AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement - Volume 3 - Appendix 7.1 Marine Water Framework Directive Assessment

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APPENDIX 7.1 MARINE WFD ASSESSMENT

1.1 INTRODUCTION

1.1.1.1 This Marine Water Framework Directive ('WFD') assessment (from here on referred to as the WFD assessment) has been prepared on behalf of AQUIND Limited in order to support an application to install and operate the AQUIND Interconnector between the UK and France. This appendix should be read in conjunction with Chapter 7 (Marine Water and Sediment Quality) of the Environmental Statement ('ES') Volume 1 (document reference 6.1.7), Chapter 6 (Physical Processes) of the ES Volume 1 (document reference 6.1.6) and Appendix 6.2 (Modelling Technical Report) of the ES Volume 3 (document reference 6.3.6.2). Chapter 3 (Description of the Proposed Development) of the ES Volume 1 (document reference 6.1.3) has informed this assessment.

1.1.1.2 A draft WFD assessment was consulted upon with the Environment Agency ('EA') who provided feedback on 26 and 30 September 2019. Section 7.3.3. of Chapter 7 (Marine Water and Sediment Quality) provides further details.

1.1.1.3 For the purposes of assessment, the Landfall and Marine Cable Corridor within the United Kingdom ('UK') Marine Area comprise the Proposed Development.

1.1.1.4 The Marine Cable Corridor encompasses the location of the Landfall and extends from Mean High Water Springs ('MHWS') at Eastney, out to the UK/France Exclusive Economic Zone ('EEZ') Boundary Line (see Figure 3.1. of the ES Volume 2 (document reference 6.2.3.1) of Chapter 3 (Description of the Proposed Development)). The Marine Cable Corridor is 500 m wide in water depths up to 10 m and then widens to 520 m in water depths > 10 m out to the UK/France EEZ Boundary Line.

1.1.1.5 The Marine Cables will make Landfall through the use of Horizontal Directional Drilling ('HDD') methods which will travel underneath the intertidal areas at Eastney from an exit/entry point in the marine environment beyond 1 km (between Kilometre Point (KP)1 – KP1.6) seaward from the Transition Joint Bays ('TJBs') located in the car park behind Fraser Range (Figure 3.3 of the ES Volume 2 (document reference 6.2.3.3) in Chapter 3 (Description of the Proposed Development)). HDD is also proposed to be undertaken at Langstone Harbour to enable the cables to cross underneath Langstone Harbour from Portsea Island to the mainland (see Figure 3.9 (Section 7 on the map) of the ES Volume 2 (document reference 6.2.3.9) of Chapter 3 (Description of the Proposed Development)). It is anticipated that no HDD works will occur within the marine environment of Langstone Harbour as the drilling will be underneath the seabed of the harbour area, with the entry and exit points of the drill located above the MHWS mark. It has been agreed with the Marine Management

Organisation ('MMO') (via email on 4 June 2019) that this is considered to be an exempt activity that does not require a marine licence, subject to the conditions of Article 35 of Marine Licensing (Exempted Activities) Order 2011 (as amended).

1.1.1.6 This WFD assessment is in relation to the Proposed Development and its possible effects on the marine environment in UK Marine Area, within the jurisdiction of the WFD (i.e. within 1 nautical mile ('nmi'); see Figure 1). Terrestrial water bodies have been assessed separately and are presented as an appendix to Chapter 20 (Surface Water Resources and Flood Risk) of the ES Volume 1 (document reference 6.1.20).

1.1.1.7 The European Union ('EU') Water Framework Directive (Directive 2000/60/EC) came into force in 2000. The goal of the WFD is to protect and enhance all inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters to one nmi and groundwater in order to reach or maintain 'good' status.

1.1.1.8 To facilitate this, the UK has established river basin districts ('RBD's), each of which has been subdivided into management catchments, operational catchments and water bodies. For each district, a River Basin Management Plan ('RBMP') was produced to establish the ecological and chemical status of each water body and to set objectives for each to achieve good status by 2015, under Article 4(1) of the WFD. Where this goal was not achieved, new objectives have been set with a deadline extension to 2021 or 2027. In all cases, there should be no deterioration in status. Implementation of the WFD is under the control of the EA.

1.1.1.9 The purpose of a WFD assessment is to determine the potential impact an activity may have on any immediate or linked water bodies, and whether or not it complies with relevant RBMPs.

1.2 WFD ASSESSMENT METHODOLOGY

1.2.1.1 The assessment methodology used here is based on guidance provided by the EA: 'Clearing the Waters for All' (EA, 2017) and the Planning Inspectorate ('PINS') Advice Note 18: The Water Framework Directive (PINS, 2017). The EA's guidance was originally published in 2016 and revised in 2017. It outlines a three-stage process to WFD assessment as follows:

1.2.2 STAGE 1 SCREENING

1.2.2.1 Screening is required to identify projects / activities which have the potential to result in deterioration of a water body or fail to comply with the objectives of that water body. Screening also serves to identify which project activities (e.g. proposed construction methods) are required to be taken through to scoping, and which activities do not have the potential to result in the deterioration of the water body.

1°15.000'W 1°0.000'W 0°45.000'W

50°48.000'N

50°42.000'N

50°36.000'N

N

a. b. c. d. e.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

0 2.5 5 7.5 10 km

Coordinate system: WGS 84 UTM 30N
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Not to be used for navigation.

AQUIND Interconnector
- Marine Cable Corridor
- WFD Zone of Influence (ZoI)
- 1 kilometer point along the Marine Cable Corridor

WFD waterbody
- Isle of Wight East
- Langstone Harbour
- Portsmouth Harbour
- Solent
- Sussex

Shellfish water
- Langstone harbour
- Ryde
- Spithead and Stokes bay

Geophysical interpretation EUNIS code and description
- A5.14 - Circalittoral coarse sediment
- A5.23 - Infralittoral fine sediment
- A5.43 - Infralittoral mixed sediment

- Chichester and Langstone Harbours Ramsar & Special Area of Protection (SPA)
- Solent and Dorset Coast potential SPA
- Solent Maritime Special Area of Conservation (SAC)
- South Wight Maritime SAC

Bathing water
a. Southsea East
b. Eastney
c. Beachlands West
d. Beachlands Central
e. Eastoke

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

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1.2.3 STAGE 2 SCOPING

1.2.3.1 Scoping is required in order to identify risks to receptors from the Proposed Development's activities, based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each water body). Potential risks to hydromorphology, biology (habitats and fish), water quality, WFD protected areas and invasive non-native species ('INNS') should be assessed. These are then considered against specific criteria provided by the EA (2017) by means of the recommended scoping template. The scoping stage will assess if elements identified during screening will have a significant non-temporary effect on the status of WFD quality elements.

1.2.4 STAGE 3 IMPACT ASSESSMENT

1.2.4.1 Where assessment has been considered necessary at scoping stage, an impact assessment is carried out for each receptor identified as being at risk as a result of proposed activities in terms of potential deterioration or non-compliance with its specific objectives as set out in the RBMP. Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the project would need to be assessed in the context of Article 4(7) of the WFD.

1.3 WATER BODY CLASSIFICATIONS

1.3.1.1 England and Wales are divided into eight RBMPs which include estuarine and coastal catchments (Defra & EA, 2019). These are broken down into management and operational catchments, which are in turn classified into discrete water bodies. There are two WFD classifications for water bodies: ecological and chemical. For a water body to obtain overall 'good' status, it has to have 'good' status in both categories.

1.3.1.2 Where the cost to achieve 'good' status would be disproportionate, the deadline for achieving the objective can be extended or a less stringent target can be set (Royal Haskoning Ltd, 2013). Such objective setting decisions are part of the river basin management planning process. Status information for each water body is provided by the EA via the Catchment Data Explorer (EA, 2019a).

1.3.1.3 Ecological status is recorded on the scale of 'high', 'good', 'moderate', 'poor' or 'bad'. 'High' denotes largely undisturbed conditions and the other classes represent increasing deviation from this natural condition. The ecological status classification for the water body is determined from the worst scoring quality element. This means that the condition of a single quality element can cause a water body to fail to reach its WFD classification objectives.

1.3.1.4 Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the European Commission ('EC') Environmental Quality

Standards Directive ('EQSD') (2008/105/EC) (EA, 2016). These chemicals include priority substances, priority hazardous substances, and eight other pollutants carried over from the substance-specific directives (widely known as the Dangerous Substance Daughter Directives). Chemical status is recorded as 'good' or 'fail'. The chemical status classification for the water body is determined by the worst scoring chemical.

1.3.1.5 WFD receptors against which water bodies are assessed are:

- Hydromorphology;
- Biology (habitats and fish);
- Water quality;
- Protected areas; and
- INNS.

1.3.2 HYDROMORPHOLOGY

1.3.2.1 Hydromorphology is a physical characteristic which supports biological elements. Where the hydromorphology of a surface water body has been significantly altered for anthropogenic purposes (e.g. navigation), it can be designated as an Artificial or Heavily Modified Water Body ('A/HMWB'). An alternative environmental objective, good ecological potential ('GEP') applies in these cases (Royal Haskoning Ltd, 2008). The maximum classification an A/HMWB can achieve is 'good and above' (European Communities Working Group 2A, 2005).

1.3.3 BIOLOGY – HABITATS

1.3.3.1 An assessment should be undertaken where the footprint of the activity is:

- 0.5 km² or larger;
- 1% or more of the water body's area;
- within 500 m of any higher sensitivity habitat; or
- 1% or more of any lower sensitivity habitat.

1.3.3.2 As per EA (2017) guidance, benthic habitats are divided into higher sensitivity and lower sensitivity habitats and are listed in Table 1.

Table 1 – Habitat sensitivity as defined by WFD guidance (EA, 2017)

Higher Sensitivity	Lower Sensitivity
Chalk reef	Cobbles, gravel and shingle
Clam, cockle and oyster beds	Intertidal soft sediments like sand and mud
Intertidal seagrass	Rocky shore
Maerl	Subtidal boulder fields

Higher Sensitivity	Lower Sensitivity
Mussel beds, including blue and horse mussel	Subtidal rocky reef
Polychaete reef	Subtidal soft sediments
Saltmarsh	
Subtidal kelp beds	
Subtidal seagrass	

1.3.4 BIOLOGY - FISH

1.3.4.1 Fish species should be considered if activities:

- are in an estuary,
- are outside an estuary but could delay or prevent fish from entering an estuary; or
- could affect fish migration through an estuary to freshwater.

1.3.5 WATER QUALITY

1.3.5.1 Water quality encompasses the chemical status of the water body, but also clarity, temperature, salinity, oxygen levels, nutrients and microbial patterns. Water quality should be considered as a receptor if activities:

- could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days);
- are in a water body with a phytoplankton status of moderate, poor or bad; or
- are in a water body with a history of harmful algae.

1.3.6 WFD PROTECTED AREAS

1.3.6.1 WFD protected areas encompass sites protected under Natura 2000 (i.e. Special Areas of Conservation ('SACs') and Special Protection Areas ('SPAs'), bathing waters, shellfish waters and nutrient sensitive areas ('NSAs'). Ramsar sites should also be considered in line with advice from Natural England('NE')'s designated sites database (NE, 2019). Guidance stipulates that WFD protected areas located within 2 km of the proposed activity must be identified (EA, 2017). It also acknowledges that the footprint of an activity may be extended as a result of temperature or sediment plume, and for dredging activity, a footprint is considered to be 1.5 times the dredge area.

Natura 2000

1.3.6.2 Natura 2000 is a network of nature protection areas in the territory of the European Union. It is made up of SACs and SPAs designated respectively under the Habitats

Directive and Birds Directive. SACs and SPAs are designated under the EC Birds Directive and Habitats Directive. The overall objective for protected areas under WFD is to "*protect and, where necessary, improve the water or water-dependent environment to the extent necessary to maintain at or improve to Favourable Conservation Status the water-dependent habitats and species for which the Protected Area is designated*" (EA, 2009). Where a site is also a Ramsar site, any additional management requirements should also be included.

1.3.6.3 SACs and SPAs with connectivity to the Proposed Development are assessed as part of the Habitats Regulations Assessment ('HRA') process, which was used to inform this WFD assessment (HRA Report: document reference 6.8.1).

Bathing waters

1.3.6.4 Bathing waters are designated around the coast of England under the Bathing Waters Directive (2006/7/EC), and are monitored by the EA. The Bathing Waters Directive aims to improve the quality of bathing waters by monitoring the presence of faecal indicator organisms and taking such measures as to reduce the presence of these organisms. The Bathing Waters Directive is complimentary to the WFD, and protection of Bathing Waters has been subsumed into the WFD. Nevertheless, reporting and public information is still in operation under the Bathing Waters Directive.

1.3.6.5 The EA takes up to twenty water samples at each designated bathing waters each year during the bathing water season (May – September) and test each sample for specific bacteria - Escherichia coli (*E. coli*) and Intestinal enterococci. A classification for each bathing waters is calculated annually based on samples from the previous four years. These four classifications range from 'excellent' (the cleanest seas) to 'poor' (water has not met the minimum standards). This information is provided by the EA via an online database (EA, 2019b).

