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Environmental Statement – Volume 1 – Chapter 7 - Marine Water and Sediment Quality

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Document Ref: 6.1.7

PINS Ref.: EN020022

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PINS REF.: EN020022

DOCUMENT: 6.1.7

DATE: 14 NOVEMBER 2019

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DOCUMENT HISTORY

Document	6.1.7 Environmental Statement – Volume 1 – Chapter 7 Marine Water and Sediment Quality
Revision	001
Document Owner	Natural Power
Prepared By	A. Walker
Date	20 October 2019
Approved By	R. Hodson
Date	30 October 2019

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7. MARINE WATER AND SEDIMENT QUALITY

7.1. SCOPE OF THE ASSESSMENT

7.1.1. INTRODUCTION

7.1.1.1. This chapter provides information regarding the potential environmental impacts on marine water and sediment quality as a result of the construction, operation (including repair and maintenance) and decommissioning of the Proposed Development.

7.1.1.2. Where effects arise as a result of the combination of the impacts of the Proposed Development and the effects of other projects in the UK Marine Area and/or other Member States, these are also identified and assessed in Section 7.7 of this Environmental Statement ('ES') chapter.

7.1.1.3. This chapter should be read in conjunction with Chapter 6 (Physical Processes) of the ES Volume 1 (document reference 6.1.6), Chapter 8 (Intertidal and Benthic Habitats) of the ES Volume 1 (document reference 6.1.8, Appendix 7.1 (Marine Water Framework Directive ('WFD') Assessment) of the ES Volume 3 (document reference 6.3.7.1) and the supporting appendices to this chapter.

7.1.1.4. Appendix 7.3 (Contaminated Sediments Survey Report) of the ES Volume 3 (document reference 6.3.7.3) provides details of the site-specific contaminated sediment sample collection and analysis. Details of sample analysis, and classification of samples, and their suitability for disposal is also provided within Appendix 7.3 (Contaminated Sediments Survey Report).

7.1.1.5. Appendix 7.5 (MMO Spreadsheet) of the ES Volume 3 (document reference 6.3.7.5) presents the Marine Management Organisation ('MMO') template for sample analysis which provides the details of the sample results. Appendix 6.5 (Disposal Site Characterisation Report) of the ES Volume 3 (document reference 6.3.6.5) presents the Disposal Site Characterisation Report which further investigates the Particle Size Distribution ('PSD') data from benthic grab samples and vibrocores to examine the suitability of dredge material for disposal.

7.1.1.6. A Habitats Regulations Assessment ('HRA') (document reference 6.8.1) has also been submitted as part of the Application, in which likely significant effects ('LSE') on European sites and their qualifying features have been considered.

7.1.1.7. Appendix 8.5 (Marine Conservation Zone Assessment) of the ES Volume 3 (document reference 6.3.8.5) of Chapter 8 (Intertidal and Benthic Habitats) presents the assessment of potential effects on Marine Conservation Zones ('MCZ's).

7.1.2. STUDY AREA

7.1.2.1. The Entire Marine Cable Corridor extends from the Landfall at Eastney, near Portsmouth to Pourville in Normandy, France. For the purposes of this assessment, the study area comprises the Landfall and Marine Cable Corridor within the UK Marine Area (as shown on Figure 7.1 of the ES Volume 2 (document reference 6.2.7.1). Further details on the study area are provided below.

Marine Cable Corridor and Landfall

7.1.2.2. 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, located approximately 1 km from the beach between Kilometre Point ('KP') 1 – KP 1.6 (Figure 3.3 of the ES Volume 2 (document reference 6.2.3.3) in Chapter 3 (Description of the Proposed Development) of the ES Volume 1 (document reference 6.1.3)). It is not determined yet whether the HDD direction will be onshore to marine, marine to onshore, or drilling from both ends.

7.1.2.3. Within the jurisdiction of the WFD[1] the study area for the marine water and sediment quality assessment encompasses the coastal and transitional water bodies in the vicinity of the Marine Cable Corridor and the associated Landfall at Eastney; namely Solent, Isle of Wight East, Langstone Harbour, Portsmouth Harbour and Sussex (see inset map in Figure 7.1).

7.1.2.4. A detailed description of activities which have the potential to increase local suspended sediment concentrations ('SSC's) is provided within Chapter 6 (Physical Processes), and summarised within Appendix 7.1 (Marine WFD Assessment). Based on this, the Zone of Influence ('ZOI') of the marine activities within the WFD jurisdiction is considered to extend 5 km from the marine activities (shown in Figure 7.1). 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.

7.1.2.5. 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 this map) of the ES Volume 2 (document reference 6.2.3.9) of Chapter 3 (Description of the Proposed Development)). No HDD works will occur within the marine environment of Langstone Harbour as the drilling will be

[1] Typically, WFD jurisdiction encompasses 1 nmi from the coast, however due to local geography this is extended to encompass the whole of the Solent.

underneath seabed of the harbour area, with the entry and exit points of the drill located above the Mean High Water Spring ('MHWS') mark. It has been agreed with the MMO (via email on the 4th of 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). The Consultation Report provides further detail on this and other consultations (document reference 5.1). Assessment of the HHD works underneath Langstone Harbour is provided in the onshore chapters of this ES.

7.1.2.6. The Marine Cable Corridor encompasses the location of the Landfall and extends from 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.

7.1.2.7. The study area beyond WFD jurisdiction extends seaward, 25 km either side of the Marine Cable Corridor out to the UK/France EEZ Boundary Line (Figure 7.1). Based upon review of Chapter 6 (Physical Processes) this is considered to be the ZOI of the marine activities occurring beyond the WFD jurisdiction.

7.2. LEGISLATION, POLICY AND GUIDANCE

7.2.1.1. This assessment has taken into account the current legislation, policy and guidance relevant to marine water and sediment quality. These are listed below.

7.2.2. LEGISLATION

International

7.2.2.1. A number of European Directives are transposed into UK law as described below:

- EC Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy - transposed into UK law under the WFD;
- EC Directive 76/464/EC Water pollution by discharges of certain dangerous substances (Dangerous Substances Directive) and Priority Substances Directive (2008/105/EC) - transposed into UK law under the Priority/Dangerous Substances Directive;
- EC Directive 91/271/EC concerning urban waste water treatment - transposed into UK law under the Urban Waste Water Directive;
- EC Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy - transposed into UK law under the Marine Strategy Framework Directive ('MSFD'); and
- The International Convention for the Prevention of Marine Pollution by Ships

(MARPOL Convention) 73/78.

National

- Marine and Coastal Access Act ('MCAA') (2009);
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Statutory Instrument 2017 No. 407) for England and Wales. Transposition of Directive 2000/60/EC (which repeals EC Directive 2006/7/EC, known as the Bathing Water Directive and EC Directive 2006/113/EC, known as the Shellfish Waters Directive);
- Nitrate Vulnerable Zones (England and Wales) Regulations 1998 (S.I. 1998/1202); and
- Marine Strategy Regulations 2010.

7.2.3. PLANNING POLICY

National

- EN-1 Overarching National Policy Statement ('NPS') for Energy (DECC, 2011),

Paragraph 5.3.3 states: "*Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the IPC consider thoroughly the potential effects of a proposed project.*"

Paragraph 5.15.2 states:

"*Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent*."

- UK Marine Policy Statement ('MPS') (2011)

The UK MPS (2011) is the framework for preparing Marine Plans and taking decisions affecting the marine environment (in the absence of an adopted Marine Plan). This policy aims to contribute to the achievement of sustainable development and ensure that development aims to avoid harm to marine ecology and biodiversity through consideration of issues such as impacts of noise, ecological resources and water quality. The South Marine Plan, which covers the spatial extent of the Proposed Development, was adopted in July 2018 and is the primary marine policy document.

Regional

7.2.3.1. South Inshore and South Offshore Marine Plan (Defra, 2018) objectives include:

- Objective 11: S-WQ-1 requires that proposals that may have significant adverse impacts upon water environment, including upon habitats and species that can be of benefit to water quality must demonstrate that they will, in order of preference: a) avoid, b) minimise, and c) mitigate significant adverse impacts; and
- Objective 12: S-BIO-3 requires that proposals that enhance coastal habitats where important in their own right and/or for ecosystem functioning and provision of goods and services will be supported. Proposals must take account of the space required for coastal habitats where important in their own right and/or for ecosystem functioning and provision of goods and

  services and demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate for net loss of coastal habitat.

7.2.3.2. Further detail and consideration on how the proposals for the Proposed Development meet the requirements of these policies is presented within the Planning Statement that accompanies the Application (document reference 5.4).

7.2.4. GUIDANCE

- Clearing the waters for all (as updated) (Environment Agency, 2017);
- Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (PINS, 2019);
- Advice Note Eighteen: Water Framework Directive (PINS, 2017); and
- Chartered Institute of Ecology and Environmental Management ('CIEEM') Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019).

