

## **22 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES**

Table 22.1 provides an overall summary of the findings of the ES and lists the potential environmental impacts that are predicted to arise during the construction and operational phases of the proposed development, including the disposal of dredged material.

The significance of each of the potential impacts (or change or risk) is stated, along with any mitigation measures that are recommended to reduce or avoid adverse impacts. The residual impact (i.e. the significance of the potential impact remaining following mitigation) is also stated.

Table 22-1 Summary of Potential Impacts, Impact Significance, Mitigation Measures and Residual Impacts

Impact	Significance	Mitigation	Residual impact
<b>HYDRODYNAMICS AND SEDIMENTARY REGIME</b>			
<b>Construction</b>			
Change to suspended sediment concentrations during capital dredging	Minor change around the dredger (50mg/l) to negligible change with distance from the dredger (3-5mg/l)	None required	Minor
Change to sediment deposition due to capital dredging	Minor change (1.7mm) to negligible change (0.5mm)	None required	Minor – negligible
Change to suspended sediment concentrations due to disposal of clean dredged material at sea	Minor change (20mg/l)	None required	Minor
Change to sediment deposition due to disposal of clean dredged material at sea	Moderate change (up to 0.5m) within disposal site, minor change (0.05m) within 1 km of the disposal site, negligible change (<0.005m) beyond 1km of the disposal site	None required	Moderate – negligible
<b>Operational</b>			
Change to wave conditions	Minor change (<0.2m) at a few sites (mainly in the docks) under certain conditions and negligible change elsewhere	None required	Minor – negligible
Change to tidal conditions	Negligible change	None required	Negligible
Change to mud transport conditions	Negligible change (610m <sup>3</sup> /yr)	None required	Negligible
Change to sand transport conditions	Negligible change (20m <sup>3</sup> /yr)	None required	Negligible
Change to coastal processes	Negligible change at Falmouth Docks, Kiln Quay and Trefusis. No change at Gyllyngvase and Castle Beaches, Castle Headland, Port Pendennis Marina, the National Maritime Museum, Discovery Quay, Custom House Quay, Visitors Yacht Haven, Fish Strand Quay, Prince of Wales Pier, Admirals Quay, Greenbank Quay and Flushing	None required	Negligible - no change

Impact	Significance	Mitigation	Residual impact
<b>Sediment quality</b>			
<b>Construction</b>			
Impact on sediment quality in the new navigation channel due to capital dredging	Minor adverse impact physically, moderate to major beneficial impact chemically and toxicologically, negligible biologically	None required	Minor adverse physically, moderate to major beneficial impact chemically and toxicologically, negligible biologically
Impact on sediment quality beyond the new navigation channel due to capital dredging	Negligible impact physically, chemically and toxicologically and no impact biologically	None required	Negligible physically, chemically and toxicologically and no impact biologically
Impact on sediment quality due to disposal of dredged material	Minor adverse impact physically, negligible impact chemically, biological and toxicologically	None required	Minor adverse physically, negligible chemically, biological and toxicologically
<b>Operational</b>			
Impact on sediment quality in the new navigation channel after capital dredging	Negligible impact physically, chemically, biologically and toxicologically	None required	Negligible
<b>Water quality</b>			
<b>Construction</b>			
Impact on dangerous substances water quality due to capital dredging - TBT	Moderate adverse impact for TBT, negligible for other contaminants	None required	Moderate adverse - negligible
Impact on shellfish water quality due to capital dredging	Minor - moderate adverse impact for TSS in Carrick Roads and Penryn shellfish waters, negligible impact for other contaminants in Carrick Roads and Penryn shellfish waters, no impact in Percuil shellfish water	None required	Minor - moderate adverse (TSS) and negligible (other contaminants) in Carrick Roads and Penryn River and no impact in Percuil River
Impact on bathing water quality due to capital dredging	No impact	None required	No impact
Impact on water quality due to	Not applicable – risk, not impact	Oil spill planning and	Not applicable – risk, not impact

