AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 3 – Appendix 8.5 Marine Conservation Zone Assessment

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: 6.3.8.5

PINS Ref.: EN020022

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PINS REF.: EN020022

DOCUMENT: 6.3.8.5

DATE: 14 NOVEMBER 2019

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DOCUMENT

Document	**6.3.8.5 Environmental Statement – Volume 3 – Appendix 8.5 Marine Conservation Zone Assessment**
Revision	001
Document Owner	Natural Power Consultants Ltd
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Date	9 September 2019
Approved By	R. Hodson
Date	29 October 2019

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FIGURES

1. INTRODUCTION

1.1.1.1. This Marine Conservation Zone ('MCZ') screening assessment has been prepared on behalf of AQUIND Ltd. in order to support an application to install and operate the AQUIND Interconnector between the United Kingdom ('UK') and France.

1.1.1.2. The purpose of this report is to determine whether any potential pressures caused by activities associated with the Proposed Development will have the potential to result in anything other than insignificant effects on MCZ features, or any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent.

1.1.1.3. This report is presented as an appendix to Chapter 8 Intertidal and Benthic Ecology Habitats of the ES Volume 1(document reference 6.1.8) however, it should also be read in the context of the baseline environments which are presented and assessed within the marine ecological chapters and their associated appendices of the Environmental Statement ('ES') which include;

- 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 7 (Marine Water and Sediment Quality) of the ES Volume 1 (document reference 6.1.7) (and Appendix 7.3 (Contaminated Sediment Report) of the ES Volume 3 (document reference 6.3.7.3);
- Chapter 9 (Fish and Shellfish) of the ES Volume 1 (document reference 6.1.9);

1.1.1.4. In keeping with the Marine and Coastal Access Act ('MCAA') (2009), this report outlines the initial screening stage within the MCZ Assessment process. The Marine Conservation Zones and Marine Licensing (Marine Management Organisation ('MMO'), 2013) guidance document outlining the assessment process for MCZs has been followed in the preparation of this report. Following on from this screening, if it is determined that s.126 of the MCAA does apply, subsequent assessment will be carried out to indicate what further action is required.

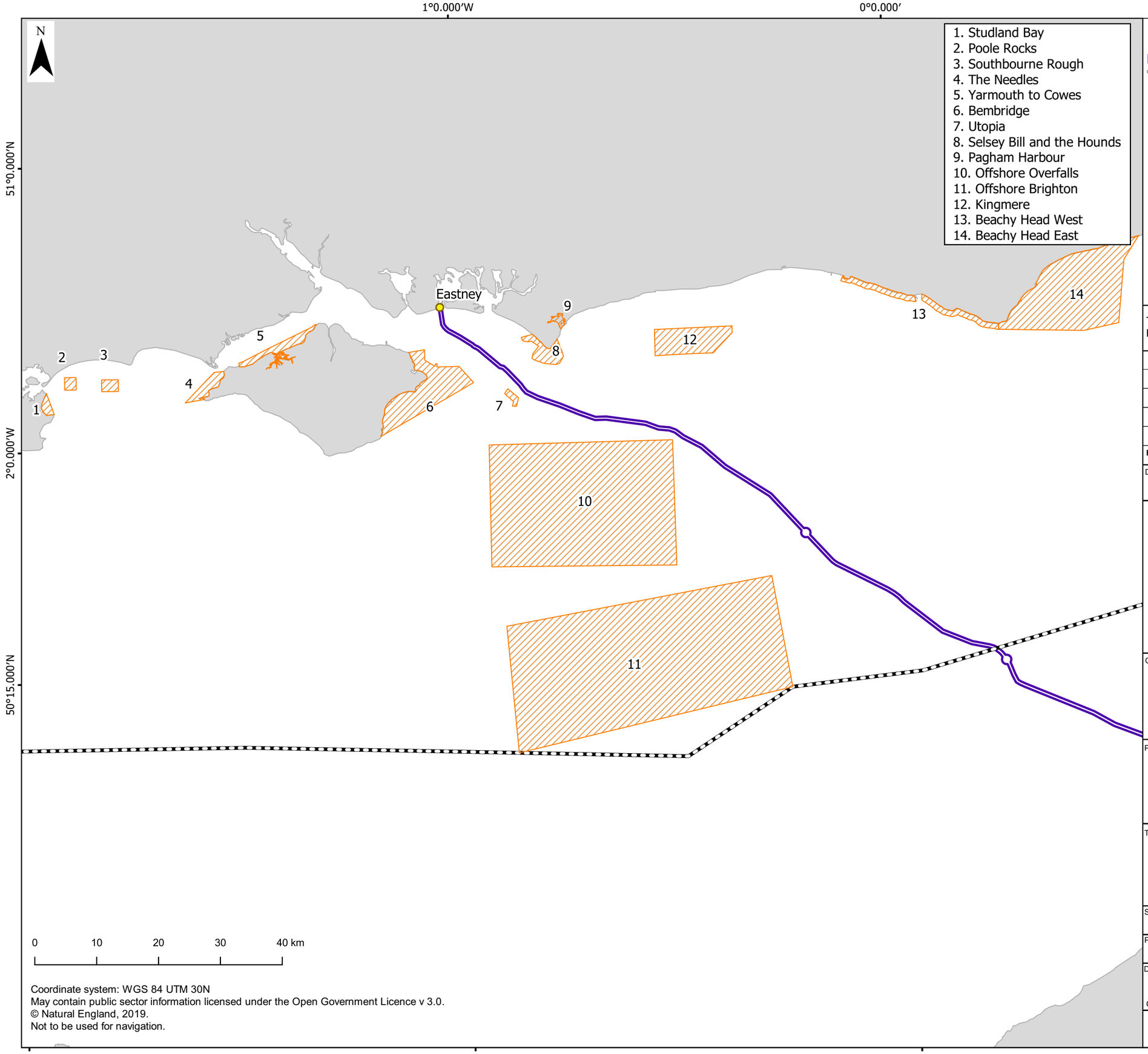
1.1.1.5. Consultation on the conclusions presented within this MCZ Assessment report has been undertaken, the responses to comments received are provided in Annex A of this report.

2. SCREENING – ASSESSMENT OF CONNECTIVITY

2.1. INITIAL IDENTIFICATION OF MCZS

2.1.1.1. Following submission of the Scoping Report and Preliminary Environmental Impact Report ('PEIR'), and all associated responses from consultees (see Chapter 8 (Intertidal and Benthic Habitats) of the ES Volume 1 (document reference 6.1.8) and Appendix 8.2 (Intertidal and Benthic Habitats Consultation Responses) of the ES Volume 3 (document reference 6.3.8.2); Chapter 9 (Fish and Shellfish) and Appendix 9.1 (Fish and Shellfish Consultation Responses) of the ES Volume 3 (document reference 6.3.9.1)), the following MCZs have been considered in this assessment (Figure 2.1):

- Offshore Overfalls;
- Utopia;
- Bembridge;
- Selsey Bill and the Hounds;
- Offshore Brighton;
- Pagham Harbour;
- Kingmere;
- Yarmouth to Cowes;
- Beachy Head West;
- The Needles;
- Beachy Head East;
- Southbourne Rough;
- Poole Rocks; and
- Studland Bay.



AQUIND Interconnector
- Landfall location
- Marine Cable Corridor
- Exclusive Economic Zone (EEZ) boundary
- Designated Marine Conservation Zone (MCZ)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

REV	DATE	BY	DESCRIPTION	CHK	APP
02	29/10/2019	AJ	FINAL DRAFT	GA	SM
01	04/07/2019	AJ	FIRST DRAFT	GA	SM

DRAWING STATUS: FINAL

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CLIENT: AQUIND

PROJECT: AQUIND Interconnector

TITLE: Figure 2.1 MCZs within the Vicinity of the Proposed Cable Route

SCALE AT A3:	CHECKED:		APPROVED:
1:600000	GA		SM
PROJECT NO: GB201394	DESIGNED: AJ	DRAWN: AJ	DATE: 29/10/2019

DRAWING NO: EN020022 - ES APPENDIX - 8.5 - 2.1
GB201394_M_100_A
REV.NO. 02

2.2. POTENTIAL PRESSURES

2.2.1.1. The seabed preparation and construction activities associated with the Proposed Development are described fully in Chapter 3 (Description of the Proposed Development) of the ES Volume 1 (document reference 6.1.3).

2.2.1.2. Potential effects from decommissioning of the Proposed Development are considered to be of similar magnitude when compared to construction activities. Similarly, potential effects during operation or from any unforeseen repair and maintenance works are considered to be similar (but not greater) in magnitude when compared to seabed preparation and construction activities. Therefore, should the impacts of construction be acceptable, it is considered that those same impacts and resultant effects from operation (and decommissioning) will also be acceptable.

2.2.1.3. As there are no MCZs which overlap the Marine Cable Corridor, only indirect effects are considered to be applicable to the MCZ assessment.