7.3. SCOPING OPINION AND CONSULTATION

7.3.1. SCOPING OPINION

7.3.1.1. As detailed within Chapter 5 (Consultation) of the ES Volume 1 (document reference 6.1.5), a Scoping Opinion was received by the Applicant from PINS on 7 December 2018. The Scoping Opinion contains comments from PINS and other key consultees such as the MMO, Environment Agency ('EA'), Natural England ('NE') and Public Health England relating to marine water and sediment quality. Table 1 of Appendix 7.2 (Marine Water and Sediment Quality Consultation Responses) of the ES Volume 3 (document reference 6.3.7.2) explains how all of these comments have been addressed, however key items that were raised included:

- An assessment of the potential impact of the operation stage works (including repair and maintenance) should be included in the assessment;
- Clarification was requested regarding the choice of a 2 km study area in the nearshore study area;
- More detail on the contaminated sediment analysis should be included and an acknowledgement of limitations;
- The scope of the marine WFD assessment should be agreed with relevant consultation bodies, and potential impacts on water quality at protected areas, in particular the Eastney bathing water, should be assessed;
- The MMO considered that the sediment sampling undertaken is sufficient to characterise the sediment to be dredged, and therefore no additional sampling is required;
- The MMO's dredge disposal reporting template should be completed and provided, detailing sediment sampling results;
- Impacts on public health should be considered;
- Emissions to water should be considered; and
- Pollution prevention and response procedures should be followed throughout all stages of the Proposed Development.

7.3.2. PEIR CONSULTATION

7.3.2.1. Consultation on the Preliminary Environmental Information Report ('PEIR') was undertaken between February and April 2019. All of the comments received from the consultation relevant to the assessment are presented in Table 2 of Appendix 7.2 (Marine Water and Sediment Quality Consultation Responses), however the key comments raised included:

- Further information on the accreditation of the laboratory which conducted sediment contaminant analysis should be provided;
- The limitations of contaminated sediment analysis were noted, particularly the lack of samples along the offshore section of the Marine Cable Corridor; though reference was made to the potential use of particle size distribution ("PSD") data to inform the assessment;
- The MMO requested completion of the MMO's dredge material reporting template with PSD and contaminant sample data;
- It was acknowledged that the marine WFD assessment was still to be completed;
- The findings of the WFD assessments and HRA should be included, particularly

in relation to the Solent Maritime SAC, with appropriate cross-referencing throughout;

- A separate disposal site characterisation report was requested;
- It was acknowledged that the cumulative assessment was yet to be completed;
- It was highlighted that any operational and maintenance activities of concern should be assessed accordingly;
- Further information regarding proximity of neighbouring projects should be provided, where survey data is used to inform the assessment;
- Short term impacts on WFD protected areas (shellfish and bathing waters) should be included; and
- The proximity of the Eastney bathing water to the proposed Landfall was highlighted.

7.3.3. POST-PEIR CONSULTATION

7.3.3.1. Further consultation with key stakeholders on specific areas relating to marine water and sediment quality has been undertaken in order to ensure all receptors and impacts have been assessed (as summarised in Table 7.1 below). The key items that have since been discussed include consultation with the EA on the draft Marine WFD Assessment including:

- The EA is content with approach and baseline information provided within Appendix 7.1 (Marine WFD Assessment). They are also content with the outcomes of the screening and scoping stages; and
- The EA requested clarification of the location of the Landfall site (i.e. the location of HDD works in the marine environment), and confirmation that no marine works would be undertaken within 500 m of Eastney bathing water during the bathing water season (May to September). The EA has confirmed that the 500 m stand-off distance for excavation works (at HDD location) during the bathing season should be measured from the bathing monitoring point located at grid reference SZ6741098774 (due south of the eastern edge of the Eastney Promenade).

Table 7.1 – Post-PEIR consultation

Consultee	Date (Method of Consultation)	Discussion
NE	13 February 2019 Teleconference	Discussion on the approach to HRA and pre-screening of sites for Annex I habitat, marine bird, Annex II migratory fish and marine mammal features.
NE, MMO and Joint Nature Conservation Committee ('JNCC')	7 May 2019 Teleconference	Discussions on the approach to dredge and disposal and the approach to plume dispersion modelling.
NE	27 June 2019 Teleconference	Discussion on the Applicant's responses to the feedback received from NE on the PEIR.
EA	8 July 2019 Email	Agreement on the approach to dredge and disposal and the approach to plume dispersion modelling.
MMO	18 July 2019 Teleconference	Discussion on the Applicant's responses to the feedback received from MMO on the PEIR including comments on marine water and sediment quality.
JNCC	24 July 2019 Email	Consultation feedback received on the draft Deemed Marine Licence ('dML').
NE	25 July 2019 Teleconference	Review and discussions on the draft dML.
EA	31 July 2019 Email	Review and feedback on the draft dML.
MMO	1 August 2019 Teleconference	Review and discussions on the draft dML.
JNCC	13 August 2019 Email	Review and feedback on the draft dML.
Environment Agency	20 August 2019 Email	Review and agreement on the Applicant's responses to Environment Agency feedback on the PEIR.
PINS	23 August 2019 Letter/Email	Feedback on draft HRA

Consultee	Date (Method of Consultation)	Discussion
MMO	19 September and 02 October 2019 Email	MMO are content with approach to cumulative assessment and requested one new coastal project to be added to long list.
NE	20 September 2019 Email	Feedback on draft HRA
Environment Agency	26 September 2019 Email	Review and feedback on draft WFD assessment, with a follow-up clarification received by email on the 30 September 2019.
JNCC	28 September 2019 Email	Feedback on draft HRA
States of Alderney	01 October 2019 Email	Feedback on draft HRA
NE	08 October 2019 Email	Review and feedback on MCZ assessment
JNCC	09 October 2019 Email	Review and feedback on MCZ assessment
NE	09 October 2019 Email	NE are content with the plume dispersion modelling approach taken for disposal activities and the resultant outputs with respect to predicted sedimentation and SSC levels, spatial extent and duration.
MMO	11 October 2019 Email	MMO provided feedback that the rationale for the additional 10% non-burial protection contingency during operation looks satisfactory however further clarity to be provided post submission.
MMO/Cefas	18 October 2019 Email	Review and feedback on draft disposal site characterisation report.

7.3.3.2. The Consultation Report (document reference 5.1) provides further detail on the consultation undertaken for the Proposed Development. (

7.3.3.3. Consultation on the standalone HRA Report (document reference 6.8.1) was undertaken with statutory and non-statutory consultees including NE, EA, JNCC and States of Alderney. Feedback on the MCZ assessment is presented in Appendix 8.5 (Marine Conservation Zone Assessment).

7.3.3.4. All comments received from these consultations on the HRA are provided in Appendix 4 (Consultation Responses) (document reference 6.8.3.4) of the HRA Report (document reference 6.8.1).

7.3.4. ELEMENTS SCOPED OUT OF THE ASSESSMENT

7.3.4.1. While no impacts were formally scoped out of assessment, HDD activities to the north-west of Langstone Harbour (A2030 Bridge), will not directly impact receptors as all activities will be located above MHWS, and ducts will be installed under the intertidal zone and marine environment. As a result, under standard operations there will be no impact to water quality as a result of the HDD works in this location.

7.3.4.2. Similarly, the onshore HDD works, i.e. Transition Joint Bays ('TJB's), and the drilling under the intertidal area at Eastney will not result in any potential effects to water quality. However, the excavation works at the marine entry/exit point off the coast at Eastney required prior to HDD works are considered within this assessment as part of the broader route preparation works (see Chapter 3 (Description of the Proposed Development) for further detail on route preparation works).

7.3.5. IMPACTS SCOPED INTO THE ASSESSMENT

7.3.5.1. The following potential impacts on marine water and sediment quality were identified during the scoping process and have been scoped in to this assessment:

- Construction (and decommissioning);
  - Temporary increase in SSC; and
  - Impacts from the resuspension of contaminated sediment.
- Operation (including repair and maintenance):
  - Temporary increase in SSC; and
  - Impacts from the resuspension of contaminated sediment.

7.4. ASSESSMENT METHODOLOGY

7.4.1.1. Where potential impacts are within the WFD transitional and coastal water bodies, the assessment has drawn on the findings of Appendix 7.1 (Marine WFD Assessment).

7.4.1.2. The assessment methodology used in this chapter is based primarily on that outlined by the CIEEM for projects in marine and coastal environments (CIEEM, 2019). These guidelines are the industry standard followed for ecological impact assessment ('EcIA') and set out the process for assessment through the following stages:

- Describing the baseline within the study area;

- Identifying the receptors;
- Determining the nature conservation importance of the receptors present within the study area that may be affected by the Proposed Development;
- Identifying and characterising the potential impacts, based on the nature of the installation, operation, maintenance and decommissioning activities associated with the Proposed Development;
- Determining the significance of the impacts;
- Identifying the counter effect of any mitigation measures to be undertaken, that may be implemented in order to address significant adverse effects;
- Determining the residual impact significance after the effects of mitigation have been considered; and
- Assessing cumulative effects (with mitigation where applicable).