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
accidental spills and leaks during construction		pollution prevention guidance	
<b>Operational</b>			
Impact on dangerous substances water quality due to capital dredging	Moderate beneficial impact due to removal of contaminants, especially TBT	None required	Moderate beneficial
Impact on water quality due to wastewater from cruise vessels	No impact due to international law on ship waste management	None required	No impact
<b>MARINE AND COASTAL ECOLOGY</b>			
<b>Construction</b>			
Loss of maerl in the proposed new navigation channel due to capital dredging	Major adverse impact from removal of viable maerl habitat	Seabed habitat mitigation is proposed in order to replace viable maerl habitat, this will offset any net loss of maerl habitat as a result of the dredge.	Moderate adverse
Loss of benthic communities in the proposed new navigation channel due to capital dredging	Moderate adverse impact as a result of the loss of benthic communities	See above	Minor adverse
Physical impacts to benthic fauna from increased TSS concentrations due to capital dredging	Minor adverse impact on benthic communities from increased TSS from dredging	None required	Minor adverse
Physical impacts to benthic fauna from increased sediment deposition due to capital dredging	Minor adverse impact on benthic fauna	None required	Minor adverse
Chemical impacts on benthic fauna from increased contaminant concentrations in the sediment due to capital dredging	Minor adverse impact	None required	Minor adverse
Impacts on benthic ecology due to	Negligible impact	None required	Negligible

Impact	Significance	Mitigation	Residual impact
wharf improvements			
Impacts on intertidal ecology due to coastal erosion protection	Minor adverse impact	None required	Minor adverse
Physical impact on benthic fauna from sediment deposition due to the disposal of dredged material	Minor adverse impact	None required	Minor adverse
<b>Operational</b>			
Impacts to marine ecology from changes to hydrodynamics and sediment transport due to the new navigation channel	Minor adverse impact	None required, however monitoring is proposed to ensure that there are no unanticipated impacts	Minor adverse
<b>ORNITHOLOGY</b>			
<b>Construction</b>			
Temporary loss of breeding and foraging habitat due to construction	Negligible	None required	Negligible
Noise disturbance from construction activities	Negligible	None required	Negligible
Light disturbance from construction activities	Negligible	None required	Negligible
<b>Operational</b>			
Disturbance to feeding and roosting waterbirds due to increased shipping activity	Negligible	None required	Negligible
<b>TERRESTRIAL ECOLOGY</b>			
<b>Construction</b>			
None predicted			
<b>Operational</b>			
None predicted			
<b>FISHING AND SHELLFISH RESOURCES</b>			

Impact	Significance	Mitigation	Residual impact
<b>Construction</b>			
Physical impacts to shellfish from increased TSS concentrations due to capital dredging	Minor adverse at the nearest point of the Truro oyster beds, when dredging near Carrick Roads	None required	Minor adverse
Physical impacts to finfish from increased TSS concentrations due to capital dredging	Negligible	None required	Negligible
Physical impacts to shellfish from increased sediment deposition due to capital dredging	Minor adverse	None required	Minor adverse
Physical impacts to finfish from increased sediment deposition due to capital dredging	Negligible	None required	Negligible
Chemical impacts to shellfish from increased contaminant concentrations in the water due to capital dredging	Minor adverse for TBT but not other contaminants	None required	Minor adverse
Chemical impacts to shellfish from increased contaminant concentrations in the sediment due to capital dredging	No impact	None required	No impact
Chemical impacts to finfish from increased contaminant concentrations in the water due to capital dredging	Minor adverse	None required	Minor adverse
Physical impacts to shellfish and finfish from sediment deposition due to disposal of dredged material	Minor adverse due to most sediment depositing within the disposal site	None required	Minor adverse
Impacts to fish and shellfish from direct uptake by dredgers	Negligible	None required	Negligible
<b>Operational</b>			
Impacts to shellfish resulting from changes in hydrodynamic regime due	Negligible	None required	Negligible

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
to the new navigation channel			
<b>COMMERCIAL FISHERIES AND SHELLFISHERIES</b>			
<b>Construction</b>			
Potential impact on fishing gear and fishing activity due to capital dredging and the disposal of dredged material	Minor adverse impact on fishing activity immediately adjacent to the disposal site, negligible impact on fishing activity in the Fal Estuary and on fishing gear deployed in Falmouth bay and the Fal Estuary	Extra publicising of works prior to works through media and during work through VHF broadcasts, creation of a dedicated sailing route and deposition zone for works, FHC to revise its Policy on the Deployment of Fishing Equipment within Falmouth Harbour Area	Negligible
Potential impact on commercial fisheries from increased chemical contaminant concentrations due to capital dredging	Minor adverse impact on the Truro oyster fishery from increases in TBT concentrations	None required	Minor adverse
Potential impact on oyster depuration from increased chemical contaminant concentrations due to capital dredging	Minor adverse impact	If the lease is maintained and Falmouth Bay Oysters continue to operate at the site, it may be necessary for the authorities monitoring programme to be extended to cover TBT concentrations.	Minor adverse
<b>Operational</b>			
None predicted			
<b>MARINE MAMMALS</b>			
<b>Construction</b>			
Impact of noise disturbance to marine	Temporary moderate adverse impact on marine	Soft start and/or a MMO,	Minor adverse impact