2.2.1.4. As such, pressures deemed to have potential to affect MCZs in the vicinity of the Proposed Development are:

- Increases in suspended sediment concentration ('SSC'); and
- Sediment deposition resulting in smothering.

2.2.1.5. All other pressures, including other indirect pressures such as underwater noise, are of such magnitude and extent that any possible impacts outside of the Marine Cable Corridor are considered to be negligible and will not result in significant effects, and as such, are screened out of this assessment.

2.2.1.6. Activities that have the potential to increase SSC (and resultant sediment deposition) include:

- Seabed preparation works including dredge and disposal activities; and
- The installation of Marine Cables (including Horizontal Directional Drilling ('HDD') works and trials of cable installation tools).

2.3. CONNECTIVITY OF IDENTIFIED MCZS

2.3.1.1. Due to differences in techniques planned between the nearshore and offshore areas of the Marine Cable Corridor, the connectivity of MCZs varies depending on whether they are likely to be affected by dredge disposal activities or solely by cable installation activities. These two activities are described further below in terms of their spatial extent in order to define the Zone of Influence ('ZOI') of the Proposed Development.

SEABED PREPARATION (INCLUDING DREDGE AND DISPOSAL)

2.3.1.2. Of the seabed preparation activities, the dredge and disposal of sediments along the Marine Cable Corridor is considered to create the largest potential pressure.

2.3.1.3. Plume dispersion modelling was undertaken to inform the assessments of the effects of dredge disposal activities (Appendix 6.2 (Modelling Technical Report) of the ES Volume 3 (document reference 6.3.6.2)). The modelled outputs display the maximum observed SSC following disposal operations and the final deposited sediment thickness. This is a cumulative measure of sedimentation following the dispersal of all dredged material at the proposed release points. Following the completion of the dredged material disposal operations, the model simulation was continued for a further period of up to 11 days to consider the continued dispersal of sediment.

2.3.1.4. To ensure that a representative worst-case scenario for plume dispersion was considered the following scenario was modelled:

- The absolute worst-case scenario based upon release of the worst-case dredge material volumes (i.e. 1,754,000 m^3, disposed in UK waters).

2.3.1.5. The total sediment dredges (the dredge mass) was proportioned into three size classes at each depth interval:

- Coarse sand and gravel;
- Fine to medium; and
- Sand and clay and silt.

Model outputs

2.3.1.6. Worst case scenario is dredge disposal of up to approx. 1.7 million m^3 (as modelled). Dredged material will be deposited at least 3 km beyond the Water Framework Directive ('WFD') jurisdiction (within a designated disposal site located within the Marine Cable Corridor between Kilometre Point ('KP 21') and KP 109).

2.3.1.7. For those designated sites further offshore of the modelled disposal events, connectivity will be established assuming the same spatial extent from the Marine Cable Corridor / disposal area.

2.3.1.8. Peak SSC of 1000 mg/l will occur 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.

2.3.1.9. 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 worst case distance of up to 25 km. SSC is predicted to reduce to background levels (<1 to 6 mg/l) within the timeframe of a few days following completion of these activities.

2.3.1.10. Sediment deposition from disposal activities will be local to the point of release, with deposits of coarser sediments potentially observed to depths of between 10 mm and 1.5 m, with greatest deposition observed across an area of a few hundred metres, elongated in the direction of the prevailing flow at the time of release, relative to the

release site. Finer sediments will be redistributed and any deposition outside the Marine Cable Corridor will be transient and negligible, with any settled material being quickly redistributed under the forcing of tidal flows.

2.3.1.11. Connectivity with dredge disposal activities is considered to extend up to 25 km from the Marine Cable Corridor at locations beyond KP 21 in an east/west direction.

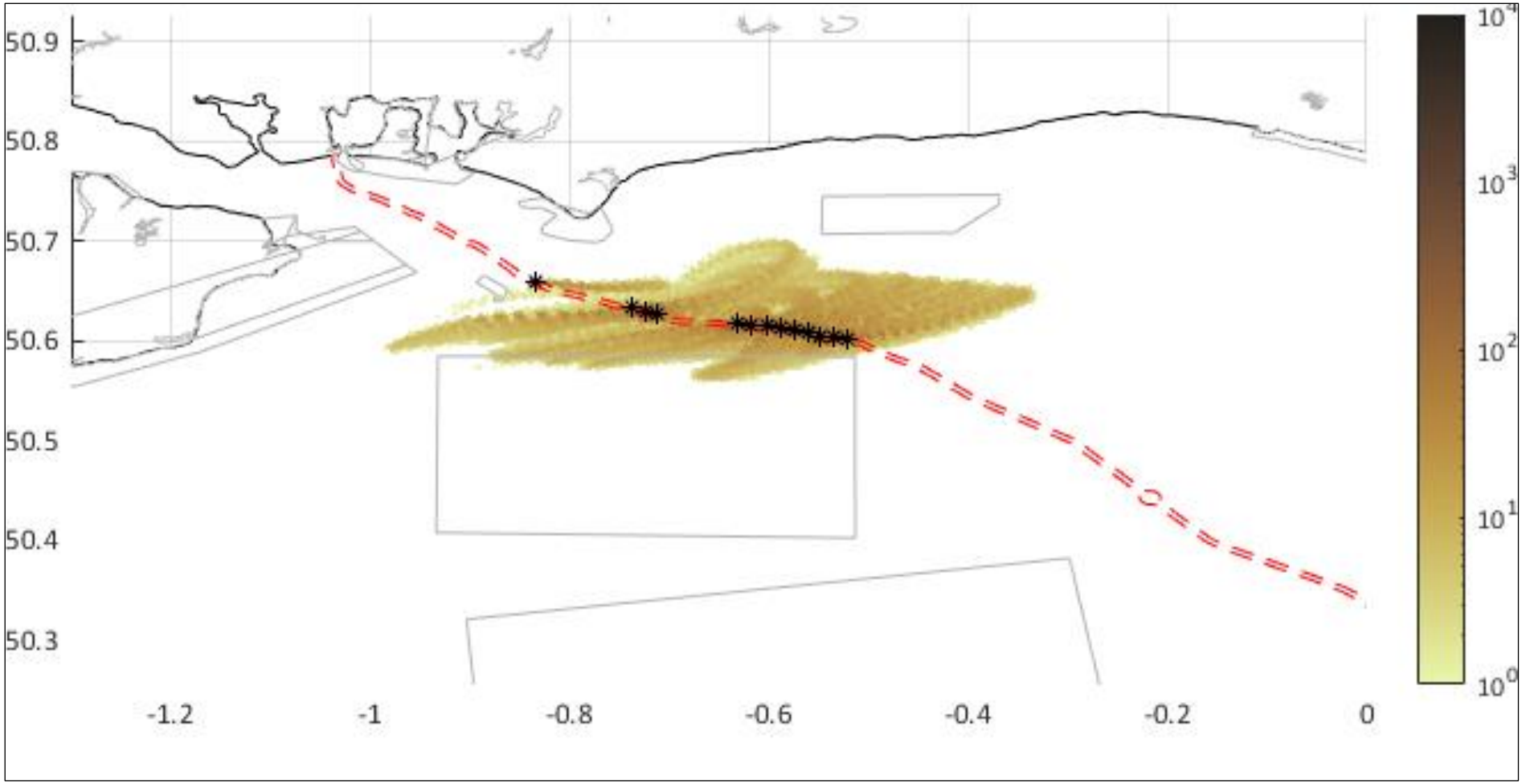

Figure 2.2 Predicted SSC increase above background (mg/l). Maximum values for entire four month based on sediment modelling.

CABLE INSTALLATION ACTIVITES

2.3.1.12. Other cable installation activities (jetting, ploughing, etc.) also have the potential to increase the levels of SSC in proximity to the Proposed Development. Based on an empirical analysis of available information, the following worst-case scenario is envisaged.

2.3.1.13. In the nearshore area (<KP 21), worst-case activities which will lead to increased SSC 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 KP 15, and in other isolated locations).

2.3.1.14. 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 approximately <5 – 75 mg/l in coastal areas, with annual averages of between 5 – 15 mg/l observed within surface waters. Therefore, any residual passive plume beyond 5 km distance is predicted to be negligible in the context of the natural background SSC present in the Solent and as such, no potential significant effects are deemed likely to arise beyond that distance.

2.3.1.15. It is predicted that a peak SSC 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 – 10 mg/l are predicted; SSC is expected to return to background levels within a few days following completion of these activities.

2.3.1.16. 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 significant dispersion of fine sediment, it is considered that deposition will be negligible with sediments quickly resuspended and redistributed under the forcing of tidal flows.

2.3.1.17. Trials of cable installation tools may also be required as part of the cable installation process. However, it is considered that any potential effects from tool trials will be significantly reduced in scale and duration (when compared to cable installation activities themselves), such that they would not be measurable when considered against the potential effects from construction activities.