7.4.1.3. The CIEEM guidelines are considered the most appropriate guidelines for this assessment due to the potential ecological impacts which could result from changes to marine water and sediment quality. It should be noted however that non-ecological impacts are also assessed here in so far as they relate to the WFD protected areas Bathing Waters and Shellfish Waters. Impacts on Human Health are assessed in Chapter 26 (Human Health) of the ES Volume 1 (document reference 6.1.26).

7.4.1.4. In order to determine importance of the receptors within the WFD jurisdiction, reference has been made to WFD protected areas (i.e. Natura 2000 sites, bathing waters and shellfish waters) and high sensitivity habitats. Beyond the WFD jurisdiction reference is made to Natura 2000 sites.

7.4.1.5. Potential impacts were identified based upon review of the proposed activities and agreed during the scoping stage of the application. Impacts were characterised based on the severity of their potential effects, including likely duration and magnitude (i.e. change from baseline).

7.4.2. DETERMINING SIGNIFICANCE OF EFFECT

7.4.2.1. With regards to the transitional and coastal water bodies within the study area, a significant effect in the EIA is considered to be one that results in a deterioration of a water body's status, or prevention of a water body reaching 'good' status as a result of the Proposed Development. The potential for the deterioration of status or prevention of reaching good status was determined following the completion of the Marine WFD Assessment (Appendix 7.1) in line with EA guidelines (Environment Agency, 2017). Ecological Status is classified by the EA in all water bodies, expressed in terms of five classes (high, good, moderate, poor or bad). These classes are established on the basis of specific criteria and boundaries defined

against biological, physico-chemical and hydromorphological elements. The three stages of the WFD assessment process (namely screening, scoping and assessment) allow a comprehensive evaluation of the potential for deterioration of status or prevention of status improvement.

7.4.2.2. Beyond the jurisdiction of the WFD, significant effects have been defined as those which are likely to result in a change in the ecosystem structure and function.

7.4.3. ASSUMPTIONS AND LIMITATIONS

7.4.3.1. Assessment has been undertaken based on the information provided within Chapter 3 (Description of the Proposed Development) and using the worst case parameters presented in Appendix 3.2 (Marine Worst-Case Design Parameters) of the ES Volume 3 (document reference 6.3.3.2) and summarised in Table 7.4. Section 7.6.1 below explains how these parameters are relevant for worst case scenarios for marine water and sediment quality.

7.4.3.2. Sediment contaminant samples have been obtained for the nearshore area only and not the full study area due to the generally higher proportion of fine sediment in the nearshore area. PSD data (Appendix 8.1 (Benthic Ecology Survey Report) of the ES Volume 3 (document reference 6.3.8.1) and 6.3 (Grain Size Statistics) of the ES Volume 3 (document reference 6.3.6.3)) obtained over the whole route shows much of the route to be comprised of sandy gravel sediment. Coarse sediment has a limited affinity for sorption of chemical contaminants and therefore sediment contamination would not be expected to pose a significant risk in the offshore areas of the route given the PSD results.

7.4.3.3. Assessment of water quality in WFD water bodies was based on the EA Catchment Explorer (2018). Although this website is updated regularly, the latest revision of water body status on this site is dated 2016. The most recent available data has been applied. The current cycle of the WFD runs from the publication of the River Basin Management Plans ('RBMP') in 2015 until 2021.

7.4.3.4. The current status of designated sites (Table 7.3) are up to date as of the time of writing (October 2019), however it is acknowledged that there is potential for these to change between submission and examination.

7.4.3.5. The EA's WFD Guidance (2017) "Clearing the Waters for All" advises reference to Magic Maps for information on the location and area of WFD lower sensitivity habitats. Due to licensing restrictions on WFD habitats spatial data however, this information cannot be reproduced. Therefore, a precautionary approach has been applied whereby the area of lower sensitivity habitats within the footprint of activities is assumed to be greater than 1% of the lower sensitivity habitat area (i.e. above the threshold for scoping into a WFD assessment).

7.4.3.6. Furthermore, the EA's WFD Guidance (2017) "Clearing the Waters for All" provides a summary table of the current status of WFD water bodies, including habitat area

information and phytoplankton status. However it is not clear when this information was produced, nor how it relates to information provided by Magic Maps. It is assumed therefore that this information is compatible with Magic Maps.

7.5. BASELINE ENVIRONMENT

7.5.1. DATA SOURCES

7.5.1.1. The baseline environment has been described using information from the sources listed in Table 7.2), studies carried out for other developments, and site-specific surveys (e.g. for contaminated sediments, as detailed in Appendix 7.3 (Contaminated Sediment Survey Report)). This information is considered to be sufficient to characterise the baseline within the study area and to conduct a proportionate assessment given the nature of the Proposed Development.

Table 7.1 – Data Sources

Organisation	Data type	Details
Natural Power Consultants Ltd	Benthic and intertidal survey (Appendix 8.1 (Benthic Ecology Survey Report)) (2019)	Site specific benthic and intertidal surveys.
Natural Power Consultants Ltd	Contaminated sediment survey results (Appendix 7.3 (Contaminated Sediments Survey Report)) (2019)	Site specific contaminated sediment sample collection and analysis.
Partrac Ltd	Coastal Processes Modelling (Appendix 6.2 (Modelling Technical Report)) (2019)	Detail of baseline environment and outline of approach to assessment including brief narrative of sediment plume modelling.
National Grid	IFA2 ES (IFA2, 2016)	Coastal Processes chapter including water quality of the ES for IFA2, a nearby interconnector project.
Rampion OWF	Rampion ES (E.ON, 2012).	Coastal Processes Appendix including water quality of the ES for Rampion OWF; an OWF located 13 km off the coast of Sussex, to the east

Organisation	Data type	Details
		of the Marine Cable Corridor.
Defra	Magic Map Application (Defra, 2019)	Online mapping resource providing layers of habitat types and features within the study area.
Environment Agency	Environment Agency Data Catchment Explorer (Environment Agency 2019)	Information relating to water bodies monitored under the remit of the WFD.
OSPAR	OSPAR Intermediate Report (OSPAR, 2017a)	Multinational assessment and monitoring effort in the OSPAR Maritime Area. The Channel lies in the Greater North Sea OSPAR Geographic Region (Region II).

7.5.2. MARINE WATER QUALITY

7.5.2.1. The waters of the Channel are characterised as shallow and well mixed with a seasonal thermocline as a result of seasonal changes in temperature and salinity (Gentilhomme & Lizon, 1998; Halsband-Lenk & Antajan, 2010; Masquelier *et al*., 2011; Tappin & Millward, 2015). As a result of its confined geography and prevailing south westerly winds, it is susceptible to swells and coastal flooding (Tappin & Millward, 2015).

7.5.2.2. There has been significant improvement in water quality within the Channel since 1990 regarding the input of nutrients; however, eutrophication is still considered to be a problem (OSPAR, 2017a). Water quality in UK waters has improved in recent years particularly due to the reduction of discharged effluent due to implementation of the Urban Waste Water Directive (adopted in 1991). Similarly, tighter controls on nutrient inputs, as directed by the Nitrates Directive (1991), have contributed to an improvement in water quality. Despite these improvements, the terrestrial area directly surrounding the Landfall and Solent is still designated as a nutrient (nitrate) sensitive area ('NSA') under the Nitrates Directive.

7.5.2.3. In a recent study of the current health status of the North-East Atlantic by OSPAR, the main source of nutrients in coastal areas was found to be from rivers, particularly related to estuaries and areas affected by river plumes, with several

spikes in nutrient input levels coinciding with large flooding events (OSPAR, 2017a). High levels of nitrogen and phosphorus were being produced from the Portsmouth area, with Chichester Harbour classified as a 'problem area' for eutrophication and Langstone Harbour was classified as a 'potential problem area' (OSPAR, 2017b). The remainder of the Channel out to the 12 nmi limit was classified as a 'non-problem area' (OSPAR, 2017b).

7.5.2.4. The Channel is supplied with oxygen-rich water originating from the Atlantic. Studies on oxygen demand in the Solent-Southampton Estuary system recorded that despite oxygen demand, dissolved oxygen levels never dropped below 80% (Shi, 2000).