Shellfish waters

1.3.6.6 Shellfish waters are designated and protected under the WFD after the subsumption (by the WFD) and repeal of the Shellfish Waters Directive (2006/113/EC) in 2013. The aim of the Shellfish Waters Directive was to "protect and, where needed, improve the quality of shellfish waters in order to support shellfish (bivalve and gastropod molluscs) life and growth, and thus contribute to the high quality of shellfish products directly edible by man" (EA, 2009). It was designed to protect the aquatic habitat of bivalve and gastropod molluscs, which include oysters, mussels, cockles, scallops and clams. Management of these sites is concerned with monitoring and regulating for the presence of faecal indicator species and taking such measures as to reduce the presence of these organisms (to <300 *E.coli*/100ml in the shellfish flesh and intravalvular fluid). Public information on the status of

Shellfish Waters is provided by Centre for Environment, Fisheries, and Aquaculture and Science ('Cefas').

Nutrient sensitive areas

1.3.6.7 Nutrient sensitive areas ('NSA') comprise nitrate vulnerable zones ('NVZs') and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as NSAs under the Urban Waste Water Treatment Directive (91/271/EEC). NSAs are managed via measures applied to terrestrial sources (e.g. sewage treatment and agricultural practices), and therefore are not considered further within this WFD assessment.

1.3.7 INVASIVE NON-NATIVE SPECIES

1.3.7.1 The introduction and spread of INNS can occur directly through the release of individuals of INNS species into the environment via activities, e.g. through release of ballast water (Ware, 2009), on the hull of ships even if recently cleaned or anti-fouled (International Maritime Organisation ('IMO'), 2012; Davidson *et al*., 2010), or indirectly by creating opportunities for organisms to settle or spread (e.g. habitat creation or disturbance), thereby allowing for them to out-compete native species. Therefore, activities should be considered where

- materials or equipment that have come from, have been used in or travelled through other water bodies; or
- activities that help spread existing INNS, either within the immediate water body or to other water bodies.

1.3.8 MEASURES TO ACHIEVE THE ENVIRONMENTAL OBJECTIVES

1.3.8.1 For each RBD, a programme of measures has been drawn up to enable the achievement of objectives of the RBMP. These include:

- Current measures;
- Measures to enable improvements by 2021; and
- Additional measures identified to achieve objectives beyond 2021.

1.3.8.2 These are integrated with measures for protected areas via site specific action plans. Current measures include:

- Physical Modifications (e.g. avigation, flood risk management, fishing, and other recreational activities);
- Managing pollution from waste water;
- Managing pollution from towns, cities and transport;
- Changes to natural flow and levels of water;
- Managing INNS; and
- Manage pollution from rural areas.

1.3.8.3 These are managed through the application of relevant legislation, policy and guidance by regulators and operators, as well as future planning, joint planning and coordination between regulators and operators. Additional measures include improved flood resilience, climate change adaptation, increased biodiversity and social cohesion.

1.4 DATA SOURCES

1.4.1.1 Information used to inform this WFD assessment has been obtained from a number of site-specific studies and online resources (Table 2).

Table 2 – Data sources

Organisation	Data type	Details
Natural Power Consultants	Benthic and intertidal survey	Site specific benthic and intertidal survey (Chapter 8 (Intertidal and Benthic Habitats) of the ES Volume 1 (document reference 6.1.8) and associated appendices)
Natural Power Consultants	Contaminated Sediment survey	Site specific contaminated sediment analysis (Appendix 7.3 (Contaminated Sediment Survey Report) of the ES Volume 3 (document reference 6.3.7.3))
Partrac Ltd.	AQUIND Physical Processes assessment	Assessment of potential effects on physical processes (Chapter 6 (Physical Processes) and associated appendices).
Defra and EA	South East RBMP	Status and management objectives for the South East South East Transitional and Coastal ('TraC') (EA, 2009; 2015).
Defra	Interactive map	Magic maps – maps of water bodies, habitats and protected areas (Defra, 2019).
EA	Database	Catchment Data Explorer – Information on current status of management & operational catchments and water bodies (EA, 2019a).
NE	Database	Designated Sites Database (NE, 2019)

Organisation	Data type	Details
EA	Database	Bathing water quality profiles for each bathing water area (EA, 2019b).
Cefas	Website	Designated bivalve mollusc production areas in England and Wales (Cefas, 2019a).
Food Standards Agency	Website	Shellfish controls information (Food Standards Agency, 2019a).
Joint Nature Conservation Committee ('JNCC')	Website	Natura 2000 designated site descriptions (JNCC, 2018).

1.5 STAGE 1: SCREENING

1.5.1 SCREENING OF ACTIVITIES

1.5.1.1 In line with guidance from the EA (2017), the Proposed Development has been screened into this WFD assessment as it is not classed as a low risk project, and it is not applicable to the MMO self-service licencing process. In line with PINS Advice Note 18 (PINS, 2017), this section outlines which specific activities or "aspects" of the Proposed Development have been screened in or out of further assessment, based on review of Chapter 3 (Description of the Proposed Development).

1.5.1.2 This WFD assessment considers the aspects of the Proposed Development which have the potential to impact transitional and coastal water bodies within one nmi of the coast. If it is identified in the marine and onshore WFD assessments that there may be potential impacts on the same water body, any potential significant cumulative effects will be considered.

Route preparation and clearance

1.5.1.3 Based upon review of Chapter 3 (Description of the Proposed Development), it is considered that some of the route preparation activities can be screened out of the WFD assessment.

1.5.1.4 There are approximately 10 Out Of Service ('OOS') cable crossings in the Marine Cable Corridor in UK waters; however, all are located beyond KP 55 (see Appendix 3.3 (Qualitative Description of Marine Cable Corridor) of the ES Volume 3 (document reference 6.3.3.3)). Due to the distance to WFD receptors, and the localised nature

of the works proposed, clearance of OOS cables has been screened out of further assessment. Similarly, while rock and / or mattress placement may be required in locations of uneven seabed, no placement for this purpose is expected to be required within the WFD jurisdiction (<1 nmi) therefore this activity has also been screened out of further assessment.

1.5.1.5 Other route preparation activities will or may occur within 1 nmi of the coast and result in habitat disturbance and generation of suspended sediment plumes. These activities also have the potential to result in the release of contaminants, if present, from the disturbed sediment. These include;

- Boulder clearance,
- Pre-lay grapnel run ('PLGR'),
- Mass flow excavation ('MFE') / dredging activities,
- Excavation works at the HDD entry/exit point, and
- Placement of temporary mattressing for HDD.

1.5.1.6 These activities have been screened in for further assessment.

1.5.1.7 Dredged material will be deposited at least 3 km beyond the 1 nmi limit of the WFD jurisdiction (within a designated disposal site located within the Marine Cable Corridor between KP 21 and KP109). Modelling indicates that there will be no significant direct interaction between the resulting sediment plumes and WFD water bodies (Appendix 6.2 (Modelling Technical Report)). Indirect interactions with mobile receptors however are possible due to the proximity of sediment plumes to the boundary of the nearest WFD water body. This activity is therefore screened in for indirect interactions with fish in relevant water bodies (see Annex A: WFD Scoping Tables) but otherwise it is screened out of further assessment.

Construction (cable installation & cable protection)

1.5.1.8 A number of the cable installation methods currently under consideration (plough, jet trencher, mechanical trencher (wheel or chain) and MFE) will result in increased suspended sediment concentrations ('SSC') within the WFD jurisdiction and may cause release of contaminants, if present in the sediment. These are therefore screened in for further assessment.

1.5.1.9 HDD activities will be undertaken at both the marine HDD entry/exit Landfall point at Eastney and to the north-west of Langstone Harbour (A2030 Bridge) where the cables cross underneath Langstone Harbour between Portsea Island and the mainland. The TJBs are above Mean High Water Springs ('MHWS'), with drilling taking place entirely under Langstone Harbour, therefore these HDD activities have been assessed within the onshore chapters of the Environmental Statement ('ES') and are not considered further here.

1.5.1.10 For the Landfall HDD, TJBs will be constructed above MHWS, and ducts will be installed under the intertidal zone. Excavations required prior to HDD works at the entry/exit Landfall at Eastney are considered as part of the route preparation works described above. HDD activities require the use of a drill fluid to lubricate the drilling process and cool the drill head. Fluid pressures would be monitored throughout activities to reduce the risk for breakout of the drilling fluid, however, should this occur, there is potential for the release of drill fluids into the marine environment. It is proposed that a bentonite based drilled drilling fluid which is Cefas approved will be used, made up of water (>90%), bentonite (~7%), Xanthan gum (<0.5%).

1.5.1.11 Xanthan gum (a natural starch) is listed on the Offshore Chemical Notification Scheme (OCNS) list as Group E, showing least hazard potential, and bentonite is listed as Group P, showing least hazard potential under Harmonised Mandatory Control Scheme (Cefas, 2019b). According to its Material Safety Data Sheet ('MSDS'), bentonite is a persistent but non-toxic natural material which is used as a lubricant.

1.5.1.12 Any potential effect from the release of drilling fluid into the marine environment is minimised by reducing the pressure of the fluid within the drill and via transfusing the drill fluid with xanthan gum which reduces the concentration of bentonite within the drill fluid. Bentonite is also broken down by seawater and it 'flocculates' and dissipates quickly. Bentonite and xanthan gum contained within the drilling fluid are in low concentration, are non-toxic and will be non-persistent in the marine environment, therefore do not pose a threat to water quality. The potential release of drill fluid during HDD works is therefore screened out of further assessment.

1.5.1.13 The Use of cable protection has the potential to impact WFD receptors due to habitat loss, and if, for example, protection is laid in shallow water environments where hydromorphological effects may be seen. This has therefore been screened into further assessment.

Operation and repair / maintenance activities

1.5.1.14 The Proposed Development has been designed so that routine maintenance to the Marine Cables is not required during their operational lifetime.

1.5.1.15 The indicative worst-case failure rate for Marine Cables (including internal and external failures) is one repair every 10 to 12 years per cable, adding up to an estimated 4 repairs per cable over the 40-year lifespan. Typically, repair works would require exposure of the cable at the point where the fault is identified, cutting the cable where damaged, recovery to the surface, repair and re-deployment and re-burial to the seabed as an omega joint using methods similar to those employed during installation. This is likely to include a requirement for placement cable protection e.g. rock placement.

1.5.1.16 The potential impact of operation and repair/maintenance ('O&M') activities is considered to be significantly reduced in comparison to route preparation and installation activities for the entire cable. While it is noted that some additional cable protection may be required post construction, a contingency amount has been added to account for this within the construction phase assessments. Therefore, O&M activities have been screened out of the further assessment.

Decommissioning

1.5.1.17 The potential effects of decommissioning are considered in the worst case (i.e. cable removal), to be equivalent to the effects associated with construction. They may potentially be less than those associated with construction depending on the decommissioning activities undertaken, for instance where the marine cable is left in situ. Decommissioning activities have therefore been screened out of further assessment. A sperate consent will be sought for decommissioning, should the proposed activities be licensable, and a WFD assessment will be undertaken at the time to support the Application.

Pollution events & waste management

1.5.1.18 Pollution events could potentially occur at any stage of the Proposed Development; however such events will be managed through standard best practice plans, which deal with spill response (e.g. marine pollution contingency plan which is included in the Marine Outline Construction Environmental Management Plan ('CEMP') document reference 6.5). Pollution events have therefore been screened out of further assessment.

1.5.1.19 All chemicals and waste, including organic waste, on board vessels will be managed in line with standard best practice waste management plans, with no planned release into the marine environment during marine activities. Release of nutrients or chemicals has therefore been screened out of further assessment.

1.5.2 ACTIVITY SCREENING SUMMARY

1.5.2.1 Table 3 summarises the conclusions of the activity screening.

Table 3 – Activity screening summary

Activity	Screening outcome	Justification
Route Preparation & Clearance		
OOS cable removal; rock / mattress placement for uneven seabed	Out	Activities will not occur within WFD water bodies, and are sufficiently beyond the WFD jurisdiction that there is no route to impact.

Activity	Screening outcome	Justification
Boulder clearance; PLGR; MFE / dredging; HDD excavation and temporary mattressing.	In	Short term activities however increased spatial extent of impacts (resulting from the sediment plume).
Deposit of dredged material within .	In (for fish receptors only)	Sediment deposition activities will be undertaken at least 3 km outside WFD jurisdiction and the modelled worst-case sediment plume will not interact directly with water bodies. There is however potential for indirect interaction with mobile WFD receptors (fish).
Construction (Cable installation & cable protection)		
Plough, jet trencher, mechanical trencher; MFE	In	Short term activities however increased spatial extent of impacts (resulting from the sediment plume).
HDD (marine exit/entry point at Eastney Landfall)	Out	Release of drilling fluids is screened out of assessment due to non-toxic and non-persistent nature. Excavation works at the marine exit/entry are considered as part of route preparation works.
HDD (Langstone Harbour - A2030 Bridge)	Out	Assessed within onshore assessments as all works will be above MHWS.
Non-burial cable protection such as rock placement (including contingency for post construction deposits)	In	Limited spatial extent of impacts, however potential longer-term impacts.
O&M activities	Out	The potential impacts of O&M activities are considered to be significantly reduced in comparison to construction activities, as cable de-burial / re-burial is likely to occur only at the point of a cable failure. A contingency for potential additional rock placement post construction is assessed elsewhere.
Decommissioning	Out	Decommissioning impacts are considered in the worst case, to be equivalent to or lesser than those for construction.

Activity	Screening outcome	Justification
Pollution events and waste	Out	Pollution events and waste will be managed via standard best practice plans and relevant regional / national pollution prevention and control mechanisms.

1.5.3 SCREENING OF WATER BODIES

1.5.3.1 The potential for connectivity with the Proposed Development is determined based on the outputs of several numerical modelling studies conducted to assess sediment plume dispersion (including project specific modelling undertaken), and the assessment of the near and far field hydrodynamic and sediment transport regimes (Chapter 6 (Physical Processes)).