2.3.1.18. Connectivity in the nearshore area is considered to extend up to 10 km from the Marine Cable Corridor at locations landward of KP 21 in an east/west direction.

2.4. SUMMARY OF CONNECTIVITY

2.4.1.1. Connectivity of MCZs with the Proposed Development has been determined based upon the worst case scenario for sediment movement during construction activities (including disposal of dredge material) (Table 1). This found that nearshore sites may be affected up to a distance of 10 km from the Marine Cable Corridor in an east west direction, whilst more offshore sites may be affected up to 25 km distant in an east west direction.

2.4.1.2. MCZs deemed to be affected only by cable installation activities, are:

- Utopia;
- Bembridge; and
- Selsey Bill and the Hounds.

2.4.1.3. MCZs deemed to be affected by dredge disposal activities are:

- Offshore Overfalls; and
- Offshore Brighton

Table 1 – Connectivity of MCZs

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
Offshore Overfalls	Recover to favourable condition: - Subtidal coarse sediment; - Subtidal mixed sediments; and - Subtidal sand. Maintain to favourable condition: - English Channel outburst flood features[1].	1.15	Connected
Utopia	Recover to favourable condition: - Moderate energy circalittoral rock; - High energy circalittoral rock; - Subtidal coarse sediment; - Subtidal mixed sediments; - Subtidal sand; and	1.3	Connected

[1] Geological feature

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
	- Fragile sponge and anthozoan communities on subtidal rocky habitats.		
Bembridge	Maintain in favourable condition: - Sheltered muddy gravels; - Short-snouted seahorse (*Hippocampus hippocampus*); - Stalked jellyfish (*Calvadosia campanulata*); - Stalked jellyfish (*Haliclystus species*); - Subtidal coarse sediment; and - Subtidal sand; Recover to favourable condition: - Maerl beds; - Native oyster (*Ostrea edulis*); - Peacock's tail (*Padina pavonica*); - Sea-pens and burrowing megafauna; - Seagrass beds; - Subtidal mixed sediments; and - Subtidal mud.	3.8	Connected
Selsey Bill and the Hounds	Maintain in favourable condition: - Bracklesham Bay geological feature; - Short-snouted seahorse (*Hippocampus hippocampus*); - Subtidal mixed sediments; and - Subtidal sand. Recover to favourable condition: - High energy infralittoral rock; - Low energy infralittoral rock; - Moderate energy infralittoral rock; - Moderate energy circalittoral rock; and	4.0	Connected

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
	- Peat and clay exposures.		
Offshore Brighton	Recover to favourable condition: - High energy circalittoral rock; - Subtidal coarse sediment; and - Subtidal mixed sediments.	8.5	Connected
Pagham Harbour	Maintain in favourable condition: - Seagrass beds; - Defolin's lagoon snail (*Caecum armoricum*); and - Lagoon sand shrimp (*Gammarus insensibilis*).	9.6	Not connected[2]
Kingmere	Recover to favourable condition: - Subtidal chalk; - Moderate energy infralittoral rock and thin mixed sediments; and - Black seabream (*Spondyliosoma cantharus*).	10.8	Not connected[3]
Yarmouth to Cowes	Maintain in favourable condition: - Bouldnor Cliff geological feature; - Estuarine rocky habitats; - Intertidal coarse sediment; - Intertidal under boulder communities; - Littoral chalk communities; - Low energy intertidal rock; - Moderate energy intertidal rock; and - Subtidal coarse sediment. Recover to favourable condition:	19.9	Not connected

[2] Distance greater than 5 km in an east/west direction hence no connectivity to the activities.

[3] Neither the plumes from dredge disposal activities (see Figure 2.2) or cable installation / HDD works overlap with the site

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
	- High energy circalittoral rock; - High energy infralittoral rock; - Moderate energy circalittoral rock; - Moderate energy infralittoral rock; - Native oyster (*Ostrea edulis*); - Peat and clay exposures; - Sheltered muddy gravels; - Subtidal chalk; - Subtidal mixed sediments; and - Subtidal mud.		
Beachy Head West	Maintain at favourable condition: - Intertidal coarse sediment; - Subtidal mixed sediments; - Subtidal mud; - Subtidal sand; - Infralittoral muddy sand; - Infralittoral sandy mud; - Low energy infralittoral rock and thin sandy sediment; - Blue mussel (*Mytilus edulis*) beds; - Subtidal chalk; - Native oyster (*Ostrea edulis*); and - Short-snouted seahorse (*Hippocampus hippocampus*). Recover to favourable condition: - Littoral chalk communities; - Moderate energy circalittoral rock; and - High energy circalittoral rock.	34.5	Not connected
The Needles	Maintain at favourable condition: - Moderate energy infralittoral rock; - High energy infralittoral rock; - Moderate energy circalittoral rock; and	35.4	Not connected

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
	- Stalked jellyfish (*Lucernariopsis campanulata*). Recover to favourable condition: - Subtidal chalk; - Subtidal coarse sediment; - Subtidal mixed sediments; - Subtidal sand; - Subtidal mud; - Sheltered muddy gravels; - Seagrass Beds; - Peacock's tail (*Padina pavonica*); and - Native oyster (*Ostrea edulis*).		
Beachy Head East	Maintain in favourable condition: - Littoral chalk communities; - Short-snouted seahorse (*Hippocampus hippocampus*); - Subtidal coarse sediment; and - Subtidal sand. Recover to favourable condition: - High energy circalittoral rock; - Moderate energy circalittoral rock; - Peat and clay exposures; - Ross worm reefs (*Saballeria spinulosa*); and - Subtidal chalk.	44.5	Not connected
Southbourne Rough	Recover to favourable condition: - Black seabream (*Spondyliosoma cantharus*) (nesting).	55	Not connected
Poole Rocks	Maintain in favourable condition: - Moderate energy circalittoral rock; and - Subtidal mixed sediments.	59.1	Not connected

MCZ	Protected feature and their conservation status / general management approach	Closest approx. dist. to Proposed Development (km)	Overall MCZ connectivity – based from model outputs
	Recover to favourable condition: - Black seabream (*Spondyliosoma cantharus*); - Couch's goby (*Gobius couchi*); and - Native oyster (*Ostrea edulis*).		
Studland Bay	Maintain in favourable condition: - Intertidal coarse sediment; - Long-snouted seahorse (*Hippocampus guttulatus*); and - Subtidal sand. Recover to favourable condition: - Seagrass beds.	63.7	Not connected

3. SCREENING – POTENTIAL FOR SIGNIFICANT EFFECTS

3.1.1.1. Potential connectivity exists for a number of MCZs due to areas of increased SSC resulting from the Proposed Development. Due to the negligible and transient sediment deposits predicted outwith the Marine Cable Corridor[4], no potentially significant effects from deposition are considered possible and this pressure is therefore screened out of further assessment.

3.1.1.2. Habitats and protected features present within the MCZs where connectivity has been identified have been screened to determine whether there is potential for significant effects to arise as a result of increased SSC. These habitats are listed below:

- Subtidal coarse sediment;
- Subtidal mixed sediment;
- Subtidal sand;
- English Channel outburst feature;
- Low energy infralittoral rock;
- Moderate energy infralittoral rock;
- Moderate energy circalittoral rock;
- High energy circalittoral rock;
- Fragile sponge and anthozoan communities;
- Bracklesham Bay geological feature;
- Sheltered muddy gravels;
- Seagrass beds;
- Maerl beds;
- Sea pens and burrowing megafauna;
- Subtidal mud;

[4] Deposits of between are 1.5 m and 10 mm are predicted to occur within 1 km of the disposal activity. The closest MCZ is 1.15 km away from the Proposed Development at its closest point and therefore is outside where significant deposits may occur.

- Peat and clay exposures;
- Short snouted sea horse;
- Stalked jellyfish (*Haliclystus* species);
- Stalked jellyfish (*Lucernaiopsis campanulata*);
- Native oyster; and
- Peacock's tail.

3.1.1.3. The assessment is based on the Marine Life Information Network (MarLIN) guidance (using the updated Marine Evidence based Sensitivity Assessment ('MarESA')) as provided in Tyler-Walters *et al*. (2018) and is organised per feature. The 'evidence base' used for the MarLIN assessment is the largest review of the effects of anthropogenic activities and natural events on marine species and habitats.

3.1.1.4. The sensitivity of a feature is an inherent characteristic and can be determined as the likelihood of damage because of a specific pressure, and the rate in which the feature can recover once the pressure is removed. For the sake of continuity, sensitivity assessment utilises a range of categories and ranks with standardised thresholds to ensure that the 'relative' sensitivity of each feature is compared on a like for like basis.

3.2. SUBTIDAL COARSE SEDIMENT

3.2.1.1. These habitats are subjected to wave action and tidal currents which causes coarse sediments to be unstable. Typically, these habitats have a low silt content, a lack of a significant seaweed component and are characterised by a robust fauna which includes venerid bivalves (Connor *et al*., 2004).