7.5.2.5. The Marine Cable Corridor passes through South East Transitional and Coastal ('TraC') Management Catchment, part of the broader South East River Basin District. The smaller operational catchments (Solent and Isle of Wight TraC) are subdivided into water bodies, of which the Marine Cable Corridor passes through Isle of Wight East and the Solent. Water bodies are defined as part of the South East District RBMP, which includes transitional waters and coastal waters up to 1 nmi from the shore (Environment Agency, 2015), however due to local geography this has been extended to encompass the whole of the Solent. The Landfall is situated close to Langstone Harbour water body (<1 km) and Portsmouth Harbour water body (<5 km) (Figure 7.1).

7.5.2.6. Details of water bodies' biological and chemical statuses for Cycles 1 and 2 of the WFD are provided online in the Environment Agency's Catchment Data Explorer (Environment Agency, 2019). The status of the water bodies scoped in to the Marine WFD Assessment are provided in Appendix 7.1 (Marine WFD Assessment) and summarised below.

Isle of Wight East Water Body

7.5.2.7. 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 ZOI within the water body overlaps with two WFD protected areas, namely South Wight Maritime SAC and Solent and Dorset Coast pSPA.

Solent Water Body

7.5.2.8. The Marine Cable Corridor and marine HDD entry/exit point 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 (Environment Agency, 2019). Its hydromorphological status is not assessed.

7.5.2.9. Its overall classification has remained 'moderate' from 2013 to 2016 (i.e. during Cycle 2 classifications), determined based on its 'moderate' ecological status. Its chemical status however improved to 'good' in 2016.

7.5.2.10. 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 the biological element to 'good' would have significant adverse impact on use. The target of reaching 'good' status has been delayed until 2027. The ZOI within the water body overlaps with a number of WFD protected areas (Natura 2000, bathing waters and shellfish waters).

Langstone Harbour Water Body

7.5.2.11. Langstone Harbour (ID: GB580705130000) is a transitional water body, the mouth of which is located approximately 160 m east from the Marine Cable Corridor (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.

7.5.2.12. Langstone Harbour's overall status classification has remained 'moderate' throughout Cycle 2 (2013 to 2016), with its ecological status also reported as 'moderate'. 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. The ZOI within the water body overlaps with the Langstone Harbour shellfish water.

Portsmouth Harbour Water Body

7.5.2.13. 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'.

7.5.2.14. 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.

7.5.2.15. 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.

7.5.2.16. 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. The ZOI within the water body does not overlap with any WFD protected areas.

7.5.3. MARINE SEDIMENTS

7.5.3.1. Seabed sediments were characterised using a combination of publicly available sources and a site-specific survey undertaken in the benthic survey area, defined as 500 m either side of the Marine Cable Corridor. A full description of marine sediments has been provided in Chapter 8 (Intertidal and Benthic Habitats) and Appendix 8.1 (Benthic Ecology Survey Report) and is summarised below.

Habitat classifications

7.5.3.2. Within WFD jurisdiction, detailed survey analysis undertaken during benthic baseline surveys showed the majority of habitat classifications within the benthic survey area was composed of A5.43 (Infralittoral mixed sediments), with A5.23 (Infralittoral fine sand) found close to the shore. EMODnet (2016) predictions of EUNIS habitat classifications in the vicinity of the benthic survey area (shown in Appendix 8.1 (Benthic Ecology Survey Report), Figure 8.1 of the ES Volume 2 (document reference 6.2.8.1)) indicated a high incidence of A5.14 (Circalittoral coarse sediment) and A5.23 (Infralittoral fine sand).

7.5.3.3. Survey results in the Channel (outwith WFD jurisdiction), shown in Appendix 8.1 (Benthic Ecology Survey Report), reveal a progression from A5.43 (Infralittoral mixed sediments) to A5.14 (Circalittoral coarse sediment), to A5.15 (Offshore circalittoral coarse sediment).

7.5.3.4. In the area surrounding the benthic survey area, EMODnet predictions of EUNIS habitat classifications also indicated a high incidence of A5.23 or A5.24 (Infralittoral sand or muddy sand) and A5.14 (Circalittoral coarse sediment), A5.25 or A5.26 (Circalittoral fine sand or muddy sand) and A5.33 or A5.35 (Infralittoral or Circalittoral sandy mud) (EMODnet, 2016).

Sediment composition

7.5.3.5. Composition of sediments across the benthic survey area in English waters ranged from predominantly sandy gravel and muddy sandy gravel to finer muds and sands. In general, sediment samples taken from sampling stations further offshore were dominated by coarser sediments. Inshore grounds typically comprised mixed

sediments with the exception of sampling station 2 near to Eastney, which was characterised by finer sands. One grab sample (station 3) comprised 60.4% mud; however, the mud fraction did not exceed 18% at any other station, and only exceeded 10% at three sampling stations. Total Organic Carbon ('TOC') values for all sampling stations in UK waters fell between 0.2% (station 2) and 2.9% (station 3), with the majority of samples greater than 0.5%. Full detail of Particle Size Distribution ('PSD') and TOC analysis is presented in Appendix 8.1 (Benthic Ecology Survey Report).

7.5.3.6. PSD data obtained over much of the route shows that the seabed sediments are composed primarily of sand and gravel, therefore contaminated sediment sampling was concentrated in the nearshore area where sediments are typically finer (Chapter 6 (Physical Processes)).

Suspended sediments

7.5.3.7. Chapter 6 (Physical Processes) describes the background levels of SSC within the Solent and the Channel and highlights that levels within the Solent are naturally higher than in the Channel. This variation is summarised in (Chapter 6 Physical Processes) as follows:

- In the nearshore region natural variation in SSC ranges from approximately <5 to 75 mg/l in coastal areas, with annual averages of between 5 – 15 mg/l observed within surface waters;
- Comparatively, offshore, natural variation is significantly reduced ranging from <1 to 6 mg/l; and
- SSC is enhanced during periods of higher energy. For example during spring tides near surface SSC's have been observed to increase by up to 10 mg/l and during storm events by up to 20 mg/l.

7.5.3.8. Further details of baseline SSC in the Channel is provided in Chapter 6 (Physical Processes).

Contaminated Sediment Analysis

7.5.3.9. A total of ten sampling stations were used for the contaminated sediment survey, as part of the benthic survey (see Appendix 8.1 (Benthic Ecology Survey Report) and Appendix 7.3 (Contaminated Sediment Survey Report) for further details). These were spaced along the benthic survey area, which is defined as 500 m either side of the Marine Cable Corridor. PSD data obtained over much of the route shows that the seabed sediments are composed primarily of sand and gravel, which has a limited affinity for the sorption of chemical contaminants (Simpson *et al.*, 2005; Sheahan *et al.*, 2001; McNiven & Gilchrist, 2016), therefore sampling was concentrated in the nearshore area where sediments are typically finer, and exposed to a higher concentration of potential sources of contamination (such as

from land run off and vessel activity). It should also be noted that sample collection was undertaken during earlier design iterations of the Proposed Development and at the time, the Marine Cable Corridor followed a slightly different route, and an East Wittering Landfall option was being considered. Stations 5 – 7 were selected in order to sample this Landfall option, which has since been removed from the Proposed Development. Sample locations are presented in Figure 1 of Appendix 7.3 (Contaminated Sediments Survey Report) which presents EMODnet habitats data within and surrounding the benthic survey area.

7.5.3.10. Analysis of the ten samples indicated that for a single metal (arsenic) two stations (5 and 26) exceeded Cefas Action Level ('AL') 1 (measuring 44.8 mg/kg and 22.3 mg/kg respectively). Cefas AL 1 is defined as 20 mg/kg for arsenic. One of these stations (5) also exceeded OSPAR Background Assessment Concentrations ('BAC's) which is defined as 25 mg/kg (MMO, 2015). Neither of these stations are within the Marine Cable Corridor (see Figure 2 in Appendix 7.3 (Contaminated Sediments Survey Report) which presents the geophysical survey data within the Marine Cable Corridor). Arsenic levels at five other stations were above OSPAR Effects Range Low ('ERL') (defined as 8.2 mg/kg), but below AL 1. The levels for all remaining metals were generally low, with no other metals exceeding AL 1 in any sample. None of the samples contained contaminant concentrations of concern (i.e. above Cefas AL 2).

7.5.3.11. The majority of the Poly-Chlorinated Biphenyls ('PCB') were below the limit of detection and none of the stations exceeded Cefas AL 1 for total PCBs. Organotin compounds, dibutyl tin ('DBT') and tributyl tin ('TBT'), were below the limits of detection <1 µg/kg, therefore did not exceed Cefas AL 1 or OSPAR levels. Full analysis of contaminated sediment samples is presented in Appendix 7.3 (Contaminated Sediments Survey Report) and Appendix 7.5 (MMO Spreadsheet).

7.5.3.12. Due to the proximity of the Marine Cable Corridor to industrial and recreational ports along the south coast (Southampton, Portsmouth, Langstone Harbour) the slightly elevated levels of arsenic in the fine muds was expected and similar results had been found in both IFA2 (IFA2, 2016) and Rampion EIA surveys (E.ON, 2012).