1.5.3.2 A detailed description of activities which have the potential to increase local SSCs has been provided within Chapter 6 (Physical Processes), a summary of which is provided below, so far as it applies to WFD receptors:

- In the nearshore (see Figure 1; KP1 – KP21, i.e. including WFD jurisdiction), the worst-case activity for increasing SSC is considered to be excavation at the HDD pits and cable installation (due to the potential for the liberation and dispersal of fines identified between KP 5 and 15, and in other isolated locations).
- The finest sediments will potentially be transported up to 6-10 km in the nearshore area, however it is highly likely that SSCs at these distances will be low (<5 mg/l) and therefore not discernible above natural variation, which ranges from <5 to 75 mg/l in coastal areas, with annual averages of between 5 – 15 mg/l observed within surface waters.
- It is predicted that peak SSCs of up to 200 mg/l may be observed locally (i.e. within 2 km of the cable trench/HDD pit). Within the hours/few days following works, SSCs will reduce to residual concentrations of 20 mg/l at a distance of approximately 4 km (i.e. concentrations are comparable to storm events), and 5 – 10 mg/l at 5 km, i.e. within yearly averages recorded for the Solent (5 to 15 mg/l).
- Deposition is not predicted to be significant - any coarse material mobilised will deposit rapidly (i.e. within several hundred metres of the cable trench). Finer sediment will be dispersed across a greater spatial extent, transiently depositing throughout the tidal cycle. However, due to the volumes of sediment likely to be liberated into the water column and dispersion of fine sediment, it is considered that deposition will be negligible with sediments quickly re-suspended and redistributed under the forcing of tidal flows.

- Outside of KP 21, indicates that there will be no significant direct interaction between the deposition of dredged material and WFD water bodies (Appendix 6.2 (Modelling Technical Report)) and is screened in for indirect interactions with fish in relevant water bodies only.

1.5.3.3 Given the information above, for the purposes of the WFD assessment, the Zone of Influence ('ZOI') of the marine activities is considered to extend 5 km from the marine activities. Any residual passive plume beyond 5 km is predicted to be negligible in the context of the natural variation in SSC within the Solent. This ZOI has been used to screen in / out water bodies.

1.5.3.4 The Marine Cable Corridor passes through TraC Management Catchment, part of the broader South East RBD (EA, 2019a). The smaller operational catchments (Solent and Isle of Wight TraCs) are subdivided into waterbodies, of which the cable passes through Isle of Wight East and the Solent. These water bodies have therefore been screened into the assessment.

1.5.3.5 Furthermore, the ZOI interacts with Langstone Harbour and Portsmouth Harbour water bodies, which lie within the Hampshire East TraC, and the Sussex water body which is within the Sussex TraC. These water bodies are therefore also screened in. Chichester Harbour water body (Western Streams TraC) is located outside the ZOI, and is therefore screened out.

1.5.3.6 Water bodies of relevance to this WFD assessment are therefore considered to be the following;

- Solent,
- Isle of Wight East,
- Langstone Harbour,
- Portsmouth Harbour, and
- Sussex.

1.5.3.7 While it is recognised that EA guidance (EA, 2017) advises that WFD protected areas within 2 km of the proposed activity are screened in, a precautionary approach has been employed in line with the ZOI, and therefore, WFD protected areas located within 5 km have been identified and screened in to the next stage of the WFD assessment process (see Figure 1).

Isle of Wight East Water Body

1.5.3.8 The Marine Cable Corridor passes through Isle of Wight East water body (ID: GB650705530000). This water body is described as heavily modified due to extensive flood and coastal erosion protection, and its hydromorphological status is not assessed. The water body met its 2015 objectives and the water body's overall classification for Cycle 2 (i.e. the second cycle of river basin planning under the

WFD, from 2013 to 2016) has remained consistently 'good', with both the ecological and chemical elements being awarded 'good' status. The water body contains a number of WFD protected areas (Natura 2000 and bathing waters).

Solent Water Body

1.5.3.9 The Marine Cable Corridor and Landfall at Eastney are within the Solent coastal water body (ID: GB650705150000). The Solent is heavily modified due to extensive coastal erosion and flooding protection, and use for navigation, ports & harbours (EA, 2019a). Its hydromorphological status is not assessed. The water body contains a number of WFD protected areas (Natura 2000, bathing waters and shellfish waters).

1.5.3.10 Its overall classification has remained 'moderate' from 2013 to 2016 (i.e. during Cycle 2 classifications). This was determined based on its ecological status, which fell short on supporting elements (surface water), angiosperms (seagrass and saltmarshes), and dissolved inorganic nitrogen which were all classed as 'moderate'. Its chemical status however improved to 'good' in 2016, while failures were recorded in 2013 – 2015 due to reported presence of the priority hazardous substance - tributyltin compounds. All other chemical categories were reported as 'good' during Cycle 2, where data is available.

1.5.3.11 Reasons for not achieving 'good' status for the overall water body in 2015 are listed as unfavourable balance of costs and benefits, disproportionate burdens, and there being no known technical solutions available. Furthermore, action to get biological element to 'good' would have significant adverse impact on use. The target of reaching 'good' status has been delayed until 2027.

Langstone Harbour Water Body

1.5.3.12 Langstone Harbour (ID: GB580705130000) is a transitional water body, the mouth of which is located approximately 160 m east from the Marine Cable Corridor as illustrated on Figure 1 (although over 1 km from the closest marine works at the HDD Landfall location within the Marine Cable Corridor). As with the Solent and Isle of Wight East water bodies, its hydromorphological designation is heavily modified due to extensive flood protection and coastal erosion protection. The water body contains a number of WFD protected areas (Natura 2000 and shellfish waters).

1.5.3.13 Langstone Harbour's overall status classification has remained 'moderate' throughout Cycle 2 (2013 to 2016), with its ecological status also reported as 'moderate' due to supporting elements (surface water) being recorded as 'moderate or less'. The water body failed in its chemical objectives in 2013 and 2014 due to presence of priority hazardous substance mercury and its compounds, but improved its chemical status to 'good' in 2015 and 2016. Disproportionate burdens are cited as the reason to delay the target of reaching 'good' overall status until 2027.

Sussex Water Body

1.5.3.14 Sussex water body (ID: GB640704540003) is a coastal water body located approximately 4.1 km east of the closest section of the Marine Cable Corridor. This water body is described as heavily modified due to extensive flood and coastal erosion protection, and its hydromorphological status is not assessed.

1.5.3.15 The overall classification between 2013 and 2016 is 'moderate' based on ecological supporting elements (surface water) being 'moderate or less' as a result of coastal protections. All other biological and chemical elements are of at least of 'good' status. Disproportionate burdens are cited as the reason to delay the target of reaching 'good' status until 2027.

Portsmouth Harbour Water Body

1.5.3.16 Portsmouth Harbour (ID: GB580705140000) is a transitional water body, the mouth of which is located approximately 4.3 km to the west of the Marine Cable Corridor. Its hydromorphological designation is heavily modified due to extensive flood protection and coastal erosion protection, in addition to modification for navigation, ports and harbours. Hydromorphological status 'supports good'.

1.5.3.17 Portsmouth Harbour's ecological classification for 2016 was 'moderate', improving from 'poor' in 2015 based on the biological quality element of angiosperms. Reasons for not achieving 'good' status for the overall water body in 2015 were primarily concerned with excess nutrient levels from both diffuse sources (e.g. agricultural runoff) and point sources (sewage discharge) resulting in excess dissolved inorganic nitrogen levels and macroalgae growth, in addition to poor angiosperm status as a result of coastal squeeze and unfavourable balance of cost and benefits preventing the support of a good hydrological regime.

1.5.3.18 The water body's chemical status in 2015 and 2016 is 'good', having failed in its chemical objectives in 2013 and 2014 due to presence of priority hazardous substances tributyl tin compounds.

1.5.3.19 Reasons cited to delay the target of reaching 'good' status to 2027 are: disproportionate burdens; action to get biological element to good would have a significant adverse impact on use; and ground water and ecological recovery time.

1.6 STAGE 2: SCOPING

1.6.1.1 This section summarises the findings of the scoping stage of the WFD assessment, whereby the potential risks to each of the key receptor groups are considered.

1.6.1.2 Full scoping tables are included in Annex A of this document, and are presented in the templates provided by the EA for assessing impacts on transitional and coastal WFD water bodies (EA, 2017). The assessments undertaken in Annex A are summarised as below however the tables below should be read alongside the full

justifications in Annex A. It should be noted that indirect interactions with fish is relevant for Isle of Wight water body only, however due to the width of the strait it is not anticipated that fish would be delayed or prevented from accessing estuaries as a result of any activity screened in for assessment, including deposit of dredged materials beyond the 1 nmi limit (Annex A).

Table 4 – Scoping summary: Isle of Wight East

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	N/A
Biology: habitats	Yes	Activities associated with the Proposed Development have the potential to impact more than 0.5 km^2 within the waterbody, more than 1% of the water body's area and 1% of lower sensitivity habitats.
Biology: fish	No	N/A
Water quality	Yes	Of the six contaminated sediment samples taken within the water body, two contained concentrations of arsenic above Cefas Action Level 1 (see Appendix 7.3).
Protected areas	Yes	There are WFD protected areas within the ZOI, namely • South Wight Maritime SAC (UK0030061) and • Solent and Dorset Coast proposed Special Protection Area (pSPA) (UK9020330).
INNS	No	N/A

Table 5 – Scoping summary: Solent

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	N/A
Biology: habitats	Yes	Activities associated with the Proposed Development have the potential to impact more than 0.5 km^2 within the waterbody, more than 1% of the water body's area and 1% of lower sensitivity habitats. In addition, high sensitivity habitats chalk reef and subtidal kelp beds

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
		are within the ZOI.
Biology: fish	Yes	Works are not occurring within an estuary; however works within this water body are close to the mouth of Langstone Harbour, which constitutes a bar-built estuary. The mouth of the harbour is within the ZOI. The potential for effects on fish migration will be assessed.
Water quality	No	N/A
Protected areas	Yes	There are WFD protected areas within the ZOI, namely • Solent Maritime SAC (UK0030059); • Solent and Dorset Coast pSPA (UK9020330); • Chichester and Langstone Harbours SPA/Ramsar site (UK9011011/UK1013); • Spithead and Stokes Bay (UKSW48) shellfish water; • Ryde (UKSW47) shellfish water; • Eastney bathing water; • Southsea East bathing water; • Beachlands West bathing water; • Beachlands Central bathing water; and • Eastoke bathing water.
INNS	No	N/A

Table 6 – Scoping summary: Langstone Harbour

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	N/A
Biology: habitats	Yes	Activities associated with the Proposed Development have the potential to impact more than 0.5 km^2 and 1% of the water body's area and more than 1% of lower

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
		sensitivity habitats. In addition, high sensitivity habitats (saltmarsh and intertidal seagrass) are within the ZOI.
Biology: fish	No	N/A
Water quality	No	N/A
Protected areas	Yes	There are WFD protected areas within the ZOI, namely, • Solent Maritime SAC (UK0030059); • Solent and Dorset Coast pSPA (UK9020330); • Chichester and Langstone Harbour SPA/Ramsar site (UK9011011/UK1013); and • Langstone Harbour Shellfish Water (UKSW33).
INNS	No	N/A

Table 7 – Scoping summary: Portsmouth Harbour

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	N/A
Biology: habitats	Yes	Activities associated with the Proposed Development have the potential to impact more 1% of lower sensitivity habitat.
Biology: fish	No	N/A
Water quality	No	N/A
Protected areas	No	N/A
INNS	No	N/A

Table 8 – Scoping summary: Sussex

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	N/A
Biology: habitats	No	N/A
Biology: fish	No	N/A
Water quality	No	N/A
Protected areas	No	N/A
INNS	No	N/A

1.7 STAGE 3: IMPACT ASSESSMENT

1.7.1.1 An impact assessment for each receptor identified during scoping as at risk is provided within this section, along with an assessment of the potential for overall deterioration in WFD status. Conclusions of the HRA Report (document reference 6.8.1) have been used to inform this assessment and should be read in conjunction with this assessment. Furthermore, a description of the potential for increased SSC has been provided in detail as part of Chapter 6 (Physical Processes), a summary of which was provided in Section 1.5.3 of this document.

1.7.2 ISLE OF WIGHT EAST

Biology – Habitats

1.7.2.1 The area of Isle of Wight East within the ZOI constitutes approximately 121.5 km^2 or 46% of the water body. It should be noted that this is not representative of the affected area at any point in time, as the activities, and the resultant sediment plume, are transient in nature.

1.7.2.2 No high sensitivity habitats are located within the ZOI. Based on available Magic maps data, habitats identified within the Marine Cable Corridor are characterised as subtidal soft sediments (A5.2, A5.3, A5.4) and subtidal gravel and cobbles (A5.1).

1.7.2.3 Habitats identified during site specific surveys of the Marine Cable Corridor (Appendix 8.1 (Benthic Ecology Survey Report)) broadly align with Magic maps data, characterising the seabed as subtidal mixed sediment (A5.4), though the prevalence of coarse sediments was considerably reduced based on interpretation of geophysical data. Magic maps data also indicates subtidal rocky reef (A3, A4) is present within the ZOI. The habitats identified during site specific surveys,

geophysical data interpretation and review of Magic maps data are classified as lower sensitivity and have medium to high resistance to, and recovery rate from, human pressures (EA, 2017). Effects on benthic habitats are considered in detail in Chapter 8 (Intertidal and Benthic Ecology), and summarised here.