3.2.1.2. This feature is present in the following MCZs:

- Utopia;
- Bembridge;
- Offshore Overfalls; and
- Offshore Brighton.

3.2.2. EFFECTS OF INCREASED SSC

3.2.2.1. In general, a relatively high degree of sediment mobility in these habitats ensures that the habitats are relatively species poor or have a community of robust species that are tolerant to scour and increased SSC. Where filter feeding species are present, there may be some reduction in feeding efficiency from increases in SSC but in general, coarse sediment habitats are considered not to be sensitive to increases in SSC (McQuillan & Tillin, 2006; Tillin, 2016a; Tillin & Tyler-Walters, 2016a).

3.2.2.2. Utopia is located 1.3 km west of the Marine Cable Corridor, therefore may receive increases in SSC associated with cable installation works up to 200 mg/l (as a conservative estimate). This is thought to persist for several hours, before returning to within background levels. Due to the transient nature of the effect, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.2.2.3. Bembridge is located 3.8 km to the west of the Marine Cable Corridor and may receive increases in SSC of 5 – 10 mg/l as a result of cable installation works, returning to within background levels in a few days. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.2.2.4. Offshore Overfalls is located 1.15 km west of the Marine Cable Corridor and may receive increases in SSC from dredge disposal activities. These habitats may receive increases in SSC of approximately 20 mg/l, returning to within background levels (<1 – 6 mg/l) within a few days. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.2.2.5. Offshore Brighton is located 8.5 km west of the Marine Cable Corridor and may receive increases in SSC as a result of dredge disposal up to 20 mg/l, returning to within background levels (<1 – 6 mg/l) within a few days. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.2.2.6. Effects of increased SSC subtidal coarse sediments are therefore screened out from further assessment.

3.3. SUBTIDAL MIXED SEDIMENT

3.3.1.1. Subtidal mixed (heterogeneous) sediments, or sublittoral mixed sediments are found in a wide range of habitats. From the extreme low water mark to offshore, deep circalittoral sediments, this habitat can be described as combining an array of sediments. This can include heterogeneous muddy sandy gravel and mosaics of cobbles and pebbles situated on a range of substrates. These wide and varied habitats offer numerous different habitats for characterising infauna and epibiota such as polychaetes, bivalves, echinoderms, anemones, hydroids and Bryozoan (Connor *et al*., 2004).

3.3.1.2. This feature is present in the following MCZs:

- Utopia;
- Bembridge;
- Selsey Bill and the Hounds;

- Offshore Overfalls; and
- Offshore Brighton.

EFFECTS OF INCREASED SSC

3.3.1.3. Due to the sedimentary nature of this feature, the characterising species are all relatively tolerant of increases in SSC. An increase in SSC could potentially affect the feeding apparatus of suspension feeders and cause a slight reduction in growth and consequently biomass. There may also be a slight increase in energy expended to clean the clogged apparatus, but this is unlikely to increase mortality. Increased SSC may increase scouring and abrasion, although most characterising species are not sensitive to this. Infaunal species such as polychaetes are likely to be resistant to increased SSC. As a result, this feature is considered to not be sensitive to increases in SSC (De-Bastos & Hill, 2016; Perry, 2016a; Perry, 2016b; Readman, 2016a; Readman, 2016b).

3.3.1.4. Utopia MCZ, located 1.3 km west of the Marine Cable Corridor, may receive increases of SSC from seabed preparation and cable installation activities associated with the Proposed Development up to 200 mg/l (as a conservative estimate). However, this is thought to persist for several hours before returning back to background levels associated with the Solent (<5 – 75 mg/l). Due to the transient nature of the effect, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.3.1.5. Bembridge and Selsey Bill and the Hounds MCZs are located at least 3.8 km and 4 km west and east of the Marine Cable Corridor respectively, therefore may experience an increase in SSC of 5-10 mg/l. Such increases are expected to last a few days before returning to within background levels (<5 – 75 mg/l). Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature in both MCZs.

3.3.1.6. Offshore Overfalls MCZ is located 1.15 km west of the Marine Cable Corridor, therefore may be subject to increases in SSC of up to 20 mg/l as a result of dredge disposal activities. Such increases will be of short duration (days) and will not lead to any change in the habitat due to the lack of sensitivity to this effect. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.3.1.7. Offshore Brighton MCZ is located 8.5 km west of the Marine Cable Corridor, therefore may experience increases in SSC of 20 mg/l as a result of dredge disposal activities. The effects on this feature are expected to be negligible as SSC will return to background levels (<1 – 6 mg/l) within a few days. Due to the transient nature of the

effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.3.1.8. Effects of increased SSC on subtidal mixed sediments are therefore screened out from further assessment.

3.4. SUBTIDAL SAND

3.4.1.1. This feature is generally compromised of medium to fine sands or non-cohesive slightly muddy sands, typically with less than 15% silt and clay. Commonly observed on open coastline, offshore or in estuaries/marine inlets, a range of taxa characterise this habitat including polychaetes, bivalve, molluscs and amphipod crustacea (Connor *et al*., 2004).

3.4.1.2. This feature is present in the following MCZs:

- Utopia;
- Bembridge;
- Selsey Bill and the Hound; and
- Offshore Overfalls.

EFFECTS OF INCREASED SSC

3.4.1.3. Increased SSC within the water column is not expected to have a direct impact on the characterising species of this habitat as they reside within the sand. Due to water movement across the habitat, large volumes of sand is likely to be suspended and resuspended causing the infauna to have a degree of tolerance to increased SSC. As is expected with increased SSC there may be an increase in scouring, however this is not expected to significantly impact the infaunal taxa (Tillin, 2016b; Tillin, 2016c).

3.4.1.4. Utopia MCZ is 1.3 km west of the Marine Cable Corridor therefore may be subject to increases of 200 mg/l of SSC from seabed preparation and cable installation activities. However, this is thought to only persist for several hours before returning back to within background levels (<5 – 75 mg/l). Due to the transient nature of the effect and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.4.1.5. Bembridge and Selsey Bill and the Hounds MCZs are located 3.8 km and 4 km west and east respectively of the Marine Cable Corridor, and may experience increases in SSC of 5 – 10 mg/l as a result of the sediment plume associated with cable installation works. Such increases are expected to last a few days following completion of works before returning back to within background levels. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature in both MCZs.

3.4.1.6. Offshore Overfalls MCZ is located 1.15 km offshore west of the Marine Cable Corridor, therefore may be subject to SSC increases of up to 20 mg/l as a result of dredge disposal activities, returning to within background levels within a few days. Due to the transient nature of the effect, the very limited magnitude of the pressure, and general lack of sensitivity in the receiving habitat, no significant effects are predicted on this feature.

3.4.1.7. Effects of increased SSC on subtidal sand are therefore screened out from further assessment.

3.5. ENGLISH CHANNEL OUTBURST FEATURE

3.5.1.1. The English Channel Outburst Flood Feature is a protected geological feature located in the English Channel. It consists of a deeply gouged channel of the seabed, providing historic evidence of the flood which created the channel separating England from mainland Europe.

3.5.1.2. This feature is present in the following MCZs:

- Offshore Overfalls

EFFECTS OF INCREASED SSC

3.5.1.3. Offshore Overfalls MCZ is located 1.15 km west the Marine Cable Corridor, therefore may experience increases in SSC up to 20 mg/l as a result of dredge disposal activities, before returning to background levels within a few days. As a geological feature, no sensitivity to SSC exists and as such there is no potential for significant effects.

3.5.1.4. Therefore effects of increased SSC on the English Channel Outburst Feature are screened out from further assessment.

3.6. LOW ENERGY INFRALITTORAL

3.7. ROCK

3.7.1.1. Located in sheltered wave and tide exposure locations, low energy infralittoral rock substratum consists of bedrock, boulders and cobbles (Hiscock, 2002). This habitat supports silt tolerant communities including *Laminaria hyperborea* and *Laminaria saccharina* (Connor *et al*., 2004). In areas with higher turbidity such as estuarine locations, it should be considered that there may be animal dominated communities that replace kelp and seaweeds,

This feature is present in the following MCZ:

- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.7.1.2. Increased SSC will reduce the amount of light reaching the seabed, therefore inhibiting the photosynthetic processes of algal species associated with this habitat. Such inhibition of light has been described as having the ability to eliminate kelp populations (Lüning, 1990; Birkett *et al*. 1998).

3.7.1.3. An increase in SSC may result in the clogging of respiratory and feeding apparatus of organisms associated with this habitat. However, since these species are found in areas with relatively high SSC as a result of occasional turbid water, it is expected that they will survive and mortality will be minimal. With increased SSC, there is likely to be some increased scouring and abrasion, although most characterising species are not sensitive to this (Hiscock, 2002).