7.5.3.13. IFA2 and Rampion OWF are proximal to the Proposed Development (0.4 km and 6.9 km, respectively) and survey data demonstrated similar PSD results. PSD data from IFA2 indicated sediments were predominantly sandy gravel (12 out of 40 stations), followed by muddy sandy gravel (8 out of 40 stations) and finally gravelly sand, slightly gravelly sand and slightly gravelly muddy sand made up the remainder of the stations (IFA2, 2016). The deep water area of the Channel was almost entirely characterised by sandy gravel.

7.5.3.14. PSD data from Rampion also indicated that sediments were generally comprised of sands and gravelly sands, with several areas of sandy gravels (E.ON, 2012).

7.5.4. DESIGNATED SITES

7.5.4.1. WFD protected areas are defined within the EA's WFD Guidance (2017) as Special Areas of Conservation ('SAC'), Special Protection Areas ('SPA'), shellfish waters, bathing waters and nutrient sensitive areas. WFD protected areas within the ZOI, with connectivity to the marine activities (i.e. SACs, SPAs, bathing waters and shellfish waters) were scoped in to the Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)) and are presented in Figure 7.1 and Table 7.3. While Natura 2000 sites (SACs and SPAs) were scoped in to the assessment, potential effects are assessed within the HRA Report (document reference 6.8.1), findings of which have been used to inform Appendix 7.1 (Marine WFD Assessment)

7.5.4.2. Other sites designated for habitat features within the ZOI jurisdiction are presented in Figures 8.2 of the ES Volume 2 (document reference 6.2.8.2) and 8.3 of the ES Volume 2 (document reference 6.2.8.3), and have been assessed for marine water and sediment quality impacts (i.e. increase in SSC and resuspension of contaminated sediments) within Chapter 8 (Benthic and Intertidal Habitats) (and associated appendices).

Table 7.2 – Designated sites scoped in for assessment

Name	Criteria	Current Status	Approx. closest distance to the Proposed Development* (km)
WFD protected areas			
Solent Maritime SAC	Qualifying features: estuaries; spartina swards (*Spartinion maritimae*); Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); sandbanks which are slightly covered by sea water all the time; mudflats and sandflats not covered by seawater at low tide; coastal lagoons; annual vegetation of drift lines; perennial vegetation of stony banks; salicornia and other annuals colonizing mud and sand; shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes").	Designated	0
Solent and Dorset Coast pSPA	Qualifying features**: Sandwich tern (*Sterna sandvicensis*) Common tern (*Sterna hirundo*) Little tern (*Sterna albifrons*)	Proposed	0
Langstone Harbour shellfish water (UKSW33)	Monitored for faecal indicator organisms by Cefas.	Class B – *Mercenaria mercenaria* Class C – *Ostrea edulis* Class C – *Crassostrea gigas* (effective from 2 September 2019)	0.01
Chichester	Qualifying features:	Designated	0.04

Name	Criteria	Current Status	Approx. closest distance to the Proposed Development* (km)
and Langstone Harbours SPA / Ramsar site	Common tern (*Sterna hirundo*), Little tern (*Sternula albifrons*), Red-breasted merganser (*Mergus serrator*), Sandwich tern (*Thalasseus sandvicensis*),		
Eastney bathing water	Monitored for the presence of faecal indicator organisms by the EA.	Excellent quality	0.4*
Beachlands West bathing water	Monitored for the presence of faecal indicator organisms by the EA.	Excellent quality	2.1
Southsea East bathing water	Monitored for the presence of faecal indicator organisms by the EA.	Excellent quality	2.5
Spithead and Stokes Bay shellfish water (UKSW48)	Monitored for faecal indicator organisms by Cefas.	Not classified	2.7
Ryde shellfish water (UKSW487)	Monitored for faecal indicator organisms by Cefas.	Class B (Ryde Middle and Sturbridge) – *O. edulis* (effective from 2 September 2019)	3.0
South Wight Maritime SAC	Qualifying features: reefs; vegetated sea cliffs of the Atlantic and Baltic Coasts; submerged or partially submerged sea caves	Designated	3.3

Name	Criteria	Current Status	Approx. closest distance to the Proposed Development* (km)
Beachlands Central bathing water	Monitored for the presence of faecal indicator organisms by the EA.	Excellent quality	4.0
Eastoke bathing water	Monitored for the presence of faecal indicator organisms by the EA.	Excellent quality	4.3
Other designated sites within the ZOI			
Langstone Harbour Site of Special Scientific Interest ('SSSI')	Notified features: saline coastal lagoons; sheltered muddy shores (including estuarine muds); Zostera communities; invertebrate assemblage	Notified	0.1
Offshore Overfalls Marine Conservation Zone ('MCZ')	Protected features: subtidal coarse sediment; subtidal mixed sediments; subtidal sand	Designated	1.2
Utopia (MCZ)	Protected features: moderate/high energy circalittoral rock; subtidal coarse/mixed sediment; subtidal sand; fragile sponge and anthozoan communities on subtidal rocky habitats	Designated	1.3
Bembridge (MCZ)	Features considered: subtidal mixed sediments; subtidal coarse sediments; subtidal sand; subtidal mud; sheltered muddy gravels; seagrass beds; maerl beds; sea-pens and burrowing megafauna; peacock's tail seaweed; Stalked jellyfish	Designated	3.8

Name	Criteria	Current Status	Approx. closest distance to the Proposed Development* (km)
	(*Calvadosia campanulata*); Stalked jellyfish (*Haliclystus species*).		
Selsey Bill and the Hounds (MCZ)	Features considered: subtidal mixed sediments; subtidal sand; high energy infralittoral rock; moderate energy infralittoral rock; moderate energy circalittoral rock; low energy infralittoral rock; tentacled lagoon worm (*Alkmaria romijni*); peat and clay exposures	Designated	4.0
Chichester Harbour (SSSI)	Notified features: Zostera communities; invertebrate assemblage	Notified	4.5
Portsmouth Harbour (SSSI)	Notified features: lagoon sand shrimp (*Gammarus insensibilis)*, Starlet Sea Anemone (*Nematostella vectensis)*	Notified	4.9
Portsmouth Harbour Wetland of International Importance (Ramsar)	Intertidal mudflat areas with Zostera beds; saltmarsh; *Hydrobia ulvae*; *Ulva spp*.; lagoon sand shrimp (*Gammarus insensibilis*)*;* Starlet Sea Anemone (*Nematostella vectensis*)	Designated	4.9
Offshore Brighton (MCZ)	Features protected: high energy circalittoral rock; subtidal coarse sediment; subtidal mixed sediments	Designated	8.5
Kingmere (MCZ)	Features protected: moderate energy infralittoral rock and thin mixed sediment; subtidal chalk	Designated	10.8

*Distance calculated based on closest point between the marine activities and the edge of the protected area, or bathing water

Name	Criteria	Current Status	Approx. closest distance to the Proposed Development* (km)
monitoring point. ‘0’ indicates overlap with the Proposed Development. It should be noted that due to the use of HDD, no marine activities will be undertaken between KP 0 and KP 1. **Only SPAs/pSPAs which overlap with the ZOI and have connectivity via water are shown. Of the SPAs/pSPAs included, only those qualifying features with potential connectivity to the Proposed Development are shown. Connectivity was established based on the features connectivity with water (i.e. their range extends below MHWS).			

7.5.5. IDENTIFICATION OF RECEPTORS

7.5.5.1. The receptors assessed within this chapter are:

- Water Bodies which were scoped in to the Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)), namely Isle of Wight East, Langstone Harbour and Portsmouth Harbour; and
- Marine waters and sediment of the Channel beyond WFD jurisdiction (and therefore outside the scope of the Marine WFD assessment, (Appendix 7.1 (Marine WFD Assessment)).

7.5.6. FUTURE BASELINE

7.5.6.1. The baseline environment present in the vicinity of the Proposed Development is currently undergoing significant change through the implementation of legislation aimed at protecting and improving the water environment. The implementation of the WFD has resulted in a gradual improvement of water quality through the identification and targeted management of water bodies, working towards 'good' ecological and 'good' chemical status by 2015 (or as extended). The WFD has incorporated the requirements of several directives, including the Bathing Waters Directive, the Shellfish Waters Directive, Nitrates Directive and Priority Substances Directives in order to ensure a coordinated approach. The second cycle of the river basin management plan will end in 2021, which is to include hydrology and hydromorphology as additional criteria for ecological status. A number of local water bodies have failed to achieve 'good' WFD status, citing unfavourable balance of costs and benefits, disproportionate burdens, with no technical solution available. In the future, it is hoped that this will change, and a new target for achieving 'good' status has been set for 2027.

7.5.6.2. In addition, the MSFD has been implemented across Europe, with the goal to increase coordination and cooperation, with the aim to achieve and maintain 'good environmental status' by 2020.