1.7.2.4 Localised reductions in abundance of benthic species is expected where sediments are directly disturbed by marine activities (Readman, 2016a) or receive 'heavy' (>5 cm) sediment deposits however, recovery of the characterising species is likely to be rapid, due to the wide availability of similar habitat (Tillin, 2016a). Species likely to suffer mortality are typically highly fecund and populations are likely to return to pre-affected levels within a short timeframe following cessation of activities. Habitats experiencing 'light' deposits will likely recover within a tide cycle. Temporary disturbance of habitats as a result of activities was not considered to be significant.

1.7.2.5 An increase in SSC is likely to have an adverse effect on suspension feeding communities (e.g. hydroids) though infaunal and deposit feeding species are likely to more resistant to such elevated SSCs. Increased SSC can result in increases in the energetic costs of feeding (Jackson & Hiscock, 2008), though for short-term, temporary increases, the effects will be sublethal and reversible upon cessation of activities. Subtidal rocky reef has medium sensitivity where macroalgae species are present due to reduction in light concentration (Stamp & Tyler-Walters, 2015). However, given the short-term nature of activities resulting in increased SSC and that increased SSCs are predicted to last no more than a few days following completion of activities, effects are not expected to be significant, and recovery of the habitat can be expected upon cessation of activities. Maximum increases in SSC will be short term and temporary, and the resulting effects was not considered to be significant.

1.7.2.6 Permanent habitat loss as a result of rock placement is expected to incur a maximum loss of 0.37 km^2, which includes contingency for post construction repair and maintenance (Chapter 3 (Description of the Proposed Development)). While it is not currently known where rock placement as non-burial protection will be required, it is assumed as a worst case that it can occur anywhere along the cable route, affecting a proportion of several habitats, or all placed in one habitat type.

1.7.2.7 Should all rock placement be required in the Isle of Wight East water body, this loss represents <1% of subtidal soft sediments (A5.2, A5.3 and A5.4) based on figures provided in the summary table accompanying EA (2017) guidance. Subtidal mixed sediments habitat is widely available in the Isle of Wight East water body. The potential habitat loss is therefore not expected to affect the overall availability or functioning of the wider habitat in Isle of Wight East.

1.7.2.8 No deterioration of the water body's 'good' status is expected to result from effects to habitats.

Water Quality

1.7.2.9 Potential impacts on water quality within the Isle of Wight East water body were scoped in for assessment due to the presence of chemicals on the EQSD list in sediment samples taken during site specific surveys, and the potential to disturb sediments containing these chemicals during works. Release of contaminated sediments has the potential to make toxic chemicals (contaminants) biologically available.

1.7.2.10 Out of 6 stations analysed for contaminated sediments within the water body, two identified arsenic concentrations in excess of Cefas Action Level 1 (Appendix 7.3 (Contaminated Sediments Survey Report)). Both sample stations were outside of the Marine Cable Corridor, and therefore those specific sample locations are unlikely to be disturbed during marine activities for the Proposed Development. No contaminants were detected in concentrations greater than Cefas Action Level 2.

1.7.2.11 In general, the potential for sediments to accumulate chemical contamination is linked with sediment type. Finer particles (muds and silts, <0.063 µm) have greater surface area to volume ratio and adsorptive capacity compared to coarser grains (sands and gravels) (Sheahan *et al*., 2001). Based on Particle Size Distribution ('PSD') data taken during the geotechnical surveys of the Marine Cable Corridor, the majority of the sediments are sand and gravel with a low proportion of finer particles however in generally isolated pockets along the route, the fines content is increased. In total, 30% of samples analysed comprise >10% total fines content (Chapter 6 (Physical Processes)).

1.7.2.12 One section between KP 9 to 13 contains a high proportion of fine sediments, between 20 and 99% of the sediment fraction. The chemical status of the Isle of Wight water body has been classified as 'good', indicating that background chemical contamination is low, likely as a result of strong sediment disturbance due to tidal forcing (Chapter 6 (Physical Processes)). The likelihood of these sediments to contain significant chemical contamination is therefore predicted to be very low.

1.7.2.13 No additional chemical contamination will be introduced as a result of the marine activities associated with the Proposed Development and potential for accidental release of materials will be minimised through the implementation of best practice industry standards (and production of a Marine Pollution Contingency Plan). There is the potential for contaminants already present in the sediment to be resuspended, however due to the mobile nature of the sediments within the region, and frequent disturbance caused by tidal forces and storms, it is likely that there is high natural dispersion and diffusion of any low level contaminants.

1.7.2.14 No deterioration of the water body's 'good' status is expected to result from effects to water quality.

Protected Areas

1.7.2.15 South Wight Maritime SAC and Solent and Dorset Coast pSPA are situated in the Isle of Wight East water body. The impact of the Proposed Development on Natura 2000 sites has been assessed in full in the HRA report (document reference 6.8.1), and summarised here.

South Wight Maritime SAC

1.7.2.16 The HRA concluded that the Proposed Development will not have a likely significant effect ('LSE') on the South Wight Maritime SAC (directly, indirectly, alone or in combination with other plans or projects).

Solent and Dorset Coast pSPA

1.7.2.17 LSE could not be excluded for little tern as a result of indirect effects on prey availability as a result of increases in SSC. However it was concluded that there will be no adverse effects on site integrity, either from the Proposed Development alone, or in combination with other plans or projects, due to the short-term and minor magnitude of potential effects.

1.7.2.18 No deterioration of the water body's 'good' status is expected to result from effects to Protected Areas.

1.7.3 SOLENT

Biology – Habitats

1.7.3.1 The area of the Solent water body within the ZOI constitutes approximately 61.9 km^2, or 23.8% of the water body's area. This includes the potential footprint of dredging / excavation activities e.g. at the HDD pits. In line with EA guidance (EA, 2017), dredging footprint should be considered at 1.5 times its area. This suggested footprint is encapsulated within the ZOI.

1.7.3.2 Based on available Magic maps data, higher sensitivity habitats within the ZOI are chalk reef and subtidal kelp reef, situated at a minimum of 0.3 km and 2.6 km from the Marine Cable Corridor respectively. Lower sensitivity habitats within the Marine Cable Corridor are subtidal soft sediment (A5.2, A5.3, A5.4) and gravel and cobbles (A5.1). Intertidal soft sediments (A2.4) are present within the ZOI. Subtidal rocky reef (A4) was also identified in the same location as high sensitivity chalk reef and therefore has been assessed as high sensitivity chalk reef. The habitats identified during the site specific surveys undertaken in the Marine Cable Corridor (Appendix 8.1 (Benthic Ecology Survey Report)) broadly align with Magic maps data, though coarse sediments were not found with the water body.

Higher sensitivity habitat – chalk reef

1.7.3.3 Subtidal chalk reef in the south-east of England is described as a formation of vertical cliffs or platforms which are easily eroded by extreme water temperatures, high levels of turbidity, siltation and scouring (Chapman, 2008).

1.7.3.4 Chalk reef is classed as a higher sensitivity habitat due to its sensitivity to disturbance form coastal defence and other works (resulting in direct disturbance), sensitivity to pollution and eutrophication, fishing activity and potential introduction and establishment of INNS (Chapman, 2008).

1.7.3.5 Increased turbidity caused by higher SSCs can inhibit light penetration whilst potentially increasing organic particles/food supply (Tillin, 2016b, Tillin & Hill, 2016). Conversely, it could also decrease feeding efficiency as higher concentrations of inorganic particles will necessitate higher filtration efforts from filter feeders, such as *Hiatella artica* and piddocks (Tillin, 2016b, Tillin & Hill, 2016).

1.7.3.6 Significantly higher levels of SSC could potentially block respiratory and feeding organs while increasing scouring and abrasion (Tillin, 2016b). Overall, an increase in SSC is likely to have an adverse effect on the suspension feeding community (e.g. hydroids) as it may interfere with feeding activity, resulting in reduced growth and potentially abundances in period of extended increase in SSC (Jackson & Hiscock, 2008). Infaunal and deposit feeding species are likely to more resistant to such elevated SSC, although some increases in the energetic costs of feeding are likely.

1.7.3.7 While maximum SSC in the vicinity of the chalk reef habitat may reach up to 200 mg/l, the plume is anticipated to persist at this concentration for a matter of minutes to hours, before reducing over the following hours and few days to levels within natural variation. Concentrations are therefore considered to be within those tolerated by the organisms inhabiting the reef and no long-term deterioration of the functioning of the habitats is expected.

Higher sensitivity habitat – subtidal kelp beds

1.7.3.8 Subtidal kelp habitats within the Solent are characterised as sheltered kelp beds on subtidal sand and mud (A5.2 and A5.22) (Stamp & Hiscock, 2015). There is currently no UK Biodiversity Action Plan ('BAP') for kelp species, however an increase in water turbidity is likely to primarily affect photosynthesis, and therefore growth and density of the canopy-forming seaweeds (Stamp & Hiscock, 2015). For kelp, *Laminiaria spp*. have shown a 50% decrease in photosynthetic activity in response to an increase in turbidity from 10 mg/l to 100 mg/l (Staehr & Wernberg, 2009). This can result in decreased growth where water clarity reductions are severe (Lyngby & Mortensen, 1996; Spilmont *et al*., 2009), though some species are more tolerant than others, (Norton, 1978). Gametophytes of *Laminaria hyperborea* can geminate in the absence

of light (Kain, 1964). Short term changes in SSC may affect growth and reproduction, however recovery can be expected to occur over the very short term.

1.7.3.9 Marine activities including excavation of the HDD entry/exit pits are expected to cause peak SSCs of 200 mg/l in the vicinity of the identified kelp beds (approximately 2 km from the activities). These SSCs are expected to inhibit photosynthesis and result in abrasion on fronds and gametophytes, however due to the short duration of the impact (returning to within natural background variation s levels within a few hours), the effects will be reversible in the short term. Therefore, no deterioration of the functioning of the habitat is expected.

Lower sensitivity habitats

1.7.3.10 Potential impacts on subtidal soft sediment and subtidal gravel and cobbles habitats (including permanent habitat loss as a result of rock placement) were assessed as part of the Isle of Wight East water body assessment presented above (Section 1.7.2). The conclusions made in Section 1.7.2 are also considered applicable here. Permanent habitat loss is anticipated to be small in extent and will not alter the wider availability and functioning of benthic habitats in the Solent water body.

1.7.3.11 No deterioration of the water body's 'moderate' status is expected to result from effects to habitats, and will not prevent the water body from attaining 'good' status.

Biology – Fish

1.7.3.12 Fish were screened into the Solent assessment as a result of increased SSCs reaching the mouth of Langstone Harbour. Potential impacts on fish resulting from the Proposed Development were considered in detail in Chapter 9 (Fish and Shellfish) of the ES Volume 1 (document reference 6.1.9), including temporary increase in SSC and smothering (including entrainment), temporary habitat disturbance / loss and noise vibration. Due to the expected tolerance of species accustomed to living in turbid waters, short-term nature of effects and short duration of activities, wide availability of similar habitat in the vicinity and distance from known important habitat, no significant effects were predicted. Similarly, impacts on Annex II diadromous migratory fish resulting from increased SSC were considered in detail in the HRA Report (document reference 6.8.1), along with physical injury, invasive species, pollution events, noise and vibration and visual disturbance. It was determined that there was no potential for LSE for all fish features.

1.7.3.13 Fish (including migratory species) in the Solent water body are considered to be accustomed to higher background SSC. Any increases in SSC outside the harbour , including through SSC generated by dredge disposal activities, are not expected to significantly alter fish behaviour or deter entry into the harbour.

1.7.3.14 No deterioration of the water body's 'moderate' status is expected to result from effects to fish, and will not prevent the water body from attaining 'good' status.

Protected Areas

1.7.3.15 The Marine Cable Corridor intersects the Solent and Dorset Coast pSPA and the Solent Maritime SAC, and Chichester and Langstone Harbours SPA/Ramsar site is within the ZOI. The impact of the Proposed Development on Natura 2000 sites has been assessed in full in the HRA report (document reference 6.8.1), and summarised here.

1.7.3.16 The Eastney bathing water sampling station is within 1 km of the Marine Cable Corridor (though beyond 500m of any dredging or excavation activities), while the Southsea East Beachlands West and Beachlands Central bathing waters are within the ZOI. Shellfish waters within the ZOI are Spithead and Stokes Bay and Ryde.

Solent and Dorset Coast pSPA

1.7.3.17 LSE could not be excluded for little tern as a result of indirect effects on prey availability as a result of increases in SSC. However, it was concluded that there will be no adverse effects on site integrity, either from the Proposed Development alone, or in combination with other plans or projects, due to the short-term and minor magnitude of potential effects.

Solent Maritime SAC

1.7.3.18 LSE could not be excluded for a number of habitats within the SAC, namely estuaries [1130], sandbanks which are slightly covered by sea water all the time [1110], mudflats and sandflats not covered by seawater at low tide [1140] Spartina swards [1320]; Atlantic salt meadows [1330] and Salicornia and other annuals colonising mud and sand [1310].

1.7.3.19 This was due to the potential for the effects of increased SSC and the deposition of sediment (smothering) where habitats experience deposition depths greater than 5 cm. Taking into account that sediment disposal activities will be undertaken outside the WFD area (and an additional buffer of 3 km has been applied where disposal activities cannot occur), it was concluded that there will be no adverse effects on site integrity for the Solent Maritime SAC, either from the Proposed Development alone, or in combination with other plans or projects.