3.7.1.4. Selsey Bill and the Hounds MCZ is 4 km east of the Marine Cable Corridor, therefore this habitat may experience increased levels of SSC of between 5 – 10 mg/l as a result of cable installation activities, returning to within background levels within a few days. Therefore, as the potential increases in SSC are low and within the natural variation present in the area, and that such levels will only persist for a short period, effects from increased SSC are expected to be negligible, and therefore no significant effects are predicted.

3.7.1.5. Effects of increased SSC on low energy infralittoral rock are therefore screened out from further assessment.

3.8. MODERATE ENERGY INFRALITTORAL ROCK

3.8.1.1. Moderate energy infralittoral rock is categorized as shallow water rock with some shelter from waves and currents. Found in areas described with moderate wave action and benign tidal currents, associated species include kelp and red seaweed species such as *Laminaria digitata* and *Laminaria hyperborea* (Connor *et al*., 2004).

3.8.1.2. This feature is present in the following MCZ:

- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.8.1.3. This habitat can be observed under several habitat categorisations which are, to varying extent, sheltered from wave action and tidal water-flow. This allows for siltier substratum which can support various seaweeds such as *L. hyperborea* and/or *L. saccharina*. This also promotes communities of associated seaweeds which are relatively tolerant to the siltier conditions. Increases in SSC can cause a reduction in light availability, which is likely to inhibit the photosynthetic ability of kelp species significantly enough to reduce the density and abundance of kelp populations (Lüning, 1990; Birkett *et al*. 1998).

3.8.1.4. Selsey Bill and the Hounds MCZ is located 4 km east of the Marine Cable Corridor, therefore this habitat may experience increased levels of SSC of between 5 – 10 mg/l as a result of cable installation activities, returning to within background levels within a few days. Therefore, as the potential increases in SSC are low and equivalent to natural variation present in the area, and as such levels will only persist for a short period, only negligible effects of increased SSC are expected on the characterising species of this feature, and therefore no significant effects are predicted.

3.8.1.5. Effects of increased SSC on moderate energy infralittoral rock are therefore screened out from further assessment.

3.9. MODERATE ENERGY CIRCALITTORAL ROCK

3.9.1.1. This habitat is characterised by circalittoral bedrock and boulders and is typically exposed to moderate energy waves, moderately strong and weak tidal streams. This moderate exposure to waves can be reflected in this habitat by a wide range of biological subtypes, from *Sabellaria* reefs, circalittoral mussel beds, echinoderms and crustose communities (Connor *et al*., 2004).

3.9.1.2. This feature is present in the following MCZs:

- Utopia; and
- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.9.1.3. Moderate energy circalittoral rock exhibits a variety of habitat types, depending on the specific environmental factors. Characterising species include scour tolerant faunal and algal crusts, as well as a range of filter feeding species including; cnidarians (e.g. *Alcyonium* spp, cup corals), sponges, hydroids, ascidians, bryozoans, anemones, and mussels (*Mytilus edulis*) (Stamp, 2016; Stamp & Tyler-Walters, 2016; Tyler-Walters, 2016a).

3.9.1.4. Although most characterising species of moderate energy circalittoral rock habitats are not deemed to be sensitive to increases in SSC, it could potentially affect feeding apparatus of suspension feeders causing a slight reduction in growth and consequently biomass. There may also be a slight increase in energy expended to clean the clogged apparatus, however increased mortality is unlikely (Tillin & Hiscock, 2016). With increased SSC, there is likely to be some increased scouring and abrasion, although most characterising species are considered not to be sensitive to this pressure.

3.9.1.5. Utopia MCZ (1.3 km away) may experience increases in SSC of 200 mg/l from cable installation activities associated with the Proposed Development, however this increase in SSC is predicted to only persist for several hours before returning to within background levels associated with the Solent. Therefore, due to the low sensitivity to

the effect of the main characterising species, and short transient nature of the pressure, no significant effects of increased SSC are expected on this feature.

3.9.1.6. Selsey Bill and Hounds MCZ is located 4 km east of the Marine Cable Corridor therefore may experience increases in SSC of 5 – 10 mg/l, returning to within background levels within a few days. Therefore, as the potential increases in SSC are low and within the natural variation present in the area, and as such levels will only persist for a short period, no effects of increased SSC are expected on the characterising species of this feature, and therefore no significant effects are predicted.

3.9.1.7. Effects of increased SSC on moderate energy circalittoral rock are therefore screened out from further assessment.

3.10. HIGH ENERGY CIRCALITTORAL ROCK

3.10.1.1. This habitat is characterised by circalittoral bedrock and boulders and is typically found in tidal straights and narrows where it is very exposed to high energy waves and strong tidal streams. This high exposure to energy can be reflected by a number of species ranging from sponges such as *Pachymatisma johnstonia*, *Halichondria panicea*, *Esperiopsis fucorum* and *Mucilla incrustans*, to barnacle *Balanus crenatus* and dense carpets of the hydroid *Tubularia indivisa*. It should also be noted that on some rocky outcrops, soft corals such as dead man's finger (*Alcyonium digitatum*) can be observed in high numbers (Connor *et al*., 2004).

3.10.1.2. This feature is present in the following MCZs:

- Utopia;
- Selsey Bill and the Hounds; and
- Offshore Brighton.

EFFECTS OF INCREASED SSC

3.10.1.3. High energy circalittoral rock exhibits a variety of habitat types, depending on the specific environmental factors, particularly the energy regime. Characterising species include scour tolerant faunal and algal crusts, as well as a range of filter feeding species including; cnidarians (e.g. *Alcyonium* spp, cup corals), sponges, hydroids, ascidians, bryozoans, anemones, and mussels (*Mytilus edulis*) (Stamp, 2016; Stamp & Tyler-Walters, 2016; Tyler-Walters, 2016a).

3.10.1.4. Although most characterising species of high energy circalittoral rock habitats are not deemed to be sensitive to increases in SSC, it could potentially affect feeding apparatus of suspension feeders causing a slight reduction in growth and consequently biomass (Readman, 2016c). There may also be a slight increase in energy expended to clean the clogged apparatus, though increases in mortality are unlikely (Readman, 2018). With increased SSC, there is likely to be some increased

scouring and abrasion which with particularly high SSC has the potential to be damaging in the high tidal streams present (Readman, 2016d; Readman, 2016e).

3.10.1.5. Utopia MCZ, may be subjected to increases in SSC of up to 200 mg/l. Such increases will however be of short duration (several hours) and as this habitat's associated characterising species display little sensitivity to this effect, any changes in the species abundances or their distribution is expected to be negligible, even at the highest levels potentially received. Therefore, no significant effects are predicted on this feature.

3.10.1.6. Selsey Bill and Hounds MCZ, may experience increases in SSC of 5 – 10 mg/l as a result of cable installation activities associated with the Proposed Development. This level of SSC is within the background levels experienced in the Solent and nearshore in the Channel and will be short in duration (a few days), therefore it is predicted that there will be no significant effects on the organisms associated with this habitat as a result of increased SSC.

3.10.1.7. Offshore Brighton, may receive increases in SSC of 20 mg/l, however the effect is expected be short in duration and any increase will reduce to background levels (<1 – 6 mg/l) within a few days. No significant changes in the species abundances or their distribution is predicted considering the general lack of sensitivity to this pressure, and as such it is predicted there will be no significant effects.

3.10.1.8. Effects of increased SSC on high energy circalittoral rock are therefore screened out from further assessment.

3.11. FRAGILE SPONGE AND ANTHOZOAN COMMUNITIES ON SUBTIDAL ROCKY HABITATS

3.11.1.1. A varied habitat made up of diverse faunal communities dominated by generally sessile invertebrates such as soft corals and bryozoans. Typically found on steep, circalittoral bedrock; boulder slopes; and rocky outcrops where they are often subject to changing tidal-streams and exposed to waves (Connor *et al*., 2004).

3.11.1.2. This feature is present in the following MCZ:

- Utopia.

3.11.1.3. According to the initial site assessment, a single record for the habitat Fragile Sponge and Anthozoan Communities on Rocky Habitats occurred within the recommended (r)MCZ, however, results from the 2012 dedicated survey of this site did not confirm the presence of this feature (DEFRA, 2015). Nevertheless, an assessment of the potential for significant effects to arise from increased SSC is provided.

EFFECTS OF INCREASED SSC

3.11.1.4. Increases in SSC could potentially affect feeding apparatus of suspension feeders present in this habitat causing a slight reduction in growth and consequently biomass.

There may also be a slight increase in energy expended to clean the clogged apparatus causing a slight reduction in growth and consequently biomass, however this is unlikely to result in increased mortality. With increased SSC, there is likely to be some increased scouring and abrasion which can be potentially damaging if high tidal streams are present.

3.11.1.5. Utopia MCZ, 1.3 km away from the Proposed Development, may receive increases in SSC of up to 200 mg/l as a result of cable installation activities. Any increases in SSC will however be of short duration (several hours) and although some limited increases in scour could occur if the feature was located in areas of high tidal streams, it is not expected that this will lead to any significant change in the habitat due to the short duration of the effect and low sensitivity of the main characterising species. In addition, the wider area has an abundance of sediment habitats and as such the communities present are expected to be tolerant or adapted to a degree of scour which naturally occur in the area. Therefore, no significant effects are predicted.