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
mammals	mammals in the immediate vicinity of piling works at Falmouth Docks	subject to consultation and agreement with relevant agencies	
Impact on marine mammals from increased chemical contaminant concentrations in the water due to capital dredging	Temporary minor adverse impact	None proposed	Minor adverse impact
Potential collision risk due to increased construction vessel numbers	Low to moderate risk	Speed restrictions, subject to consultation and agreement with relevant agencies	Low risk
<b>Operational</b>			
Potential collision risk due to increased cruise vessel numbers	Low risk	None proposed	Low risk
<b>NAVIGATION AND RECREATION</b>			
<b>Construction</b>			
Impact on commercial navigation due to construction in the water	Negligible	None required	Negligible
Impact on general recreation due to construction in the water	No impact on marinas, leisure mooring areas and designated zones for water-skiing, bathing and water sports	None required	No impact
Impact on diving due to construction in the water	Moderate adverse impact on diver safety and recreational diving activities	Extra publicising of works prior to works through media and during work through VHF broadcasts, creation of a dedicated sailing route and deposition zone for works, FHC to revise its protocol for recreational diving in the Falmouth Harbour and Bay	Minor adverse

Impact	Significance	Mitigation	Residual impact
Impact on angling due to construction in the water	Minor adverse impact on angler safety and recreational diving activities	Extra publicising of works prior to works through media and during work through VHF broadcasts, creation of a dedicated sailing route and deposition zone for works, FHC to revise its Policy on the Deployment of Fishing Equipment within Falmouth Harbour Area	Negligible
<b>Operational</b>			
Impact on commercial and recreational navigation due to the cruise vessel movements	Negligible	None required	Negligible
<b>ARCHEOLOGY AND HERITAGE</b>			
<b>Construction</b>			
Changes to the Northern Wharf and Queens Wharf due to wharf improvements	Minor adverse impact due to demolition and disturbance to the Northern Wharf's structures	Photographic record of the Northern Wharf	Negligible
Disturbance to wrecks and wreckage due to capital dredging	Potential major adverse impact due to disturbance of features and wreckage	Archaeological Protocol and Written Scheme of Investigation including an archaeological watching brief and a system for recording finds	No impact
Dredging disturbance to prehistoric landsurfaces	Minor - major adverse impact due to loss of sequence record	Archaeological Protocol and Written Scheme of Investigation including a long vibrocore and full	Minor - moderate beneficial

Impact	Significance	Mitigation	Residual impact
Disturbance to prehistoric landsurfaces due to disposal of dredged material at sea	Potential moderate adverse impact due to wreck damage	archaeological analysis and dating Under the WSI identified earlier, the condition of wreck 17502 should be verified, and following discussion with English Heritage, a possible exclusion zone for dumping of dredged material may be defined.	Negligible
<b>Operational</b>			
Change to the visual setting of scheduled monuments due wharf improvements	Negligible impact	None required	Negligible
Change to the historic landscape character due to the wharf improvements	Minor beneficial	Minor beneficial	Minor beneficial
<b>TRAFFIC</b>			
<b>Construction</b>			
Changes to traffic flows on the local road network during construction	Moderate adverse impact on the docks estate's road network	Conduct TA, derive and adopt suitable mitigation measures	Minor adverse
Changes to traffic flows within Falmouth Docks during construction	Moderate adverse impact on the local road network	Conduct TA, derive and adopt suitable mitigation measures	Minor adverse
<b>Operational</b>			

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
Changes to traffic flows due to day calls	Moderate adverse impact on the local road network	Conduct TA, derive and adopt suitable mitigation measures	Minor adverse
Changes to traffic flows due to turnaround calls	Minor adverse impact on the local road network	Conduct TA, derive and adopt suitable mitigation measures	Minor adverse
<b>NOISE AND VIBRATION</b>			
<b>Construction</b>			
Disturbance due to on-site construction noise	Moderate adverse impact on Falmouth receptors and potential major adverse impact on Trefusis receptors due to piling works, and no impact due to other construction works	Agreement with the local Environmental Health Department including hours of working and construction methods, including piling. General application of the principles of Best Practicable Means (BPM), as defined in BS 5228 and The Control of Pollution Act 1974. Community liaison	Minor – moderate adverse during piling works
Disturbance due to construction traffic	Moderate adverse impact on site, particularly to receptors at the Maritime Apartments. Moderate or major adverse impact off site, particularly to receptors along haul routes	On site: maintain surface of haul road in good condition to prevent adverse noise caused by vehicle jolting over surface irregularities. Ensure low speed within the site. Community liaison Off site: conduct TA and produce and mitigation measures accordingly	Minor adverse
<b>Operational</b>			