Chichester and Langstone Harbours SPA/Ramsar site

1.7.3.20 LSE could not be excluded for red-breasted merganser and little tern as a result of indirect effects on prey availability as a result of increases in SSC. However, it was concluded that there will be no adverse effects on site integrity, either from the Proposed Development alone, or in combination with other plans or projects, due to the short-term and minor magnitude of potential effects.

Bathing waters

1.7.3.21 Increased SSC has the potential to impact on the turbidity of bathing waters. Suspended sediments are composed of hard particulate matter (sand and silt) but also contain an organic fraction which can temporarily increase the dissolved nutrient content of the water column (Essink, 1999). Sediment mixing is theorised to have an important role in nutrient cycling (Corbett, 2010), however excess nutrient release can boost microbial and algal production (resulting in a bloom), creating high demand on dissolved oxygen concentration in the water column, and potentially leading to oxygen depletion (OSPAR, 2017). Higher levels of oxygen-depleting nutrients are found in finer grained sediments or where there are high background levels of organic pollution (Cefas, 2011 for review). Thus, de-oxygenation is also associated with sediment mobilisation and increased SSC resulting from dredging activities, but this effect is typically minimal and short-lived (Cefas, 2011).

1.7.3.22 Bathing waters are monitored for concentrations of faecal coliforms, namely *E. coli* and intestinal enterococci. The concentration of faecal coliforms increases with nutrients, specifically nitrogen and phosphorus compounds in the water column, and typically comes from organic waste, particularly effluent, originating from terrestrial sources.

1.7.3.23 Background nutrient levels in the Channel are known to be high as a result of riverine inputs, with coastal waters particularly affected (OSPAR, 2017). Despite this, the status of bathing waters around the Solent, including Eastney, have attained at least 'good' status, with the majority classed as 'excellent', based on samples taken from 2015 and 2018, indicating low incidence of *E. coli* and intestinal enterococci (EA, 2019b). Similarly, phytoplankton at the bathing water "was not assessed as being sufficient to be objectionable", but was observed as being present on all sites between 4 and 8% of visits for the four year assessment period between 2015 and 2018 (EA, 2019b). In addition, Beachlands Central was awarded a blue flag in 2019 for excellent water quality, educational resources provided and facilities available at the site meeting Blue Flag requirements (Blue Flag, 2019). Sewage debris was not noted as present at any site over the last four year period. The closest sewage discharge point to any bathing water is 5 km, and it was also noted that discharge points were designed to protect bathing water quality and of a high standard. It should be noted that there are storm overflows in the vicinity of bathing waters. Fort Cumberland storm overflow, situated in the mouth of Langstone Harbour, is 1 km east of Eastney bathing water and Green lane storm overflow is less than 1 km to the east of Beachlands Central. In heavy rain, these have the potential to increase SSC and, given the terrestrial source of the water, bacterial contamination.

1.7.3.24 Sediment disturbance as a result of dredging activities has been shown to result in a short term release in sediment bound nutrients which can interact with micro-

organisms (bacteria and phytoplankton) in the water column, however the effect is localised and short lived (Grimes, 1975; Grimes, 1980; Essink, 1999; Cefas, 2011 for review), and strongly influenced by water currents (Grimes, 1975). Even sediments which are heavily contaminated with organic matter or pre-existing faecal coliforms, bacterial concentrations have been shown to be limited to within 2 km directly downstream of the deposition site (Grimes, 1980).

1.7.3.25 Based on the high quality of local bathing sites, background faecal contamination and bacterial concentration is low, therefore sediment disturbance and suspension as a result of marine activities resulting from the Proposed Development is not expected to alter concentrations of faecal coliforms at bathing sites.

1.7.3.26 Compared to dredge disposal activities as described in the literature (Cefas, 2011 for review), increases in SSC as a result of the Proposed Development including excavation of the HDD entry/exit point will be relatively low and are highly unlikely to result in significant effects on bathing water quality. In addition, activities do not represent a source of additional contamination as any waste generated during activities will be managed through project plans, including, for example, waste management plans and implementation of routine standard best practice in terms of pollution prevention and will seek to ensure that the risk of release of contaminants due the Proposed Project is as low as possible.

1.7.3.27 No dredging or excavation activities will be carried out within 500m of the Eastney Bathing Water sampling location. The Proposed Development is therefore not expected to threaten the 'excellent' classification of Eastney bathing water, therefore potential effects will not prevent the water body reaching overall 'good' status in 2027.

Shellfish waters – Spithead and Stokes Bay, Ryde

1.7.3.28 Similar to bathing waters, shellfish waters are monitored and classified based on the presence of faecal indicator species. In addition, closure and re-opening of shellfish production and relay areas is based on the presence of certain species of phytoplankton, biotoxins in the flesh of shellfish, and chemical contamination (Food Standards Agency, 2019a). Background levels of bacteria in shellfish beds in the Southern Inshore Fisheries and Conservation Authority ('Southern IFCA') are typically low, with the majority of beds awarded a B classification in 2019 indicating shellfish are safe to consume after treatment (Food Standards Agency, 2019b), though some sites have been downgraded for the 2019-2020 season to Class C, indicating an increase in levels of *E. coli* found in samples from the site (Food Standards Agency, 2019b). Biotoxin and phytoplankton levels recorded in the Solent and associated harbours have also been recorded as low (Food Standards Agency, 2019c), and chemical contamination is also below maximum permitted levels based on samples collected in 2015 (Food Standards Agency, 2017).

1.7.3.29 Oyster beds in the Southern IFCA are subject to an annual closed season in effect between the 1st of March to the 31st of October (Southern IFCA, 2017) inclusive. In addition to this, oyster beds in the Solent (with the exception of a sub-area of the designated Ryde shellfish water (Middle) and Portsmouth Harbour in 2018/2019 season) have been subject to an additional temporary closure between 1st November and 28th February inclusive due to poor stock levels (Southern IFCA, 2017). Similar closures have been in place since 2013 (Gravestock, 2016). Assessment of shellfish's safety for consumption is not always carried out for closed beds (*pers. comm.* Southern IFCA, 2019). The decision to implement a closure is taken annually and at the time of writing, this decision has not been made for 2019-2020 season however, based on current information, it is deemed likely that additional closures will apply to a number of oyster beds in the coming season (*pers. comm*. Southern IFCA, 2019).

1.7.3.30 No quality status has been established for Spithead and Stokes Bay, likely as a result of temporary closures in place on this bed. Sub-areas within the designated Ryde shellfish water (Middle) was exempt from the temporary closure in place between 1st November 2018 and 28th February 2019 (Southern IFCA, 2018). The classification for Ryde (Middle & Sturbridge) has been updated for the 2019-2020 season to Class B - Preliminary (Food Standards Agency, 2019b).

1.7.3.31 As discussed for bathing waters, bacteria and phytoplankton production can be enhanced by additional nutrient input which can accompany sediments resuspended during marine activities, though the effect is localised and short lived (Grimes, 1975; Grimes, 1980; Cefas, 2011; Essink, 1999).

1.7.3.32 In addition, given that these oyster beds are closed during peak season for phytoplankton and bacterial proliferation (due to increased light and concentration and temperature), construction activities including HDD entry/exit point excavation are predicted to result in short term, localised increases in SSC which are not expected to influence quality status of beds within the ZOI. Effects specific to oysters are not relevant to this assessment and are discussed in more detail in Chapter 9 (Fish and Shellfish).

1.7.3.33 No deterioration of the water body's 'moderate' status is expected to result from effects to Protected Areas, and will not prevent the water body from attaining 'good' status.

1.7.4 LANGSTONE HARBOUR

Biology – Habitats

1.7.4.1 The area of Langstone Harbour within the ZOI is approximately 10.7 km^2, or 56.6% of the total water body's area. SSC variability within the harbour is high, owing to its tidal nature and frequent exposure to storm induced fluctuations (New Forest District

Council, 2017). Suspended sediments within the harbour have been measured at 200 mg/l (Humby & Dunn, 1975 – cited in New Forest District Council, 2017), While there is potential for sediment to be transported deeper into the harbour on an incoming tide (New Forest District Council, 2017), any potential increased SSC as a result of marine activities from the Proposed Development will be within natural variation experienced within the Harbour.

1.7.4.2 Based upon available Magic map data, areas of the higher sensitivity habitats intertidal seagrass and saltmarsh are within the ZOI. Lower sensitivity habitats intertidal soft sediment (A2.2, A2.3, A2.4), subtidal soft sediment (A5.2, A5.3, A5.4) and intertidal coarse sediment (A2.1) have been identified as present in the ZOI.

Higher sensitivity Habitat – Saltmarsh

1.7.4.3 Saltmarsh habitats are dependent on suspended sediment to grow (accretion) and are vulnerable to erosion, although a dynamic balance of erosion and accretion is probably normal (Tyler-Walters, 2001). While saltmarsh habitat is described as tolerant to increases in turbidity, increased siltation may increase sedimentation rates above growth rates resulting in smothering, whereas decreased siltation rates may reduce the rate of growth and subject it to increased erosion (Tyler-Walters, 2001).

1.7.4.4 Magic maps data indicates that the minimum distance between the location of the marine entry/exit HDD (i.e. the closest marine works) and saltmarsh habitat is approximately 2 km. As suspended sediment enters the mouth of the harbour coarse material will settle first, with fine sediments potentially carried further into the harbour. Increases in SSC resulting from the marine activities will however be short lived (expected to return to background levels within a few days following completion of activities), and therefore will not increase sedimentation rates above growth rates of the saltmarsh.

1.7.4.5 Due to the short term nature of potential increases in SSC within the harbour (days), coupled with the reliance of saltmarsh on sediments for accretion, it is considered that marine works will not lead to significant or long-term effects on saltmarsh habitats within Langstone Harbour.

Higher sensitivity Habitat – Intertidal Seagrass

1.7.4.6 Intertidal seagrass beds have high sensitivity to increases in SSC as a result of a reduction in light availability for photosynthesis, oxygen depletion and increases of organic particulate matter which may be mobilised with sediments (D'Avack *et al*., 2015), although they can be tolerant for a short period of time (less than 2 weeks) (Peralta *et al*., 2002; Erftemeijer & Robin, 2006; Olesen & Sand-Jensen, 1993). A loss of the population is expected for long term increases in turbidity (Philippart, 1995), however short-term increases lasting less than two weeks are not expected to result in significant effects on seagrass beds.

Lower sensitivity habitats

1.7.4.7 Intertidal and subtidal sediments are themselves composed of settled material and are reliant on regular sediment input, and are not sensitive to increases in SSC (Connor *et al*., 2004; Readman, 2016b; Tillin, 2016a).

1.7.4.8 No deterioration of the water body's 'moderate' status is expected to result from effects to habitats, and will not prevent the water body from attaining 'good' status.

Protected Areas

1.7.4.9 Solent Maritime SAC, Solent and Dorset Coast pSPA and Chichester and Langstone Harbour SPA/Ramsar site overlap the Langstone Harbour water body. It is considered that the assessments presented in Sections 1.7.2 and 1.7.3 for these protected areas (which also overlap either the Solent or Isle of Wight East water bodies) can be applied to Natura 2000 sites associated with Langstone Harbour.

1.7.4.10 Accordingly, no deterioration of the water body's 'moderate' status is expected to result from effects to Protected Areas, and it will not be prevented from achieving 'good' status. Further information is provided for the HRA Report (document reference 6.8.1).

Shellfish water – Langstone Harbour

1.7.4.11 Langstone Harbour is designated for American hard-shell clams and Pacific oyster in addition to native oyster, which is subject to a temporary closure (Southern IFCA, 2017). As discussed for shellfish waters associated with the Solent water body above, shellfish waters are monitored and classified based on the presence of faecal indicator species and can be closed based on the presence of certain species of phytoplankton, biotoxins in the flesh of shellfish, and chemical contamination (Food Standards Agency, 2019a). Background levels of bacteria in shellfish beds in Langstone Harbour (as a Southern IFCA shellfish water) are typically low, having been awarded a B classification for all three species in 2018, (Food Standards Agency, 2018), however this has been downgraded for both oyster species for the 2019-2020 season to Class C (Food Standards Agency, 2019b), indicating an increase in levels of *E. coli* found in samples from the site. Biotoxin and phytoplankton levels have been recorded as low (Food Standards Agency, 2019c), and chemical contamination is also below maximum permitted levels based on samples collected in 2015 (Food Standards Agency, 2017). Bacteria and phytoplankton production can be enhanced by additional nutrient input which can accompany sediments resuspended during marine activities, though the effect is localised and short lived (Grimes, 1975; Grimes, 1980; Cefas, 2011; Essink, 1999).

1.7.4.12 SSC within the harbour has been recorded to reach 200 mg/l (Humby & Dunn, 1975 – cited in New Forest District Council, 2017), therefore any suspended sediment

entering the harbour from marine activities including excavation works at HDD entry/exit point are expected to be within natural variation.

1.7.4.13 The waters of the Solent have low background concentration of faecal indicator organisms which are unlikely to increase as a result of short term, temporary increases in SSC resulting from the Proposed Project. Given the natural degree of sediment movement likely to occur, coupled with the existing levels of run off in the Channel and the temporary nature of the activities, the works are not expected to threaten the current classification of affected shellfish waters. Potential impacts to bathing or shellfish waters will not prevent the water body reaching 'good' status in 2027.