3.11.1.6. Effects of increased SSC on fragile sponge and anthozoan communities on subtidal rocky habitats are therefore screened out from further assessment.

3.12. BRACKLESHAM BAY GEOLOGICAL FEATURE

3.12.1.1. The Bracklesham Bay Geological feature consists of expanses of fossil bearing rock consisting of molluscs, corals, sea snakes and fish dating back 46 million years ago to the Eocene era.

3.12.1.2. This feature is present in the following MCZ:

- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.12.1.3. Bracklesham Bay Geological Feature is located over 4 km east of the Marine Cable Corridor, and may experience increases in SSC of 5 – 10 mg/l, returning to within background levels within a few days. However, as a geological feature, it is not sensitive to increased SSC and therefore there will be no significant effects on this feature.

3.12.1.4. Effects of increased SSC on the Bracklesham Bay Geological Feature are therefore screened out from further assessment.

3.13. SHELTERED MUDDY GRAVEL

3.13.1.1. Sublittoral mixed (heterogeneous) sediments found from the extreme low water mark to deep offshore circalittoral habitats. These habitats incorporate a range of sediments including heterogeneous muddy gravelly sands and also mosaics of cobbles and pebbles embedded in or lying upon sand, gravel or mud. A number of

sub-biotopes can be found within this habitat, which are found to be dependent on the nature of the substratum. (Connor *et al*., 2004).

3.13.1.2. In this area the habitat is dominated by suspension feeders (*Urticina feline, Sabella pavonina*), burrowing anemones (*Ceriathus lloydii*) and mollusc (*Crepidula fornicata*).

3.13.1.3. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.13.1.4. As this habitat is dominated by suspension feeders there is the potential for increases in SSC to (depending on whether the sediment is organic or not) influence the energy expenditure for feeding and/or cleaning feeding apparatus which may cause sub-lethal effects (Perry, 2016b).

3.13.1.5. Even though increased sediment levels are often considered to have a negative impact on suspension feeders (Gerrodette & Flechsig 1979), the characterising species found in this biotope type are capable of tolerating increased sedimentation levels.

3.13.1.6. The fine sediments that exist naturally in this environment ensure that any species present are already naturally tolerant to a reasonable degree of SSC. Examples of this habitat are found more than 5 km from the Proposed Development, and as such any increases in SSC can be expected to be low and within background variation (<5 mg/l). At this level of magnitude, and the fact that this increase in SSC will be short in duration (a few days), no significant effects on species present is predicted as the received level of SSC is well within background.

3.13.1.7. Therefore, any impacts of increased SSC on sheltered muddy gravel are screened out from further assessment.

3.14. SEAGRASS BEDS

3.14.1.1. This habitat can often be observed in fine sand or sandy mud and characterised by *Zostera* spp. and the various associated infaunal species. A number of sub-biotopes can be found within this habitat, which are found to be dependent on the nature of the substratum.

3.14.1.2. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.14.1.3. Subtidal Seagrass beds, although sensitive to high or long term increases in SSC (due to a reduction in photosynthesis and reduced oxygen levels), are considered to potentially be tolerant to short-term isolated events such as would be experienced as a result of the Proposed Development (D'Avack, *et al*., 2019). Seagrass beds in

Bembridge MCZ are also located over 5 km from the Proposed Development and as such may be affected by low increases in SSC (<5 mg/l) within natural background variation, for a short duration (days). No significant changes to seagrass bed function or distribution are therefore considered likely to arise as a result of the Proposed Development and no significant effects are predicted.

3.14.1.4. Therefore, any impacts of increased SSC on seagrass beds are screened out from further assessment.

3.15. MAERL BEDS

3.15.1.1. Maerl is an unattached coralline alga which can occur in various marine environments ranging from tide-swept, often stony channels of marine inlets and open coastline. The dominant species will often be dependent on the salinity found at the location. For instance, Perry & Tyler-Walters (2018) adapted the work of Connor *et al*. (2004) and stated that in fully marine conditions *Phymatolithon calcareum* was typically observed to be the characterising species, whereas in more variable salinity it may be that *Lithothamnion glaciale* will develop and be more prevalent. Maerl is also light dependant, and in European waters Hall-Spencer (1998) observed that associated alga were restricted to relatively turbid habitats shallower than 32 m depth.

This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.15.1.2. Maerl's dependency on light for photosynthesis is the overriding reason for the limitations on depth at which maerl is observed. Subsequently during conditions of increased SSC, the availability of light towards the deeper communities will be reduced and the photosynthetic ability will be reduced accordingly. This increase in SSC, when coupled with the typically fast currents and high levels of water movement through maerl beds, will increase the levels of scour (Perry & Tyler-Walters, 2018). Vadas *et al*. (1992) states this exaggerated level of scour can promote higher mortality rates in early post-settlement algal stages whilst also inhibiting the settlement of maerl spores due to the invariable increased deposition of silt.

3.15.1.3. However Perry & Tyler-Walters (2018) suggests an increase in SSC can lead to a higher availability of detritus for filter feeders to feed on. The depth at which the maerl bed is found will also have a bearing on the severity of the effects as deeper biotopes may exhibit higher rates of mortality with increases in SSC.

3.15.1.4. Maerl beds are located *c*.10 km from the Proposed Development at their closest location. At this distance, any increase in SSC from the Proposed Development is likely to be <5 mg/l, which is within background variation. Although sensitive to reductions in light attenuation due to increased SSC, the negligible levels predicted to arise at this distance from the Proposed Development, and the short term transient

nature of the impact, will not result in anything other than negligible effects on the function, health or distribution of the Mearl beds, and therefore no significant effects are predicted.

3.15.1.5. Therefore, any impacts of increased SSC on maerl beds are screened out from further assessment.

3.16. SEA PENS AND BURROWING MEGAFAUNA

3.16.1.1. Sea pens (e.g. *Virgularia mirabilis* and *Pennatula phosphorea*) and various burrowing megafauna (e.g. *Nephrops norvegicus* and *Cerianthus lloydii*) are often characterising species in soft mud habitats, and can be observed at a range of depths in predominantly sheltered habitats where deposition rates are likely to be relatively high. Hughes (1998) highlights that the relationship between the bioturbation caused by burrowing megafauna and sea pen populations to be unknown, but it is noted that they co-exist in soft mud habitats and there were likely to be a 'mosaic' of burrowing megafauna communities which are dependent on natural levels of SSC and sediment deposition.

3.16.1.2. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.16.1.3. Sea pens are typically found in sheltered areas composed of fine sediments which are regularly subjected to high levels of SSC, and are known to demonstrate self-cleaning capabilities (Hill & Tyler-Walters, 2018). Although there is uncertainty about the actual effects of increased SSC, there have been several tests aimed at the cleaning methods of different sea pen species. Hoare and Wilson (1977) tested this in *V. mirabilis* and found that the suspended sediments were grasped and rejected quite swiftly and Hiscock (1983) noted that when subjected to increased levels of SSC, *V. mirabilis* secreted large quantities of mucus which kept the polyps clear of the silt, whilst also demonstrating the ability to self-clean. In addition, burrowing megafauna are not considered sensitive to increases in SSC.

3.16.1.4. Bembridge MCZ supports communities of sea pens and burrowing megafauna, and is situated 3.8 km west of the Marine Cable Corridor and may therefore experience increases in SSC between 5 – 10 mg/l. These raised levels will be short in duration (a few days) following the completion of cable installation activities. Given the short duration, low levels of SSC predicted, and relative tolerance of the species present, no significant effects are predicted on this habitat.

3.16.1.5. Therefore, any impacts of increased SSC on sea pens and burying megafauna are screened out from further assessment.

3.17. SUBTIDAL MUD

3.17.1.1. This habitat is predominantly characterised by cohesive sandy mud, often observed in sheltered habitats which can extend from the lower shore out to deep, offshore circalittoral habitats. Being more sheltered, tidal streams and wave action will be reduced, enabling fine sediments to settle. Characterising species which are typically dominant within this habitat are polychaetes and echinoderms such as brittlestars (*Amphiura* spp.), sea pens (*V. mirabilis*) and burrowing megafauna (Connor *et al*., 2004).

3.17.1.2. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.17.1.3. The infaunal species which characterise this biotope are unlikely to be significantly affected by increased levels of SSC due to the fine silts and muds that accumulate in low energy habitats such as these. There is also likely to be an inherent level of adaptation to this pressure due to natural re-suspension of these fine sediments (Tyler-Walters, 2016b). Burrowing megafauna are not expected to be impacted by this pressure due to predominantly existing within their burrows (Tillin & Tyler-Walters, 2016b).