7.5.6.3. These directives have been incorporated into national planning policy and are unlikely therefore to be affected by any changes in the UK's status in the EU.

7.5.6.4. In the absence of the Proposed Development, this trend towards the improvement of water quality status is predicted to continue as a result of current management regimes and increased coordination of marine activities under the WFD and national planning policy, subject to the influence of large-scale climactic factors that may occur in such a time period.

7.6. IMPACT ASSESSMENT

7.6.1. WORST CASE DESIGN ENVELOPE

7.6.1.1. This section describes the potential impacts that may arise from the construction, operation (including maintenance and repair) and decommissioning of the Proposed Development and the effects these may have on marine water and sediment quality.

7.6.1.2. Table 7.4 presents the worst-case design parameters as they apply to marine water and sediment quality. Further details regarding the proposed activities and programme are presented in Chapter 3 (Description of Proposed Development) and Appendix 3.2 (Marine Worst-Case Design Parameters).

7.6.1.3. The options for decommissioning include leaving the Marine Cables in situ, removal of the entire cables or removal of sections of the Marine Cables. One option is to leave the inert and environmentally benign cable in situ so as to avoid unnecessary disturbance of the seabed (see Chapter 3 (Description of the Proposed Development)). Whilst some types of cable contain liquid oil for electrical insulation, the proposed cables contain no oil. Therefore, if a cable is ruptured, no liquids or gases will be released into the marine environment. It is therefore considered that there is no potential for significant effects from leaving the inert marine cables in place.

7.6.1.4. It is acknowledged however, that the Crown Estate and the Department for Business Enterprise and Industrial Strategy ('BEIS') currently support removal of cables where practicable for offshore renewable energy installations ('OREI's) (BEIS, 2019). In the event that cables are retrieved, decommissioning will be undertaken in line with industry best practice, and any effects are considered to be equivalent to or lesser in nature than those considered for construction activities undertaken during construction (and should inert cables be left in situ, they are expected to be significantly less). As such, predicted effects from decommissioning the Proposed Development are not assessed individually in the following paragraphs for each receptor and impact.

Table 7.3 – Worst case design parameters

Potential impact	Worst case parameters used for the assessment
Construction (& Decommissioning) stage	
Temporary increase in suspended sediment concentrations	**WFD water bodies** • Worst-case activities which will lead to increased SSC are considered to be excavation at the marine HDD pits (KP 1.0-1.6) with backhoe dredger or Mass Flow Excavation ('MFE'), 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). and these concentrations could potentially persist for several hours following completion of construction activities. Sediment plumes are also likely to be transported up to 5 km from the cable trench/HDD pit at which point concentrations of 5 to 10 mg/l are predicted; SSC is expected to return to background levels within a few days following completion of these activities. **Marine Water and Sediment of the Channel (beyond WFD water bodies)** • Worst-case scenario considers surface release of up to 1,754,000 m^3 of sediment. • Peak SSC of 1000 mg/l within 1 km from the release point but coarser sediment is expected to deposit quickly (almost immediately) with significant reductions of SSC within hours of disposal at each location. • Beyond 1 km from release, the passive plume is likely to generate SSC in the region of
Resuspension of contaminated sediment	

Potential impact	Worst case parameters used for the assessment
	approximately 20 mg/l, transported in the direction of the prevailing flow out to a worst-case distance of 25 km. • SSC is predicted to reduce to background levels (<1 – 6 mg/l) within the timeframe of a few days following completion of these activities. Depth of penetration of seabed preparation (after bedform clearance) and burial tools will range from 1 m (PLGR) to 3 m (cable burial tools). Trials of cable installation tools may be required prior to cable installation. However, it is considered that any potential effects from tool trials will be significantly reduced in scale and duration such that they would not be measurable against the potential effects from construction activities and have potential to overlap with areas impacted by other seabed preparation / construction activities. The possible impacts from decommissioning are predicted to be equal to or less than construction activities.
Operation (including maintenance and repair) stage	
Temporary increase in suspended sediment concentrations	The Proposed Development has been designed so that maintenance of the marine cables is not required during its operational lifetime. During operation, it is assumed that an indicative worst-case failure rate of the marine cables would require one repair every 10-12 years. Reburial of cables and placement of cable

Potential impact	Worst case parameters used for the assessment
Resuspension of contaminated sediment	protection may be required but it is predicted that the replacement of sections of cable would constitute the worst case. It is assumed that an indicative worst-case failure rate of the marine cables would require: • One repair every 10-12 years; • A length of cable up to 3 x water depth to be recovered from the seabed (e.g. in the worst-case, at the maximum water depth of approximately 70 m, this could amount to approx. 1,100 m of cable to typically be recovered and relaid for each repair of a cable pair); • The actual jointing operation may take up to 5 – 6 days, and the handling of the joint and deployment to the seabed could take 1 – 2 days. Depending on the extent of cable damage, cable repair operations typically have duration of several weeks to months. It is therefore considered that should any repair and maintenance works be required, the works would be of shorter duration and smaller in extent than the construction stage.

7.6.2. EMBEDDED MITIGATION

7.6.2.1. Embedded mitigation measures are considered to be those included as part of the project or which constitute industry standard plans or best practice. Embedded mitigation measures which are considered to be part of the design of the Proposed Development are as follows:

- Disposal of dredged material is restricted to beyond WFD jurisdiction (plus 3 km) to eliminate effects on WFD water bodies of the Marine Cable Corridor (as agreed with the EA via email on 12 April 2019);
- Any coatings/treatments used will be suitable for use in the marine environment;
- Adoption of project plans and procedures for marine pollution prevention, risk reduction and waste management to eliminate and mitigate the potential risk to water quality receptors as covered within the Marine Outline Construction Environmental Management Plan ('CEMP') (document reference 6.5);
- Prevention of cable abrasion, corrosion and damage (and therefore maintenance and repair requirements) by burial to an anticipated target depth of 1.0 m over approximately 90% of the Marine Cable Corridor;
- The cable bundles are insulated and protected by layers of polyethylene, including an anti-corrosion layer which is highly resistant to degradation as industry best practice to limit the potential for abrasion and corrosion; and
- Distributed Temperature Sensing System ('DTS') via two fibre optic cables will be laid within the cable bundle, which can be utilised to facilitate cable maintenance and repair by reducing cable inspection requirements, and localise potential areas requiring maintenance.

7.6.3. CONSTRUCTION (AND DECOMMISSIONING) IMPACTS

Temporary Increase in SSC

7.6.3.1. Activities associated with the construction of the Proposed Development will cause a temporary increase in SSC which could negatively impact the identified receptors through increased turbidity and release of sediment bound nutrients thus making them biologically available to marine organisms. Additionally, increases in SSC could give rise to high oxygen demands, thus reducing the levels of dissolved oxygen within the water.

7.6.3.2. It is anticipated that overall increases in SSC will occur within the study area following route preparation (including sandwave clearance using Trailing Suction Hopper Dredge ('TSHD')/MFE, deposit of dredged material, HDD pit excavation and cable joint work using MFE/excavator) and cable installation works. The disposal of dredged material from route preparation works will however only be undertaken

beyond WFD waters (plus an additional 3 km buffer) within the proposed marine disposal area. As a result and based upon review of modelling outputs (Chapter 6(Physical Processes)), increases in SSC in WFD waters will be limited to other seabed preparation and cable installation activities proposed to be undertaken in the nearshore. The impacts on receptors are considered below.

WFD Water Bodies

7.6.3.3. The impact of temporary increase in SSC on WFD water bodies was considered in detail in the Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)). Based on the results of scoping and impact assessment presented within the Marine WFD Assessment, it was concluded that there is no potential for deterioration of WFD receptors as a result of marine activities, including those which may cause temporary increases in SSC.

7.6.3.4. No disposal of dredged material will take place within WFD waters. The worst-case activities which will lead to increased SSC in WFD waters are 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 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. 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) and these concentrations could potentially persist for several hours following completion of construction activities. Sediment plumes are also likely to be transported up to 5 km away from the trench/pit at which point concentrations of 5 to 10 mg/l are predicted; SSC is expected to return to background levels within a few days following completion of these activities.

7.6.3.5. As stated within the EA's guidance (Environment Agency, 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.

7.6.3.6. The Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)) 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. Therefore, any resulting impacts are considered to be **not significant**.

Marine Water and Sediment of the Channel (beyond WFD jurisdiction)

7.6.3.7. Literature indicates that background levels of SSC within the Channel are naturally lower than that of the Solent. Offshore, natural variation ranges from <1 to 6 mg/l, though SSC is enhanced during periods of higher energy. For example, near surface SSC's have been observed to increase by up to 10 mg/l during spring tides,

and by up to 20 mg/l during storm events (Chapter 6 (Physical Processes)).