1.7.4.14 Therefore, marine activities associated with the Proposed Development resulting in short term, localised increases in SSC are not expected to influence quality status of beds within the sediment plume.

1.7.4.15 No deterioration of the water body's 'moderate' status is expected to result from effects to Protected Areas, and will not prevent the water body from attaining 'good' status.

1.7.5 PORTSMOUTH HARBOUR

Biology – Habitats

1.7.5.1 Based upon available Magic map data, the ZOI will overlap with 0.4 km^2 of the lower sensitivity habitats intertidal and subtidal coarse sediment (A2.1, A5.1) within Portsmouth Harbour water body, which is estimated to constitute over 1% of the habitat within the water body.

1.7.5.2 Portsmouth Harbour is over 4 km from the marine activities associated with the Proposed Development and the harbour entrance is the most sheltered of the inlets assessed. Thus, littoral drift input to the tidal channel is very low to virtually zero (Halcrow Maritime *et al*., 2000; Halcrow, 2010a – cited in New Forest District Council, 2017). The temporary increase in SSC at this distance is expected to be 20 mg/l (storm levels) or less and will only persist for a few days following completion of the marine activity. These concentrations, and any potential deposition, are not considered to have any significant detrimental effect on the ecological functioning of the habitat.

1.7.5.3 No deterioration of the water body's 'moderate' status is expected to result from effects to habitats and will not prevent the water body from attaining 'good' status.

1.8 CONCLUSIONS

1.8.1.1 Based on the results of scoping (Annex A) and impact assessment (Section 1.7), there is no potential for deterioration of WFD receptors as a result of marine activities associated with any stage of the Proposed Development.

1.8.1.2 With the exception of rock placement as non-burial cable protection, all activities will result in temporary and / or transient effects.

1.8.1.3 As stated within the EA guidance (EA, 2017), temporary effects due to short-duration activities like construction or maintenance do not count as deterioration if the water body would recover in a short time without any restoration measures. Furthermore, while some habitat loss may be permanent as a result of rock placement in the Solent or Isle of Wight East water bodies, it will be small in extent and will not alter the wider availability and functioning of habitats in these water bodies.

1.8.1.4 Therefore, it is concluded that the marine activities resulting from the Proposed Development will not prevent the water bodies from meeting the environmental objectives specified within the South East RBMP, and will not impact current status of water bodies, or prevent improvement of WFD status in the future.

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ANNEX A – WFD SCOPING TABLES

ISLE OF WIGHT EAST WATER BODY

Section 1: Hydromorphology

Table A1 – Hydromorphological considerations for scoping – Isle of Wight East

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	The Isle of Wight East is not a high status water body.
Could significantly impact the hydromorphology of any water body (i.e. at less than high status)		No – Impact Assessment not required	Cable installation and burial are short term activities confined to the Marine Cable Corridor and are transient by their nature. The cable will be buried as a preference, leaving minimal permanent addition of features to interact with hydromorphology receptors. Any introduction of material (i.e. non-burial protection methods) will be highly localised and protection will be restricted in height in accordance with best practice guidance and navigational protocols and are thus unlikely to significantly interact with hydromorphology.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	The Isle of Wight East is classified as heavily modified for coastal and flood protection. These activities do not overlap with cable installation activities.

Section 2: Biology

Habitats

Table A2 – Risk information for biology habitat receptors – Isle of Wight East

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger	Yes – impact assessment required		Based on the estimated footprint of cable installation activities screened in to further assessment, including the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 121.5 km^2. It should be noted that this plume will be transient in nature as the cable installation activities move along the cable corridor (see Section 1.5.3).
1% or more of the water body's area	Yes – impact assessment required		Based on the estimated footprint of cable installation activities screened in to further assessment, including the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 121.5 km^2. The total footprint therefore equates to 46% of the water body's total area (264 km^2). It should be noted that this plume will be transient in nature as the cable installation activities move along the cable corridor (see Section 1.5.3).
Within 500 m of any higher sensitivity habitat		No – Impact Assessment not required	There are no higher sensitivity habitats within 500 m of the activity, or within the ZOI of the activities which were screened in for further assessment.
1% or more of any lower sensitivity habitat	Yes – impact assessment		Based upon available Magic map data, the marine cable will be installed within the lower sensitivity habitats subtidal soft sediments (A5.2, A5.3, A5.4) and gravel and cobbles (A5.1). In addition, while areas of Subtidal

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
	required		Rocky Reef (A3, A4) do not overlap the Marine Cable Corridor, they are found within the ZOI. Based upon the WFD Water Body Summary Table (EA, 2017), subtidal soft sediments constitute 56.4 km^2 of the water body, gravels and cobbles constitute 8.2km^2, and subtidal rocky reef constitute 103.0 km^2. Due to licensing restrictions on WFD habitats spatial data, an accurate calculation of the area of lower sensitivity habitats within the ZOI (as shown on Magic maps) cannot be provided here, however for the purposes of this assessment it is assumed that the footprint of the activities which were screened in has the potential to affect more than 1% of the lower sensitivity habitats.

Fish

Table A3 – Fish considerations for scoping – Isle of Wight East

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, or is outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No – impact assessment not required	The Isle of Wight East is not an estuary; however it is located between the Isle of Wight and mainland England, providing a route of access to several estuaries via the Solent strait. Due to the width of the strait it is not anticipated that fish would be delayed or prevented from accessing estuaries as a result of any activity screened in for assessment, including deposit of dredged materials beyond the 1 nmi limit (i.e. at deposit locations beyond KP 21).
Could impact on normal fish		No – impact	Potential impacts on fish as a result of the Proposed Development have

Consider if your activity:	Yes	No	Biology fish risk issue(s)
behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		assessment not required	been assessed within Chapter 9 (Fish and Shellfish), including temporary habitat disturbance / loss; temporary increase in suspended sediments and smothering (including entrainment); and noise and vibration. No significant effects are predicted to occur due to the wide availability of similar habitat in the vicinity, distance of works from known important habitat, temporary and short term duration of activities. Furthermore, potential effects on Annex II diadromous migratory fish were assessed in HRA Report (document reference 6.8.1). It was determined that there was no potential for LSE for all fish features. It is not anticipated that normal fish behaviour will be impacted as a result of any activity screened in for assessment, including deposit of dredged materials beyond the 1 nmi limit.
Could cause entrainment or impingement of fish		No – impact assessment not required	Marine activities are in open water and are undertaken predominantly on the seabed. No solid barriers to movement will be created, and activities do not have the potential to cause entrainment or impingement of fish (as assessed and concluded in Chapter 9 (Fish and Shellfish)).

Section 3: Water Quality

Table A4 – Water quality considerations for scoping – Isle of Wight East

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for		No – impact assessment not required	Marine activities are temporary and transient in nature. While the activities will temporarily increase SSC in the vicinity of the works, coarser material is expected to fall out of suspension within minutes, and although fine sediments will likely be transported further in the water column over the

Consider if your activity:	Yes	No	Water quality risk issue(s)
longer than a spring neap tidal cycle (about 14 days)			hours / days following works, SSC within the ZOI will reduce to residual concentrations of 5 - 10 mg/l (see Section 1.5.3). SSC is expected to return to background levels within a few days following completion of these activities.
Is in a water body with a phytoplankton status of moderate, poor or bad		No – impact assessment not required	Phytoplankton status in the Isle of Wight East remained 'high' throughout Cycle 1 and into Cycle 2, up until 2014. While no data is available on the EA Catchment Data Explorer for 2015 and 2016, it is assumed for the purpose of this assessment that given the overall current 'good' status of the water body the current status of phytoplankton is at least 'good', if not 'high'.
Is in a water body with a history of harmful algae		No – impact assessment not required	Harmful algal blooms are not monitored for this water body, therefore this is unknown. The water body contains several high quality bathing areas however, which are all classified as 'excellent' status. It is assumed for the purpose of this assessment that harmful algal blooms are not a common occurrence.

Table A5 – Water quality considerations relating to the disturbance of chemicals for scoping – Isle of Wight East

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list	Yes – impact assessment		The 2016 chemical status of the water body is 'good', indicating low levels of contaminants within sediments. However, of the six contaminated sediment samples taken within the water body, two revealed

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
	required		concentrations of arsenic above Cefas Action Level 1. Arsenic is on the EQSD list.
It disturbs sediment with contaminants above Cefas Action Level 1	Yes – impact assessment required		The 2016 chemical status of the water body is 'good', indicating low levels of contaminants within sediments. However, of the six contaminated sediment samples taken within the water body, two revealed concentrations of arsenic above Cefas Action Level 1.

Table A6 – Water quality considerations relating to the release of chemicals for scoping – Isle of Wight East

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – impact assessment not required	The Proposed Development does not include a discharge pipeline or outfall.

Section 4: WFD Protected areas

Table A7– Considerations for WFD protected areas for scoping – Isle of Wight East

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area			
SAC	Yes – impact assessment required		The South Wight Maritime SAC (UK0030061) is within the ZOI. While it is recognised that the Solent Maritime SAC (UK0030059) is listed as a protected area of relevance to the Isle of Wight East water body (EA, 2019a), it has been assessed under the Solent water body assessment.
SPA / pSPA	Yes – requires impact assessment		The Solent and Dorset Coast pSPA (UK9020330) overlaps the water body and is within the ZOI.
Shellfish Waters		No – impact assessment not required	The Isle of Wight East does not contain any shellfish waters.
Bathing Waters		No – impact assessment not required	All bathing waters within the Isle of Wight East are outside the ZOI.
NSAs		No – impact assessment not required	Nutrient inputs into water bodies are generally of terrestrial origin i.e. from rivers and land run off, and therefore, it is considered that there is no pathway for effects resulting from the Proposed Development.

Section 5: Invasive and non-native species

Table A8– Considerations for INNS introduction for scoping – Isle of Wight East

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – impact assessment not required	The Isle of Wight East water body hosts significant marine traffic and the potential for INNS introduction is already high from pre-existing activities. It is recognised that a number of INNS species have been reported within the region of the Solent, such as the slipper limpet (*Crepidula fornicata*), wire weed (*Sargassum muticum*), and the leathery sea squirt (*Styela clava*) (Eno *et al*., 1997; GB Non-Native Species Secretariat, 2019). The Marine Cables will be installed by burial as a preference, minimising the introduction of new hard substrate habitat on which colonising organisms can settle. Furthermore, any secondary cable protection will be of terrestrial rather than marine origin thus removing the risk of direct introduction of INNS from other marine regions. The Project is international and uses vessels and equipment travelling from other water bodies, however all vessels will operate with the required national and/or international standards anti-fouling and biosecurity & ballast water protocols, in order to ensure that the risk of INNS introduction is as low as reasonably practicable. The Proposed Development does not have the potential to increase the overall risk of introducing or spreading INNS.

SOLENT WATER BODY

Section 1: Hydromorphology

Table A9 – Hydromorphological considerations for scoping – Solent

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	The Solent is not a 'high' status water body.
Could significantly impact the hydromorphology of any water body (i.e. at less than 'high' status)		No – Impact Assessment not required	Cable installation and burial activities are short term, confined to the Marine Cable Corridor, and are transient in nature. The cable will be buried as a preference, leaving minimal permanent addition of features to interact with hydromorphology receptors. Any introduction of material (i.e. non-burial protection methods) will be highly localised and protection will be restricted in height in accordance with best practice guidance and navigational protocols and are thus unlikely to significantly interact with hydromorphology.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	The Solent is classified as 'heavily modified' for coastal and flood protection. These activities do not overlap with the cable installation works.

Section 2: Biology

Habitats

Table A10– Risk information for biology habitat receptors - Solent

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger	Yes – impact assessment required		Based on the estimated footprint of HDD Landfall and cable installation activities screened in to further assessment and the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 61.9 km^2. It should be noted however that this plume will be transient in nature as the Landfall and cable installation activities move along the Marine Cable Corridor (see Section 1.5.3).
1% or more of the water body's area	Yes – impact assessment required		Based on the estimated footprint of HDD Landfall and cable installation activities screened in to further assessment and the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 61.9 km^2. The total footprint equates to 23.8% of the water body's total area (260 km^2). It should be noted however that this plume will be transient in nature as the Landfall and cable installation activities move along the cable corridor (see Section 1.5.3).
Within 500 m of any higher sensitivity habitat	Yes – impact assessment required		High sensitivity habitats Chalk Reef (Subtidal Chalk HOCI 20) and Subtidal Kelp Beds (A5.52, A5.522) are present in the Solent and are located 0.3 km and 2.6 km east of the Marine Cable Corridor respectively, within the ZOI.

