidity will be monitored at frequent and regular intervals. Caution and Stop thresholds will be established which will trigger, respectively, a methodology review or cessation of dredging operations.

- **Measures to manage commercial navigation during dredging:** The following best practice management procedures will be followed and controlled by Vessel Traffic Service (VTS) during the dredging works to maintain a high level of navigational safety and to avoid and/or minimise disruption to existing users.
  - Co-ordination of the dredging activity by VTS. If necessary, the dredger will be instructed to relocate to allow vessels to pass safely;
  - 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;
  - Prior to dredging activities, a 'Notice to Mariners' will be issued. These will give instructions on how to pass the dredger, details of speed restrictions and other guidance.

- **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;
  - Navigation marks will be repositioned to mark the new channel alignment with the new buoy positions and will be passed to the UK Hydrographic Office for subsequent chart updates; and
  - Port user navigational guidelines will be updated to reflect new operating parameters and procedures.

- **Control measures to manage recreational navigation during dredging works**:
  - The existing moorings at Marchwood Yacht Club will be relocated;
  - Notices to Mariners will be issued by the Harbour Master's department during the dredging works to advise all users;
  - Direct liaison with Marchwood Yacht Club and Eling Sailing Club will be undertaken; 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**:
  - The existing moorings at Marchwood Yacht Club will be relocated.

- **Measures to reduce noise disturbance during dredging:** Measures to reduce disturbance from construction noise will be established and agreed with the Environmental Health Officers of Southampton City Council and New Forest District Council (see Chapter 16), including:
  - Where necessary, exclusion zones will be set up in the Admiralty Quay area to limit dredger noise at certain times;
  - Consideration into 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 offset potential impact to features of marine archaeological interest:** Mitigation measures will be detailed in a Written Scheme of Investigation (WSI) prior to dredging, 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. A specification for the following archaeological impact reduction measures will be established:
  - A programme of bulk sampling, the exact nature of which will be set out in the WSI, will be undertaken during the dredging programme; 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 21)

159. The Marchwood Widening Works are required to address pressing navigational safety when large vessels are visiting the Port. The proposed capital dredge will increase the width of the channel enabling container vessels entering or departing the Western Docks to maintain an increased distance from passenger vessels berthed at the Mayflower Cruise Terminal. The dredge methodology has been selected with a view to avoiding and/or minimising environmental impacts where possible. The assessment has shown that in most cases the impacts will be **insignificant** or **minor adverse significant** 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.