7.6.3.8. It is predicted that SSC as a result of deposition of dredged material may peak at 1000 mg/l within 1 km from the release point but coarser sediment is expected to deposit quickly (almost immediately) with significant reductions of SSC within hours of disposal at each location.

7.6.3.9. Beyond 1 km from release, the passive plume which is transported beyond this is likely to generate SSC in the region of approximately 20 mg/l, transported in the direction of the prevailing flow out to a distance of up to 25 km. However, SSC is predicted to reduce to back within background levels (<1 – 6 mg/l) within the timeframe of a few days following completion of these activities (Chapter 6 (Physical Processes)).

7.6.3.10. Furthermore, it is considered that the water quality within the Channel has the capacity to accommodate increases in turbidity as the water exchange would remain unrestricted throughout all stages of the Proposed Development, allowing rapid recovery to background levels.

7.6.3.11. While release of sediment bound nutrients would have the potential to increase algal growth under suitable conditions, the study area is supplied with oxygen-rich water originating from the Atlantic, and algal blooms are unlikely to occur where there is significant flushing of oxygen rich waters.

7.6.3.12. It is therefore considered that the marine water and sediments of the Channel (beyond WFD jurisdiction) demonstrate high recoverability to the impact, and while the sediment plume may extend over a large area, its magnitude (in this instance considered to be the degree of change from baseline) is predicted to be low and the impact will be temporary. There will be no change to ecosystem structure or function within the Channel. Therefore, any resulting impacts are considered to be **not significant**.

Resuspension of Contaminated Sediment

7.6.3.13. Activities associated with the Proposed Development will result in the resuspension of sediments, which may result in the release of toxic chemicals which are biologically available.

7.6.3.14. Nearshore stations analysed for contaminated sediments indicated that two out of 10 identified arsenic concentrations in excess of Cefas AL 1. Both stations were situated outside of the Marine Cable Corridor and are therefore unlikely to be disturbed. None of the samples within the Marine Cable Corridor exceeded either Cefas AL 1 or OSPAR BACs. No contaminants were detected in concentrations greater than Cefas AL 2.

7.6.3.15. PSD data obtained for much of the Marine Cable Corridor, indicates that the majority of the sediments are sand and gravel with a low proportion of finer particles. However isolated pockets of sediment along the route have an increased fines content. In total 30% of samples analysed comprise >10% total fines content

(Chapter 6 (Physical Processes)). The impacts on receptors are considered below.

WFD Water Bodies

7.6.3.16. Impact of resuspension of contaminated sediment on WFD water bodies is considered in detail in Appendix 7.1 (Marine WFD Assessment). Contaminated sediment analysis undertaken in the nearshore area indicated that 2 out of 10 stations contained arsenic concentrations in excess of Cefas AL 1 (Appendix 7.3 (Contaminated Sediments Survey Report)). These were both found in the Isle of Wight East water body, outside the Marine Cable Corridor. In general, the chemical status of the Isle of Wight water body and other water bodies in the study area was 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)).

7.6.3.17. Due to the mobile nature of the sediments within the region, and frequent disturbance caused by tidal forces and storms, it was considered likely that there is high natural dispersion and diffusion of any low-level contaminants, potential effects to water quality was not expected to result in deterioration in WFD status.

7.6.3.18. Contaminated sediment sample analysis within WFD jurisdiction identified two stations within the benthic survey area (though outside of the Marine Cable Corridor) which contained elevated levels of arsenic at 44.8 mg/kg (station 5) and 22.3 mg/kg (station 26). These concentrations are above Cefas AL 1 (defined as 20 mg/kg) but below Cefas AL 2 (defined as 100 mg/kg). Arsenic levels in one of these samples also exceeded BAC level (defined as 25 mg/kg). No contaminants in any samples exceeded Cefas AL 2.

7.6.3.19. Levels of arsenic detected within the benthic survey area are generally consistent with levels detected within samples collected for nearby developments, namely IFA2 (IFA2, 2016) and Rampion OWF (E.ON, 2012). Sampling undertaken to inform the IFA2 Environmental Statement ('ES') identified arsenic concentrations which slightly exceeded Cefas AL 1 in 2 of the 8 samples taken within the Solent (30.7 mg/kg and 30 mg/kg). These concentrations are well below AL 2. Sampling undertaken to inform Rampion OWF ES (E.ON, 2012) also indicated elevated levels of arsenic at 11 sampling stations, however none were above AL 2, with the highest levels in any sample 38 mg/kg.

7.6.3.20. Although samples with increased arsenic are outside the Marine Cable Corridor, the potential disturbance of sediment with arsenic cannot be completely discounted. While disturbance and release of sediments contaminated with low levels of arsenic will have negative effects on marine water and sediment quality, these will be temporary and low in magnitude (i.e. degree of change above baseline). As stated within the EA guidance (Environment Agency, 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. Therefore, any resulting impacts are considered to be **not significant**.

Marine Water and Sediment of the Channel (beyond WFD jurisdiction)

7.6.3.21. Within the Channel, PSD data indicates that the majority of the sediments are sand and gravel with a low proportion of finer particles. Coarser sediments have a limited affinity for the sorption of chemical contaminants (Simpson *et al*., 2005; Sheahan *at al*., 2001; McNiven & Gilchrist, 2016), and the potential for presence of contaminants in these types of sediments is reduced.

7.6.3.22. Based on the results of surveys undertaken for IFA2 and Rampion OWF (0.4 km and 6.9 km from the Proposed Development respectively), levels of contaminants in sediments in deeper water in the Channel are generally low (i.e. below AL 1 and BAC) or below detection levels.

7.6.3.23. Given the low level of contamination detected within two samples taken within the WFD jurisdiction (where there is a higher concentration of source activity e.g. land runoff, shipping traffic, and industry and spoil dumping) it is considered that risk of contaminants being present in sediments within the Channel and released by the marine activities is greatly reduced.

7.6.3.24. There is potential for sediments which originated within the WFD jurisdiction to be deposited beyond the boundaries of WFD jurisdiction, or for the resultant plume to extend beyond WFD jurisdiction. However, dilution effects within the Channel, due to increased rates of flushing, will result in habitats receiving lower concentrations of contaminants (if present), and there will be no change to ecosystem structure or function within the Channel. Therefore, any resulting impacts are considered to be **not significant**.

7.6.4. OPERATION (INCLUDING REPAIR AND MAINTENANCE) IMPACTS

7.6.4.1. As stated within Chapter 3 (Description of the Proposed Development) and Table 7.4, the Proposed Development has been designed so that maintenance of the marine cables is not required during its operational lifetime.

7.6.4.2. It is assumed however that an indicative worst-case failure rate of the marine cables would require one repair every 10 – 12 years. The actual jointing operation during a repair may take up to 5 – 6 days, and the handling of the joint and deployment to the seabed could take 1 – 2 days.

7.6.4.3. Depending on the extent of cable damage, cable repair operations typically have a duration of several weeks to months. However, should repair works be required, it is anticipated that the works would be of significantly shorter duration and smaller in extent than the installation works required during the construction stage, and it is considered that no large scale dredge and deposit of material will be required.

Temporary Increase in SSC

7.6.4.4. Activities associated with marine cable repair(s) during the operational life of the Proposed Development (including repair and maintenance) will cause a temporary

increase in SSC which could negatively impact the identified receptors through increased turbidity and release of sediment bound nutrients thus making them biologically available to marine organisms. Additionally, increases in SSC could give rise to high oxygen demands, thus reducing the levels of dissolved oxygen within the water.

7.6.4.5. Typically repair works 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. Burial methods such as pre-dredging of a seabed pit may be required, however seabed clearance requirements will be considerably less compared to sandwave clearance and/or dredging / excavation requirements at the HDD pits, and will not generate significant volumes of sediment for disposal. As such, the activities described above would be of shorter duration and smaller in extent compared to construction phase activities. The impacts on receptors are considered below.

WFD Water Bodies

7.6.4.6. Operation & Maintenance ('O&M') activities were included during Stage 1 screening in the Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)). The potential impact of O&M activities was considered to be significantly reduced in comparison to route preparation and installation activities for the entire cable and were screened out of further assessment.

7.6.4.7. Based on the conclusions of the Marine WFD Assessment for the potential impact of construction activities, it is concluded that effects on receptors will be temporary and reversible. As stated within the EA's guidance (Environment Agency, 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. The Marine WFD Assessment concluded that the marine activities associated with 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. Therefore, any resulting impacts are considered to be **not significant**.

Marine Water and Sediment of the Channel (beyond WFD jurisdiction)

7.6.4.8. Background levels of SSC within the Channel are naturally lower than that of the Solent (Chapter 6 (Physical Processes)). Offshore, natural variation ranges from <1 to 6 mg/l, though SSC is enhanced during periods of higher energy. For example, near surface SSC's have been observed to increase by up to 10 mg/l during spring tides, and by up to 20 mg/l during storm events (Chapter 6 (Physical Processes)). It is predicted that increases in turbidity as a result of localised cable repairs will not exceed levels observed during storm events.