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
			It should be noted however that any sediment plume will be transient in nature as the Landfall and cable installation activities move along the Marine Cable Corridor (see Section 1.5.3).
1% or more of any lower sensitivity habitat	Yes – impact assessment required		Based upon available Magic map data, the marine cable will be installed in the lower sensitivity habitats subtidal soft sediment (A5.2, A5.3, A5.4) and gravel and cobbles (A2.1, A5.1). Intertidal soft sediment (A2.4) and subtidal rocky reef (A4) are also present within the ZOI. The WFD Water Body Summary Table provided with the EA guidance (EA, 2017), indicates that subtidal soft sediment constitutes 118 km^2 of the Solent water body, gravel and cobbles constitute 129 km^2, intertidal soft sediment constitutes 15 km^2 and subtidal rocky reef constitutes 4.6 km^2. Due to licensing restrictions on WFD habitats spatial data an accurate calculation of the area of lower sensitivity habitats within the ZOI (as shown on Magic maps) cannot be provided here, however for the purposes of this assessment it is assumed that the footprint of the activities which were screened in has the potential to affect more than 1% of the lower sensitivity habitats

Fish

Table A11 – Fish considerations for scoping - Solent

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, or is outside an estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Yes – impact assessment required		While works are not occurring within an estuary; works are close to the mouth of Langstone Harbour, which constitutes a bar-built estuary. The mouth of the harbour is within the ZOI of the sediment plume. It is not anticipated that fish would be delayed or prevented from accessing estuaries as a result of any activity screened in for assessment beyond the 1 nmi limit, including deposit of dredged materials (i.e. at deposit locations beyond KP 21) due to the distance between the Solent and the 1 nmi limit.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – impact assessment not required.	Potential impacts on fish have been assessed within Chapter 9 (Fish and Shellfish), including temporary habitat disturbance / loss; temporary increase in suspended sediments and smothering (including entrainment); and noise and vibration. No significant effects are predicted to occur due to the wide availability of similar habitat in the vicinity, distance of works from known important habitat, temporary and short term duration of activities. Furthermore, potential effects on Annex II diadromous migratory fish were assessed in HRA Report (document reference 6.8.1). It was determined that there was no potential for LSE for all fish features. It is not anticipated that normal fish behaviour within the Solent will be impacted as a result of any activity screened in for assessment.
Could cause entrainment or		No – impact	While installation activities at the nearshore Marine Cable Corridor are

Consider if your activity:	Yes	No	Biology fish risk issue(s)
impingement of fish		assessment not required	located near the mouth of Langstone Harbour, the activities will not cross or block it. Installation activities are in open water and are undertaken on the seabed. No solid barriers to movement will be created, and activities do not have the potential to cause entrainment or impingement of fish (as assessed and concluded in Chapter 9 (Fish and Shellfish)).

Section 3: Water Quality

Table A12– Water quality considerations for scoping - Solent

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – impact assessment not required	Marine activities are temporary and transient in nature. While the activities will temporarily increase SSC in the vicinity of the works, coarser material is expected to fall out of suspension within minutes, and although fine sediments will likely be transported further in the water column over the hours / days following works, SSC within the ZOI will reduce to residual concentrations of 5 - 10 mg/l (see Section 1.5.3). SSC is expected to return to background levels within a few days following completion of these activities.
Is in a water body with a phytoplankton status of moderate, poor or bad		No – impact assessment not required	The Solent water body is classified as having a phytoplankton status of 'high'.
Is in a water body with a history of harmful algae		No - Impact assessment not required	There is no history of harmful algae in the Solent.

Table A13 – Water quality considerations relating to the disturbance of chemicals for scoping – Solent

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – impact assessment not required	The 2016 chemical status of the water body is 'good', indicating low levels of contaminants within sediments, and of the four contaminated sediment samples taken within the Solent, along the proposed cable route, no contaminants were above Cefas Action Level 1 (see Appendix 7.3 (Contaminated Sediment Survey Report)).
It disturbs sediment with contaminants above Cefas Action Level 1		No – impact assessment not required	The 2016 chemical status of the Solent water body is 'good', indicating low levels of contaminants within sediments, and of the four contaminated sediment samples taken within the Solent water body, along the proposed cable route, no contaminants were above Cefas Action Level 1 (see Appendix 7.3 (Contaminated Sediment Survey Report)).

Table A14 – Water quality considerations relating to the release of chemicals for scoping – Solent

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – impact assessment not required	The Proposed Development does not include a discharge pipeline or outfall.

Section 4: WFD Protected areas

Table A15 – Considerations for WFD protected areas for scoping – Solent

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area			
SAC	Yes – requires impact assessment		Marine Cable Corridor intersects the Solent Maritime SAC (UK0030059).
SPA / pSPA	Yes – requires impact assessment		The following SPAs overlap the water body and are within the ZOI: • Solent and Dorset Coast pSPA UK9020330); • Chichester and Langstone Harbours SPA/Ramsar site (UK9011011/UK1013).
Shellfish Waters	Yes – requires impact assessment		Shellfish waters within the Solent are not within 2 km of activities, but are within the ZOI: • Spithead and Stokes Bay (UKSW48); and • Ryde (UKSW47). It is recognised that the Langstone Harbour shellfish water (UKSW33) is listed as a protected area of relevance to the Solent water body (EA, 2019a); however it has been assessed under the Langstone Harbour water body assessment.
Bathing Waters	Yes –		The Eastney bathing water is within 2 km of marine activities. Additionally,

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
	requires impact assessment		the following bathing waters are within the ZOI. • Southsea East, • Beachlands West, • Beachlands Central; and • Eastoke.
NSAs		No – impact assessment not required	NSAs have no connectivity with marine activities.

Section 5: Invasive and non-native species

Table A16 – Considerations for INNS risks - Solent

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No - Impact assessment not required	The Solent hosts significant marine traffic, and there is considered to be risk of INNS introduction from pre-existing activities. The Marine Cables will be protected by burial as a preference, minimising the introduction of new hard substrate habitat on which colonising organisms could settle. Furthermore, any secondary cable protection will be of terrestrial rather than marine origin and will remove the risk of introduction of INNS from other marine regions. The Project is international and uses vessels and equipment travelling from other water bodies, however all vessels to be used will operate with

Consider if your activity could:	Yes	No	INNS risk issue(s)
			the required national and/or international standards anti-fouling and biosecurity & ballast water protocols, minimising the potential to introduce INNS. The Proposed Development does not have the potential to increase the overall risk of introducing or spreading INNS.

LANGSTONE HARBOUR WATER BODY

Section 1: Hydromorphology

Table A17 – Hydromorphological considerations for scoping – Langstone Harbour

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	The harbour is not a 'high' status water body.
Could significantly impact the hydromorphology of any water body		No – Impact Assessment not required	No marine works will be undertaken within the harbour.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	The harbour is classified as 'heavily modified' for coastal and flood protection. These activities do not overlap with the Landfall and cable installation works.

Section 2: Biology

Habitats

Table A18– Risk information for biology habitat receptors – Langstone Harbour

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger	Yes – Impact assessment required		Based on the estimated footprint of HDD Landfall and cable installation activities screened in to further assessment, including the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 10.7 km^2. It should be noted however that this plume will be transient in nature as the Landfall and cable installation activities move along the Marine Cable Corridor (see Section 1.5.3) away from the water body.
1% or more of the water body's area	Yes – Impact assessment required		Based on the estimated footprint of HDD Landfall and cable installation activities screened in to further assessment, including the ZOI of the resultant sediment plume, the footprint of activities within the water body is approximately 10.7 km^2. The total footprint therefore equates to 56.6% of the total water body area (18.9 km^2). It should be noted however that this plume will be transient in nature as the Landfall and cable installation activities move along the Marine Cable Corridor (see Section 1.5.3) away from the water body.
Within 500 m of any higher sensitivity habitat	Yes – Impact assessment required		While there are no high sensitivity habitats within 500m of the activities, intertidal seagrass (A2.6111) and saltmarsh (A2.5) lie within the ZOI. All other higher sensitivity habitats are outwith the ZOI. It should be noted however that any sediment plume will be transient in

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
			nature as the Landfall and cable installation activities move along the Marine Cable Corridor (see Section 1.5.3).
1% or more of any lower sensitivity habitat	Yes – Impact assessment required		Based upon available Magic map data, habitats present within the ZOI are intertidal and subtidal soft sediment (A2.2, A2.3, A2.4, A5.2, A5.3, A5.2, A5.3, A5.4), coarse sediment (A2.1, A5.1) and rocky shore (A1). Intertidal soft sediments comprise 13.9 km^2, while subtidal soft sediments comprise 3.8 km^2 and intertidal coarse sediments comprise 0.2 km^2 within Langstone Harbour. It should be noted that there is no data available for the centre of the channel. Due to licensing restrictions on WFD habitats spatial data an accurate calculation of the area of lower sensitivity habitats within the ZOI (as shown on Magic maps) cannot be provided here, however for the purposes of this assessment it is accepted that the footprint of the activities which were screened in has the potential to affect more than 1% of the lower sensitivity habitats.

Fish

Table A19 – Fish considerations for scoping – Langstone Harbour

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, or is outside the estuary but could delay or prevent fish entering it		No – impact assessment not required.	No marine activities will occur within the harbour. The potential for impacts on fish migrating to this estuary as a result of works outside the harbour area are assessed as part of the Solent water body scoping (Table A.12).

Consider if your activity:	Yes	No	Biology fish risk issue(s)
or could affect fish migrating through the estuary		(Assessed as part of Solent water body)	
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – impact assessment not required	No marine activities will occur within the harbour, and while the ZOI may extend into the harbour, SSCs within the plume are not expected to exceed natural fluctuations in the estuarine environment (Humby & Dunn, 1975 – cited in New Forest District Council, 2017). The potential for impacts on fish migrating to this estuary as a result of works outside the harbour area are assessed as part of the Solent water body scoping (Table A.12).
Could cause entrainment or impingement of fish		No – impact assessment not required	Marine cable installation activities are located near the mouth of Langstone Harbour, but will not cross or block it. All activities are predominantly undertaken on the seabed and will not block fish passage in the rest of the water column. Activities do not have the potential to cause entrainment or impingement of fish. Works outside the harbour area are assessed in relation to the Solent water body (Table A.12).

Section 3: Water Quality

Table A20 – Water quality considerations for scoping – Langstone Harbour

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen		No – impact assessment	Marine activities are temporary and transient in nature. While the activities will temporarily increase SSC in the vicinity of the works, coarser material

Consider if your activity:	Yes	No	Water quality risk issue(s)
levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		not required	is expected to fall out of suspension within minutes, and although fine sediments will likely be transported further in the water column over the hours / days following works, SSC within the ZOI will reduce to residual concentrations of 5 - 10 mg/l (see Section 1.5.3). SSC is expected to return to background levels within a few days following completion of these activities.
Is in a water body with a phytoplankton status of moderate, poor or bad		No – impact assessment not required	Phytoplankton status within the harbours was recorded as 'high' up to and including 2014. While no more recent data is available on the EA Catchment Data Explorer (EA, 2019a), it is not expected that the phytoplankton status would be significantly reduced as a result of works outside of the harbour.
Is in a water body with a history of harmful algae		No – impact assessment not required	The water body has a history of harmful algae; however no marine activities will be undertaken within Langstone Harbour. There is potential for suspended sediments to enter the harbour. Suspended sediments can contain an organic fraction which can temporarily increase the dissolved nutrient content of the water column and may also resuspend populations of harmful bacteria or algae present in the sediments (Cefas, 2011). Evidence suggests that such disturbances are short lived and localised. Based on studies undertaken by Grimes (1975; 1980), increases in bacteria did not extend further than 2 km downstream from the site of disposal for heavily contaminated material (Cefas, 2011 for review). It is expected that this will also apply to phytoplankton. No sediments will be disturbed within the harbour. Based on the high quality of local bathing sites near the source of sediment disturbance (assessed above), disturbance of harmful algae in

Consider if your activity:	Yes	No	Water quality risk issue(s)
			sediments is considered unlikely, therefore sediment disturbance and suspension as a result of marine activities is not expected to alter concentrations of harmful algae within the harbour.

Table A21 – Water quality considerations relating to the disturbance of chemicals for scoping – Langstone Harbour

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – impact assessment not required	No marine works will be undertaken within the harbour. No chemicals will be released in the harbour.
It disturbs sediment with contaminants above Cefas Action Level 1		No – impact assessment not required	No marine works will be undertaken within the harbour. Therefore, no sediment within the harbour will be disturbed.

Table A22 – Water quality considerations relating to the release of chemicals for scoping – Langstone Harbours

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – impact assessment not required	The Proposed Development does not include a discharge pipeline or outfall.

Section 4: WFD Protected areas

Table A23 - Considerations for WFD protected areas for scoping – Langstone Harbour

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area			
SAC	Yes – requires impact assessment		The Solent Maritime SAC (UK0030059) is located within the water body and within the ZOI.
SPA / pSPA	Yes – requires impact assessment		The following SPAs within the harbour are within the ZOI: • Solent and Dorset Coast pSPA (UK9020330); • Chichester and Langstone Harbour SPA/Ramsar site (UK9011011/UK1013).
Shellfish Waters	Yes – requires impact assessment		Langstone Harbour Shellfish Waters (UKSW33) is within the ZOI.
Bathing Waters		No – impact assessment not required	The harbour does not contain any designated bathing waters. The Eastney bathing water is within 2 km of marine activities however, this and the other four bathing waters have been considered within the scoping for the Solent water body (see Table A15).
NSAs		No – impact	NSAs have no connectivity with marine activities.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
		assessment not required	

Section 5: Invasive and non-native species

Table A24 – Considerations for INNS introduction for scoping – Langstone Harbour

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – impact assessment not required	Langstone Harbour hosts significant vessel traffic, and there is considered to be risk of INNS introduction from pre-existing activities. The Marine Cables will be protected by burial as a preference, minimising the introduction of new hard substrate habitat on which colonising organisms could settle. Furthermore, any secondary cable protection will be of terrestrial rather than marine origin and will remove the risk of introduction of INNS from other marine regions. The Project is international and uses vessels and equipment travelling from other water bodies, however all vessels to be used will operate with strict anti-fouling and biosecurity protocols in line with international regulations, minimising the potential to introduce INNS. The Proposed Development does not have the potential to increase the overall risk of introducing or spreading INNS.