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
Disturbance due to cruise vessels	Moderate beneficial impact due to berthed vessels	None required	Moderate beneficial
Disturbance due quay operations	Minor to moderate adverse impact	Guidance on the use of PA systems	Minor adverse
Disturbance due to traffic	Moderate adverse impact as a result of extra vehicle movements	Conduct TA and produce and mitigation measures accordingly	Minor adverse
<b>AIR QUALITY</b>			
<b>Construction</b>			
Impact on air quality during construction	Moderate adverse impact from dust emissions on sensitive receptors	Environmental management plan	Minor adverse
<b>Operational</b>			
Emission of pollutants due to increased sizes and numbers of vessels	Minor adverse impact due to more vessel calls and larger engines	None required	Minor adverse
Emission of pollutants due to increased road traffic	Moderate adverse impact on nearby sensitive residential receptors	Conduct TA, refine the impact assessment, and, if necessary, to derive suitable mitigation measures	Minor adverse
<b>LANDSCAPE AND VISUAL SETTING</b>			
<b>Construction</b>			
Impacts to landscape designation	Major adverse impact during works on Cornwall AONB and South West Coast Path National Trail	None required	Major adverse
Impacts to landscape character	No impact	None required	No impact
Impacts to landscape elements and features	No impact	None required	No impact
Visual impacts as a result of the construction of the project	Various moderate to major adverse impacts depending on location of the visual receptor	Minimise the duration of the works as far as possible	Moderate to major adverse
<b>Operational</b>			
Changes to landscape and visual interests due to cruise vessels	Major beneficial impact when design vessel is berthed and no impact when sailing or berthing	None required	Major beneficial and no impact

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
Changes to landscape character due to landside development	No impact	None required	No impact
Changes to landscape elements and features due to landside development	Minor adverse impact from loss of vegetation on the AONB	Replacement planting	Negligible
Changes to visual interests due to land-side development	moderate to major impact on a number of visual receptors in the area, adverse or beneficial dependant on subjective point of view	Sympathetic choice of materials. Terminal design in line with other marine development in the area.	Moderate to major adverse / beneficial
<b>SOIL QUALITY AND GEOLOGY</b>			
<b>Construction</b>			
Impact to human health – site workers	Medium adverse risk	Various risk management actions	Low adverse
Impact to shallow perched groundwater	Medium adverse risk	Various risk management actions	Low adverse
Impact to deep groundwater	Medium adverse risk	Various risk management actions	Low adverse
Impact to surface water	Medium to high adverse risk	Various risk management actions	Low adverse
Impact to neighbouring properties and land use	Low adverse risk	Various risk management actions	Low adverse
Impact to ecological receptors	Medium adverse risk	Various risk management actions	Low adverse
Impacts to buildings and structures	Medium adverse risk	Various risk management actions	Low adverse
<b>Operation</b>			
Impact to human health – site workers	Medium adverse risk	Various risk management actions	Low adverse

<b>Impact</b>	<b>Significance</b>	<b>Mitigation</b>	<b>Residual impact</b>
Impact to shallow perched groundwater	Medium adverse risk	Various risk management actions	Low adverse
Impact to deep groundwater	Medium adverse risk	Various risk management actions	Low adverse
Impact to surface water	Medium to high adverse risk	Various risk management actions	Low adverse
Impact to neighbouring properties and land use	Low adverse risk	Various risk management actions	Low adverse
Impact to ecological receptors	Medium adverse risk	Various risk management actions	Low adverse
Impacts to buildings and structures	Medium adverse risk	Various risk management actions	Low adverse
<b>SOCIO-ECONOMIC</b>			
<b>Construction</b>			
Increased local employment through construction	Moderate beneficial impact	None required	Moderate beneficial
<b>Operational</b>			
Additional direct revenue to port based businesses from cruise ships	Minor beneficial	None required	Minor beneficial
Additional spend by cruise passengers and crew	Moderate beneficial	None required	Moderate beneficial
Additional employment by A&P Falmouth and other port related businesses	Moderate beneficial	None required	Moderate beneficial