7.6.4.9. Although extensive dredging is not considered to be necessary during O&M, 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, 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). Furthermore, as the water exchange would remain unrestricted throughout all stages of the Proposed Development, it is considered that the water quality within the Channel has the capacity to accommodate temporary and localised increases in turbidity, allowing rapid recovery to background levels.

7.6.4.10. It is therefore considered that the marine water and sediments of the Channel (beyond WFD jurisdiction) demonstrate high recoverability to the impact; the impact will be temporary; and the magnitude of the impact (in this instance considered to be the degree of change from baseline) is predicted to be low. There will be no change to ecosystem structure or function within the Channel. Therefore, any resulting impacts are considered to be **not significant**.

Resuspension of Contaminated Sediment

7.6.4.11. Activities associated with cable repair(s) during the operational life of the Proposed Development will result in the resuspension of sediments, which may result in the release of toxic chemicals which are biologically available.

7.6.4.12. Out of 10 stations analysed for contaminated sediments, two identified arsenic concentrations in excess of Cefas AL 1. Both stations were situated outside of the Marine Cable Corridor and are therefore unlikely to be disturbed. None of the samples within the Marine Cable Corridor exceeded either Cefas AL 1 or OSPAR BACs. No contaminants were detected in concentrations greater than Cefas AL 2.

7.6.4.13. PSD data taken during geotechnical surveys of the Marine Cable Corridor indicated that, the majority of the sediments are sand and gravel with a low proportion of finer particle. However, there are isolated pockets of increased fines along the cable. In total 30% of samples analysed comprise >10% total fines content (Chapter 6 (Physical Processes)). The impacts on receptors are considered below.

WFD Water Bodies

7.6.4.14. Sediment disturbance and the subsequent release of contaminants, if present, is considered to be a higher potential risk in inshore waters (within WFD jurisdiction) due to the higher concentration of source activity (e.g. land runoff, shipping traffic, industry and spoil dumping). Due to the more localised extent of repair work (in comparison to that required during construction stage) it is considered unlikely that sediment which originated within WFD jurisdiction will be deposited beyond the

WFD boundary, or for the resultant plume to extend beyond the WFD boundary, in volumes sufficient to cause an impact.

7.6.4.15. O&M activities were included during Stage 1 screening in the Marine WFD Assessment (Appendix 7.1 (Marine WFD Assessment)). The potential impact of O&M activities was considered to be significantly reduced in comparison to route preparation and installation activities for the entire cable and were screened out of further assessment. In addition, due to the mobile nature of the sediments within the region, and frequent disturbance caused by tidal forces and storms, it was considered likely that there is high natural dispersion and diffusion of any low-level contaminants, and potential effects to water quality was not expected to result in a deterioration in WFD status. It is concluded therefore, that no significant effects will occur as a result of this impact.

Marine Water and Sediment of the Channel (beyond WFD jurisdiction)

7.6.4.16. Contaminated sediment sampling, and analysis of PSD at stations in the Channel beyond WFD jurisdiction) indicates that contamination is likely to be low due to the coarser nature of sediments meaning the low potential for sorption of chemicals within coarse sediments, and the greater distance from potential inshore sources (e.g. land runoff and shipping traffic). Furthermore, based on the results of surveys undertaken for IFA2 and Rampion OWF, levels of contaminants in sediments in deeper water in the Channel are generally low or below detection levels. Localised disturbance and resuspension of sediment of is therefore not considered to pose a significant risk to marine water and sediment quality.

7.6.4.17. Furthermore, dilution effects within the Channel, due to increased rates of flushing, will result in habitats receiving lower concentrations of contaminants. There will be no change to ecosystem structure or function within the Channel. Therefore, any resulting impacts are considered to be **not significant**.

7.7. CUMULATIVE EFFECTS ASSESSMENT

7.7.1. INTER-PROJECT EFFECTS

7.7.1.1. Cumulative effects on marine water and sediment quality may arise from the interaction of impacts from the Proposed Development during construction, operation (including repair and maintenance) or decommissioning, and impacts from other planned or consented projects in the wider vicinity of the Proposed Development.

7.7.1.2. It has generally been considered that the potential for cumulative effects will be greatest during the construction phase of the Proposed Development. Decommissioning is assumed to have similar (or lesser) impacts than construction. In the event that cables need to be repaired or maintained, the activities required to undertake the works are considered similar to the effects that may arise during

construction although much lower in magnitude due to the considerable reduction in scale and shorter duration of works.

7.7.1.3. A list of projects that have the potential to give rise to a cumulative effect on marine water and sediment quality receptors has been considered in Appendix 7.4. This included major projects (offshore wind farms, interconnector cables, oil and gas), aggregate dredging projects, dredging and disposal projects, and coastal projects. This long list was agreed with the MMO (see Table 7.1).The locations of projects within this list in relation to the Proposed Development are presented in Chapter 29 and illustrated in Figures 29.1 to 29.5.

7.7.1.4. As detailed in Chapter 29 (Cumulative Effects) of the ES Volume 1 (document reference 6.1.29), this assessment is to be undertaken with regards to PINS Advice Note Seventeen – Cumulative Effects Assessment (PINS, 2019). The long list of projects presented in Appendix 7.4 (Marine Water and Sediment Quality Cumulative Assessment Matrix) of the ES Volume 3 (document reference 6.3.7.4) has been refined for marine water and sediment quality as follows:

- First, a spatial assessment was conducted. Any project identified in the long list of projects falling within the study area for marine water and sediment quality (as defined in Section 7.1) was screened in for further consideration. The study area is considered to encompass the likely ZOI described in Appendix 7.4;
- A temporal, scale and nature-based assessment was conducted for those projects where a potential spatial overlap was identified; and
- Taking the above into account, any projects considered likely to affect the marine water and sediment quality, and/or likely to result in significant effects due to their scale and nature, have been identified.

7.7.1.5. After review of all potential cumulative projects (see Appendix 7.4 (Marine Water and Sediment Quality Cumulative Assessment Matrix)), it is considered that due to the limited spatial scale of all effects arising from the Proposed Development (relative to the locations of other projects) on marine water and sediment quality receptors, and the negligible levels of effect and transient nature of all potential impacts, that there is no potential for the Proposed Development to contribute to significant cumulative effects on water quality receptors. Therefore, no projects have been considered in a Stage 3 or 4 assessment.

7.7.2. INTRA-PROJECT EFFECTS

7.7.2.1. As detailed in Chapter 4 (EIA Methodology) of the ES Volume 1 (document reference 6.1.4), Chapter 29 (Cumulative Effects) presents consideration of potential intra-project effects on marine water and sediment quality.

7.7.3. TRANSBOUNDARY EFFECTS

7.7.3.1. No significant effects on marine water and sediment quality receptors within the UK

Marine Area have been identified as a result of the Proposed Development. While there is potential for the sediment plume to extend into French waters, the potential impact and associated effects is considered to be temporary, of low magnitude and reversible as a result of flushing within the Channel. Therefore, no significant transboundary effects are currently expected to occur.

7.8. PROPOSED MITIGATION

7.8.1.1. The approach to assessment in this chapter assumes that mitigation measures embedded into the design (e.g. routing the cable to avoid constraints, use of appropriate construction techniques, pollution prevention measures) or which constitute industry standard environmental plans and best practice will be in place.

7.8.1.2. Given that no significant effects were predicted for marine water and sediment quality, no additional mitigation measures or monitoring are proposed.

7.9. RESIDUAL EFFECTS

7.9.1.1. Table 7.5 summarises the significance of effects of potential impacts assessed to date.

Table 7.4 – Summary of Effects for Marine Water and Sediment Quality

Stage	Impact	Receptor	Significance	Mitigation	Significance of Residual Effect
Construction (and Decommissioning)	Temporary increase in SSC	WFD Water Bodies	Not significant	None	Not significant
		Marine water and sediment of the Channel (beyond WFD jurisdiction)	Not significant	None	Not significant
	Resuspension of contaminated sediment	WFD Water Bodies	Not significant	None	Not significant
		Marine water and sediment of the Channel (beyond WFD jurisdiction)	Not significant	None	Not significant
Operation (including repair and maintenance)	Temporary increase in SSC	WFD Water Bodies	Not significant	None	Not significant
		Marine water and sediment of	Not significant	None	Not significant

Stage	Impact	Receptor	Significance	Mitigation	Significance of Residual Effect
		the Channel (beyond WFD jurisdiction)			
	Resuspension of contaminated sediment	WFD Water Bodies	Not significant	None	Not significant
		Marine water and sediment of the Channel (beyond WFD jurisdiction)	Not significant	None	Not significant

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