PORTSMOUTH HARBOUR WATER BODY

Section 1: Hydromorphology

Table A25 – Hydromorphological considerations for scoping – Portsmouth Harbour

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	The harbour is not a 'high' status water body.
Could significantly impact the hydromorphology of any water body		No – Impact Assessment not required	No marine works will be undertaken within the harbour.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	The harbour is classified as heavily modified for coastal and flood protection, as well as navigation, ports and harbours. These activities do not overlap with Landfall and cable installation activities.

Section 2: Biology

Habitats

Table A26 – Risk information for biology habitat receptors – Portsmouth Harbour

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger		No – Impact assessment	Based on extent of the potential sediment plume (i.e. the ZOI) which may extend up to 5 km from the activities within the Marine Cable Corridor, the area within the water body affected constitutes approximately 0.13 km^2.

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
		not required	
1% or more of the water body's area		No – Impact assessment not required	Based on the potential sediment plume (which may extend up to 5 km from the activities within the Marine Cable Corridor), the ZOI is 0.13 km^2, constituting 0.79% of the total water body area (16.4 km^2).
Within 500 m of any higher sensitivity habitat		No – Impact assessment not required	There are no higher sensitivity habitats within 500 m of activities, or within the ZOI of the activities which were screened in for further assessment.
1% or more of any lower sensitivity habitat	Yes – Impact assessment required		Based upon available Magic map data, habitats present within the ZOI are intertidal and subtidal coarse sediment (A2.1, A5.1) which comprise 0.4 km^2 within Portsmouth Harbour water body. It should be noted that there is no data available for some of the intertidal area at the entrance to the harbour. Due to licensing restrictions on WFD habitats spatial data an accurate calculation of the area of lower sensitivity habitats within the ZOI (as shown on Magic maps) cannot be provided here, however for the purposes of this assessment it is assumed that the footprint of the activities which were screened in has the potential to affect more than 1% of the lower sensitivity habitats.

Fish

Table A27 – Fish considerations for scoping – Portsmouth Harbour

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, or is outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No – impact assessment not required.	No marine activities will occur within the harbour. The ZOI extends to the mouth of the harbour, however it is not anticipated that fish would be delayed or prevented from accessing the harbour as plumes at this distance from the marine activities are predicted to be less than 10 mg/l. Natural variation in the Solent ranges from approximately <5 to 75 mg/l in coastal areas, with annual averages of between 5 – 15 mg/l observed within surface waters (Section 1.5.3). It is not anticipated that fish would be delayed or prevented from accessing estuaries as a result of any activity screened in for assessment beyond the 1 nmi limit, including deposit of dredged materials (i.e. at deposit locations beyond KP 21) due to the distance between the Solent and the 1 nmi limit.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – impact assessment not required	No marine activities will occur within the harbour, and while the ZOI may extend to the mouth of the harbour, SSCs within the plume are not expected to exceed natural fluctuations in the estuarine environment (Section 1.5.3).
Could cause entrainment or impingement of fish		No – impact assessment not required	The ZOI does extend to the mouth of the harbour, but are predominantly undertaken on the seabed and will not block fish passage in the rest of the water column.. Activities do not have the potential to cause entrainment or

Consider if your activity:	Yes	No	Biology fish risk issue(s)
			impingement of fish.

Section 3: Water Quality

Table A28 – Water quality considerations for scoping – Portsmouth Harbour

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – impact assessment not required	Marine activities are temporary and transient in nature. While the activities will temporarily increase SSC in the vicinity of the works, coarser material is expected to fall out of suspension within minutes, and although fine sediments will likely be transported further in the water column over the hours / days following works, SSC within the ZOI will reduce to residual concentrations of 5 - 10 mg/l (see Section 1.5.3). SSC is expected to return to background levels within a few days following completion of these activities.
Is in a water body with a phytoplankton status of moderate, poor or bad		No – impact assessment not required	Phytoplankton status within the harbour was recorded as 'high' up to and including 2016. While no more recent data is available on the EA Catchment Data Explorer (EA, 2019a), it is not expected that the phytoplankton status would be significantly reduced as a result of influence by the sediment plume.
Is in a water body with a history of harmful algae		No – impact assessment not required	There is a history of harmful algae within the water body; however no marine works will be undertaken within the harbour. While it is recognised that the ZOI interacts with the water body, and nutrient release may occur during marine activities, the activities will be undertaken approximately 4-5 km from the water body. At these distances, SSCs are not considered to

Consider if your activity:	Yes	No	Water quality risk issue(s)
			be sufficient to cause or increase potential for harmful algal blooms.

Table A29 – Water quality considerations relating to the disturbance of chemicals for scoping – Portsmouth Harbour

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – impact assessment not required	No marine works will be undertaken within the harbour. No chemicals will be released in the harbour.
It disturbs sediment with contaminants above Cefas Action Level 1		No – impact assessment not required	No marine works will be undertaken within the harbour. Therefore, no sediment within the harbour will be disturbed.

Table A30 – Water quality considerations relating to the release of chemicals for scoping – Langstone Harbours

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – impact assessment not required	The Proposed Development does not include a discharge pipeline or outfall.

Section 4: WFD Protected areas

Table A31 - Considerations for WFD protected areas for scoping – Portsmouth Harbour

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area			
SAC		No – impact assessment not required	There are no SACs associated with Portsmouth Harbour within the ZOI.
SPA / pSPA		No – impact assessment not required	The boundary of Portsmouth Harbour SPA/Ramsar sites is outwith the ZOI. The Solent and Dorset Coast pSPA (UK9020330) overlaps the water body and is within the ZOI. This is assessed under the Isle of Wight East water body (see Table A7).
Shellfish Waters		No – impact assessment not required	Spithead and Stokes Bay Shellfish Water (UKSW48) is listed within the EA's Catchment Data Explorer as associated with the Portsmouth water body. However it is assessed under the Isle of Wight East water body (see Table A7).
Bathing Waters		No – impact assessment not required	The harbour does not contain any designated bathing waters.
NSAs		No – impact assessment not required	NSAs have no connectivity with marine activities.

Section 5: Invasive and non-native species

Table A32 – Considerations for INNS introduction for scoping – Portsmouth Harbour

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – impact assessment not required	Portsmouth Harbour hosts significant vessel traffic, and there is considered to be risk of INNS introduction from pre-existing activities. The Marine Cables will be protected by burial as a preference, minimising the introduction of new hard substrate habitat on which colonising organisms could settle. Furthermore, any secondary cable protection will be of terrestrial rather than marine origin and will remove the risk of introduction of INNS from other marine regions. The Project is international and uses vessels and equipment travelling from other water bodies, however all vessels to be used will operate with strict anti-fouling and biosecurity protocols in line with international regulations, minimising the potential to introduce INNS. The Proposed Development does not have the potential to increase the overall risk of introducing or spreading INNS.

SUSSEX WATER BODY

Section 1: Hydromorphology

Table A33 – Hydromorphological considerations for scoping – Sussex

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	Sussex is not a 'high' status water body.
Could significantly impact the hydromorphology of any water body (i.e. at less than high status)		No – Impact Assessment not required	No marine works will be undertaken within the water body.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	Sussex is classified as heavily modified for coastal protection, as well as navigation, ports and harbours. These activities do not overlap with cable installation activities.

Section 2: Biology

Habitats

Table A34 – Risk information for biology habitat receptors – Sussex

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger		No – Impact Assessment	Based on the potential sediment plume, which may extend up to 5 km from the activities within the Marine Cable Corridor (i.e. the ZOI), the area

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
		not required	within the water body affected constitutes approximately 0.83 km^2. However, at this distance from the marine works the SSCs are predicted to be between 5-10 mg/l which is within normal background levels, and will not lead to any impacts on habitats in this area of the water body.
1% or more of the water body's area		No – Impact Assessment not required	Based on the potential sediment plume (which may extend up to 5 km from the activities within the Marine Cable Corridor), the ZOI, the area within the water body affected constitutes approximately 0.83 km^2. The total footprint equates to 0.4% of the water body's total area (190.6 km^2).
Within 500 m of any higher sensitivity habitat		No – Impact Assessment not required	There are no higher sensitivity habitats within 500 m of the activity, or within the ZOI of the activities which were screened in for further assessment.
1% or more of any lower sensitivity habitat		No – Impact Assessment not required	Based upon available Magic map data, the ZOI will overlap with the lower sensitivity habitat subtidal gravel and cobbles (intertidal & subtidal coarse sediment A5.1), which constitute 12.1 km^2 of the area of the water body. Due to licensing restrictions on WFD habitats spatial data an accurate calculation of the area of lower sensitivity habitats within the ZOI (as shown on Magic maps) cannot be provided here. While it is accepted that the ZOI may interact with more than 1% of the lower sensitivity habitats, at this distance from the marine activities the SSCs are predicted to be between 5-10 mg/l, and not considered sufficiently high to lead to any impacts on habitats in this water body.

Fish

Table A35 – Fish considerations for scoping – Sussex

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, or is outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No – impact assessment not required	Sussex water body is not an estuary. There is no potential to delay or prevent fish from entering or migrating through an estuary.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – impact assessment not required	Potential impacts on fish as a result of the Proposed Development have been assessed within Chapter 9 (Fish and Shellfish), including temporary habitat disturbance / loss; temporary increase in suspended sediments and smothering (including entrainment); and noise and vibration. No significant effects are predicted to occur due to the wide availability of similar habitat in the vicinity, distance of works from known important habitat, temporary and short term duration of activities. Furthermore, potential effects on Annex II diadromous migratory fish were assessed in HRA Report (document reference 6.8.1). It was determined that there was no potential for LSE for all fish features. It is not anticipated that normal fish behaviour will be impacted as a result of any activity screened in for assessment.
Could cause entrainment or impingement of fish		No – impact assessment not required	Marine activities are in open water and are undertaken predominantly on the seabed. No solid barriers to movement will be created, and activities do not have the potential to cause entrainment or impingement of fish.

Section 3: Water Quality

Table A36 – Water quality considerations for scoping – Sussex

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – impact assessment not required	Marine activities are temporary and transient in nature. While the activities will temporarily increase SSC in the vicinity of the works, coarser material is expected to fall out of suspension within minutes, and although fine sediments will likely be transported further in the water column over the hours / days following works, SSC concentrations at the edges of the ZOI are expected to reach 5 - 10 mg/l (see Section 1.5.3). SSC is expected to return to background levels within a few days following completion of these activities.
Is in a water body with a phytoplankton status of moderate, poor or bad		No – impact assessment not required	Phytoplankton status in Sussex remained 'good' throughout Cycle 1 and into Cycle 2, up until 2016.
Is in a water body with a history of harmful algae		No – impact assessment not required	Harmful algae are not monitored within the water body (EA, 2017). No marine works will be undertaken within the water body. While it is recognised that the ZOI interacts with the water body, and nutrient release may occur during marine activities, the activities will be undertaken approximately 4-5 km from the water body. At these distances, SSCs are not considered to be sufficient to cause or increase potential for harmful algal blooms.

Table A37 – Water quality considerations relating to the disturbance of chemicals for scoping – Sussex

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – impact assessment not required – assessed as part of Isle of Wight East water body	No marine works will be undertaken within the water body. Sediments within the potential plume from the works are likely to originate from the Isle of Wight East water body. Effects of the potential for transfer of contaminants from Isle of Wight East are assessed within the Isle of Wight East impact assessment relating to water quality (see Table A5).
It disturbs sediment with contaminants above Cefas Action Level 1		No – impact assessment not required – assessed as part of Isle of Wight East water body	No marine works will be undertaken within the water body. Sediments within the potential plume from the works are likely to originate from the Isle of Wight East water body. Effects of the potential for transfer of contaminants from Isle of Wight East are assessed within the Isle of Wight East impact assessment relating to water quality (see Table A5).

Table A38 – Water quality considerations relating to the release of chemicals for scoping – Sussex

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – impact assessment not required	The Proposed Development does not include a discharge pipeline or outfall.

Section 4: WFD Protected areas

Table A39– Considerations for WFD protected areas for scoping – Sussex

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area			
SAC		No – impact assessment not required	There are no SACs within the ZOI for Sussex water body.
SPA / pSPA		No – impact assessment not required	The Solent and Dorset Coast pSPA (UK9020330) overlaps the water body and is within the ZOI. This is assessed under Isle of Wight East water body (see Table A7).
Shellfish Waters		No – impact assessment not required	Sussex does not contain any shellfish waters.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Bathing Waters		No – impact assessment not required	All bathing waters within Sussex water body are outside the ZOI.
NSAs		No – impact assessment not required	NSAs have no connectivity with marine activities.

Section 5: Invasive and non-native species

Table A40 – Considerations for INNS introduction for scoping – Sussex

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – impact assessment not required	Sussex water body hosts significant marine traffic and the potential for INNS introduction is already high from pre-existing activities. It is recognised that a number of INNS species have been reported in the area (Eno *et al*., 1997; GB Non-Native Species Secretariat, 2019). The Marine Cables will be installed by burial as a preference, minimising the introduction of new hard substrate habitat on which colonising organisms can settle. No new habitat will be introduced to the Sussex water body. Furthermore, any secondary cable protection will be of terrestrial rather than marine origin and will remove the risk of introduction of INNS from other marine regions. The Project is international and uses vessels and equipment travelling from other water bodies, however all vessels will operate with the required national and/or international standards anti-fouling and biosecurity &

Consider if your activity could:	Yes	No	INNS risk issue(s)
			ballast water protocols, in order to ensure that the risk of INNS introduction is as low as reasonably practicable. The Proposed Development does not have the potential to increase the overall risk of introducing or spreading INNS.