3.17.1.4. Significant increases in turbidity as a result of organic particles will increase the availability of food. However, should the suspended particles be non-organic material, this has the potential to increase associated energetic costs with feeding and cleaning whilst inhibiting growth rates and reproductive success. Lethal effects resulting from increased SCC are considered very unlikely (Tillin & Tyler-Walters, 2016b).

3.17.1.5. Bembridge MCZ, located 3.8 km west of the Marine Cable Corridor, may receive increases in SSC between 5 – 10 mg/l however these are within the natural background levels already experienced. The pressure is expected to be short in duration (a few days) and the characterising species of these habitats are well adapted to residing within environments with varied turbidity. Consequently, only negligible effects on the presence or distribution of species within subtidal muds are considered likely to arise as a result of the project and no significant effects predicted for this feature.

3.17.1.6. Consequently, the effects of increased SSC on subtidal mud is to be screened out from further assessment.

3.18. PEAT AND CLAY EXPOSURES

3.18.1.1. This habitat includes littoral and sublittoral examples of peat and clay exposures, both soft enough to allow a variety of piddocks, particularly *Pholas dactylus*, *Barnea*

candida and *Barnea parva* (Maddock, 2011*).* Depending on the erosion of the site, both clay and peat can occur together or independently of each other. Where peat is present, the surface is characterised by algal mats consisting of red seaweed *Cerium* spp. and green seaweed species such as *Ulva lactuca* and *Ulva intestinalis (*Maddock, 2011). *Carcinus maenas* and *Cancer Pagurus* also occur in crevices of this habitat. Where clay is present, seaweed cover is sparse with some species such as *Mastocarpus stellatus* and *Ceramium* spp. attached to loose pebbles or shells (Maddock, 2011). On the surface of clay, *Mytilus edulis* can be identified as well as barnacles and periwinkles (*Littorina littorea*). Micro habitats are also present once piddocks have died, their holes provide shelter for species such as crabs and anemones (*Cereus pedunculatus* and *Aulactinia verrucosa*).

This feature is present in the following MCZ:

- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.18.1.2. Peat and clay exposures can be found in exposed to extremely sheltered shores paired with moderate to strong tidal streams (Maddock, 2011). Consequently, this habitat is expected to endure a degree of sediment mobility, and as a result, increased scour. Therefore, associated species will be tolerant to a degree of increased SSC, however instances of particularly high SSC may limit macroalgal cover of this habitat. Where filter feeding species are present, there may be some reduction in feeding efficiency from increases in SSC but in general this will not lead to increases in mortality.

3.18.1.3. Selsey Bill and the Hounds MCZ is located 4 km east of the Marine Cable Corridor, therefore may experience an increase in SSC of 5 – 10 mg/l over a short duration (a few days). As the potential increase in SSC is low and of a short duration, with species not considered overly sensitive to this effect, no significant effects on this feature are predicted.

3.18.1.4. Therefore, the effects of increased SSC on peat and clay exposures can be screened out of further assessment.

3.19. SHORT-SNOUTED SEAHORSE (*HIPPOCAMPUS HIPPOCAMPUS*)

3.19.1.1. Short-snouted seahorses can grow up to 15 cm in length and are distributed along the south coast of England, with substantial populations around the Channel Islands and Ireland (Garrick-Maidment and Jones, 2004). Preferred habitats include muddy waters, estuaries, seaweed and seagrasses as well rocky areas in under 5 m of water (Sabatini and Ballerstedt, 2007). The biology of this species is largely unknown as well as the exact size and distribution of populations around the British Isles (Sabatini and Ballerstedt, 2007).

3.19.1.2. Sensitivities outlined below from MarLIN have been superseded by the MarESA approach to sensitivity assessment.

3.19.1.3. This feature is present in the following MCZs:

- Bembridge; and
- Selsey Bill and the Hounds.

EFFECTS OF INCREASED SSC

3.19.1.4. Short snouted sea horses are predators, therefore do not rely on increases in SSC to increase food availability (Sabatini & Ballerstedt, 2007). However, seagrass habitats associated with short snouted seahorses are dependent on light for photosynthesis and increases in turbidity can be a limiting factor for photosynthetic processes, particularly if the period of light attenuation is extended. Therefore large increases in turbidity may result in a reduction of available habitat for short-snouted sea horses (Sabatini and Ballerstedt, 2007). However, due to the mobility of short-snouted sea horses, habitats with more suitable conditions can be accessed.

3.19.1.5. Bembridge and Selsey Bill and the Hounds MCZs both include short-snouted sea horses as a feature and are located 3.8 and 4 km west and east of the Marine Cable Corridor respectively, and may experience an increase in SSC of 5 - 10 mg/l, returning to within background levels in a few days. Due to the short duration and low magnitude of impact, it is predicted that there will be no significant effects on short snouted sea horses from increased SSC at either of these MCZs.

3.19.1.6. Therefore, the effects of increased SSC on short snouted sea horses are screened out from further assessment.

3.20. STALKED JELLYFISH (*HALICLYSTUS* SPECIES AND *LUCERNARIOPSIS CAMPANULATA*)

3.20.1.1. Stalked jellyfish *Haliclystus* spp. and *Lucenariopsis campanulata* can be found fixed on macroalgae and seagrass habitats in mid intertidal and shallow sublittoral zones. Distributions have been recorded in the Shetland Isles, Orkney, the west coasts of England, Ireland and Scotland, with isolated records from Northumberland. These features are present in the following MCZ:

- Bembridge.

3.20.1.2. Information on the ecology of these species is limited, therefore information from similar species or other members of the group Stauromedusae was used by MarLIN to produce a sensitivity review (Tyler-Walters & Heard, 2017). Both species sensitivity assessments are the same, therefore they have been combined during assessment.

EFFECTS OF INCREASED SSC

3.20.1.3. Stalked jellyfish are recorded as present within Bembridge MCZ more than 5 km from the Proposed Development, and as such, may receive increases in SSC <5 mg/l, which is within background variation. There is no evidence of negative effects on stalked jellyfish as a result of increased SSC, however it is recognised that increases in SSC may adversely affect the availability of suitable substratum, including seagrass and subtidal macrophyte species (Tyler-Walters & Heard, 2017). Any effects on seagrass or macrophyte species are predicted to be negligible at these levels of increased SSC, and as such, there are no predicted significant effects on the distribution or abundance of stalked jellyfish as a result of the Proposed Development.

3.20.1.4. Therefore, effects of SSC on stalked jellyfish species can be screened out from further assessment.

3.21. NATIVE OYSTER (*OSTREA EDULIS*)

3.21.1.1. The native oyster can grow up to 11 cm long and distributions are located around the UK, particularly in the west coast of Scotland and the south east of the UK (Perry and Jackson, 2017). Native oysters are often associated with highly productive estuarine and shallow coastal water habitats on firm benthos consisting of mud, rocks, muddy sand, muddy gravel and hard silt. Depth ranges do not exceed 80 m (Perry and Jackson, 2017).

3.21.1.2. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.21.1.3. Evidence suggests that native oyster growth can be enhanced at low levels of sediment resuspension and inhibited as sediment deposition increases (Ray, 2005). Chlorophyll in low levels of SSC may act as a food supplement, enhancing growth (Ray, 2005). However higher concentrations of SSC may dilute planktonic food resources and supress food ingestion.

3.21.1.4. Native oysters respond to increases in SSC by increasing pseudofaeces production paired with the occasional rapid closure of their valves to expel accumulated silt (Yonge, 1960), thereby resulting in an energetic cost.

3.21.1.5. Decreases in growth rates have been determined as a result of increased levels of SSC which reduce the ability of native oysters to feed efficiently (Korringa, 1952; Grant *et al*., 1990; Perry and Jackson, 2017).

3.21.1.6. Bembridge MCZ is located 3.8 km west of the Marine Cable Corridor, and may receive increases in SSC of 5 – 10 mg/l, returning to within background levels in a few days. This short term increase in SSC is unlikely to have any effect on native

oysters, other than a minor energetic cost if any cleaning of feeding apparatus is required. Therefore, there is predicted that any effects on this species will be negligible and no significant effects are predicted.

3.21.1.7. Increased SSC on native oyster will therefore be screened out of further assessment.

3.22. PEACOCK'S TAIL (*PADINA PAVONICA*)

3.22.1.1. Being one of the few species of calcified brown algae, *Padina pavonica* inhabits pools rocky shores, often compromised of soft substratum and adjacent to silty/sandy or clay areas (Herbert *et al*., 2016), and occasionally within the shallow infralittoral zone. Flat fronds develop over its life into funnel-shaped fronds which, when fully grown are often funnel-shaped, with a diameter of up to 10 cm.

3.22.1.2. This feature is present in the following MCZ:

- Bembridge.

EFFECTS OF INCREASED SSC

3.22.1.3. Peacock's tail seaweed (*P. pavonica*) is often found in the infralittoral zone and often in close proximity to clay, sand and silts. As such, it is regularly exposed to high water movements and increased SSC. As with other species of algae, increases in SSC will decrease the light penetration and promote scouring. However, as *P. pavonica* is a calcified alga, it has high resistance to scour. Bembridge MCZ is located 3.8 km west of the Marine Cable Corridor, and may experience an increase in SSC of 5 – 10 mg/l, returning to within background levels in a few days. Given the short duration, low levels of SSC predicted, and relative tolerance of the species, no significant effects are predicted on the abundance or distribution of this species.

3.22.1.4. Increased SSC on peacock's tail seaweed is screened out of further assessment.

3.23. SUMMARY OF ASSESSMENT FOR POTENTIAL SIGNIFICANT EFFECTS

Table 2 – Summary of screening for potential significant effects from increase SSC

MCZ	Protected feature and their conservation status / general management approach	Summary of Screening Assessment
Offshore Overfalls	Recover to favourable condition: - Subtidal coarse sediment; - Subtidal mixed sediments; and - Subtidal sand. Maintain to favourable condition: - English Channel outburst flood features[5].	No potential for significant effects. Screened out
Utopia	Recover to favourable condition: - Moderate energy circalittoral rock; - High energy circalittoral rock; - Subtidal coarse sediment; - Subtidal mixed sediments; - Subtidal sand; and Fragile sponge and anthozoan communities on subtidal rocky habitats.	No potential for significant effects. Screened out
Bembridge	Maintain in favourable condition: - Sheltered muddy gravels;	No potential for significant effects. Screened out

[5] Geological feature

MCZ	Protected feature and their conservation status / general management approach	Summary of Screening Assessment
	- Short-snouted seahorse (*Hippocampus hippocampus*); - Stalked jellyfish (*Calvadosia campanulata*); - Stalked jellyfish (*Haliclystus species*); - Subtidal coarse sediment; - Subtidal sand; Recover to favourable condition: - Maerl beds; - Native oyster (*Ostrea edulis*); - Peacock's tail (*Padina pavonica*); - Sea-pens and burrowing megafauna Seagrass beds; - Subtidal mixed sediments; and - Subtidal mud.	
Selsey Bill and Hounds	Maintain in favourable condition: - Bracklesham Bay geological feature; - Short-snouted seahorse (*Hippocampus hippocampus*); - Subtidal mixed sediments; and - Subtidal sand. Recover to favourable condition: - High energy infralittoral rock; - Low energy infralittoral rock; - Moderate energy infralittoral rock;	No potential for significant effects. Screened out

MCZ	Protected feature and their conservation status / general management approach	Summary of Screening Assessment
	- Moderate energy circalittoral rock; and Peat and clay exposures.	
Offshore Brighton	Recover to favourable condition: - High energy circalittoral rock; - Subtidal coarse sediment; and - Subtidal mixed sediments.	No potential for significant effects. Screened out

4. CONCLUSION

4.1.1.1. No pressures are anticipated to directly affect any MCZs, with the Proposed Development at least 1.15 km from the boundary of any MCZ. Indirect effects (increased SSC) were however considered to represent a potential pressure on MCZs identified in the vicinity of the Proposed Development.

4.1.1.2. As only negligible and transient deposits are predicted outwith the immediate area of sediment deposition (i.e. within 1 km of the disposal location), no potentially significant effects from deposition were considered possible.

4.1.1.3. The following MCZs were considered to have potential for connectivity and were therefore assessed to determine whether there was any potential for significant effects to arise.

- Offshore Overfalls (1.5 km distant);
- Utopia (1.3 km distant);
- Bembridge (3.8 km distant);
- Selsey Bill and the Hounds (4 km distant); and
- Offshore Brighton (8.5 km distant).

4.1.1.4. The assessment concluded that there would be no significant effects on the MCZ features, or any supporting ecological or geomorphological processes on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent. As such the conditions of s.126 can be met and the effects from increased SSC could be screened out from further assessment for all sites.

4.1.1.5. Therefore, a Stage 1 assessment is not required as it is concluded that the Proposed Development will not result in significant risk of the hindering the achievement of the conservation objectives of any MCZs.

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ANNEX A. CONSULTATION RESPONSES

Table A1. Consultation responses from Natural England on the MCZ Assessment conclusions

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
1	General Layout and presentation of information	Natural England is content with the presentation of information and general layout and they acknowledge that the document is a working draft which is subject to further amendment.	The Applicant acknowledges that Natural England is content with the layout and presentation of information.
2	Introduction (chapter 1)	Natural England is content with the information presented in this chapter and note that the environmental baseline data used to inform this report remains consistent with the Preliminary Environmental Information Report (PEIR), which Natural England has previously reviewed.	The Applicant acknowledges that Natural England is content with the information in this chapter.
3	Section 2.1	Natural England agrees with the MCZs that have been identified for consideration within the assessment.	The Applicant acknowledges and welcomes Natural England's agreement.

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
4	2.2.1.4	Natural England agrees with the approach to assess only indirect effects to MCZs given that there are no MCZs that overlap with the Marine Cable Corridor.	The Applicant acknowledges and welcomes Natural England's agreement.
5	Screening – Assessment of Connectivity (Chapter 2)	Connectivity of MCZs with the Proposed Development is determined by the worst-case scenarios for sediment movement during construction, including the disposal of dredge material. We note that this may affect nearshore sites up to a distance of 10km from the Marine Cable Corridor; and offshore sites up to a distance of 25km – based upon the outputs of plume dispersion modelling. Natural England agrees with the outcomes of this screening, subject to their comments on the plume dispersion modelling.	The Applicant acknowledges and welcomes Natural England's agreement. See additional response to consultation undertaken on modelling approach presented in Table A2.
6	3.1.1.1	Natural England agrees with the approach to screen out potentially significant effects from deposition due to the negligible and transient sediment deposits predicted outside the Marine Cable Corridor.	The Applicant acknowledges and welcomes Natural England's agreement.
7	3.1.1.3	Natural England welcomes the application of MarESA guidance to inform the sensitivity assessments of site features, in the absence of published MCZ Conservation Advice packages.	The Applicant acknowledges and welcomes Natural England's agreement.

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
8	Screening – Potential for Significant Effects (Chapter 3)	Natural England has reviewed the assessment of potential increased SSC impacts upon each designated feature of the five MCZs deemed to have potential connectivity and agrees with the approach taken. However, we recommend that advice is also sought from the Joint Nature Conservation Committee (JNCC) on the assessments for Offshore Overfalls MCZ and Offshore Brighton MCZ.	The Applicant acknowledges Natural England recommendation. JNCC have also been consulted on this MCZ assessment and their comments are found in Table A3.
9	Conclusion (Chapter 4)	The assessment concludes that the Proposed Development will not result in any significant effects upon MCZ features, or any supporting ecological or geomorphological processes on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent. The rationale for this conclusion considers the distance of MCZs with potential connectivity from the Marine Cable Corridor; the sensitivity of designated features; and the relative effects of predicted sediment deposition and SSC levels. Natural England agrees with this conclusion, subject to any subsequent comments on the modelling outputs used to inform this assessment.	The Applicant acknowledges and welcomes Natural England's agreement. See additional response to consultation undertaken on modelling approach presented in Table A2.

Table A2. Consultation responses from Natural England on the Modelling Approach

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
1	2.3	[Natural England are] content with the modelling approach taken and the resultant outputs with respect to predicted sedimentation and SSC levels, spatial extent and duration. We don't have any further specific comments to add at this stage. We note that the outputs of this plume dispersion modelling have been used to inform the draft HRA and MCZ assessment reports, so please refer to our respective letters of 20th September and 9th October 2019 for Natural England's advice on the assessment of potential impacts.	The Applicant acknowledges and welcomes Natural England's agreement.

Table A3. Consultation responses from the Joint Nature Conservation Committee (JNCC)

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
1	Section 2.2.1.1	JNCC agree that the footprint of maintenance and decommissioning is likely to be a similar magnitude to that of seabed preparation and construction activities. However, we disagree that the maintenance and decommissioning will be of shorter duration. An unforeseen repair may take longer than the preparation and construction activities. Also, both	The wording of section 2.2.1.2 has been updated to reflect the concerns of JNCC. The reference to shorter duration of maintenance activities has been removed from this section so that it

Comment No.	Relevant Paragraph	Summary of comment received	How has this been addressed by the Applicant?
		maintenance and decommissioning activities may involve the placement of stabilisation material such as rock dump, which will affect the seabed for a longer duration than seabed preparation and construction activities. As such, we believe that in this occasion maintenance or decommissioning activities will have a similar magnitude of impact as seabed preparation and construction activities. We request that in future applications this text is amended.	now reflects the possibility of maintenance activities having a similar duration to construction works.
2	Disposal of Dredged Material	Would moving disposal areas to beyond KP 21 bring it closer to the MCZ and potentially impact the features and conservation objectives for this site?	Discussion was had with JNCC on this point and it was agreed that the proposed KP21 mitigation (the moving of dredged material to outside this point) will not have a significant impact on Offshore Overfalls MCZ.