POWERFUEL

# Portland energy recovery facility

Environmental statement
Second addendum
Appendices

9.1

## 9.1

## Potential Marine Impacts of the Proposed Portland ERF Marine Conservation Zone Assessment

## Powerfuel Portland Ltd

# Potential Marine Impacts of the Proposed Portland Energy Recovery Facility

## Marine Conservation Zone Assessment

January 2022

Innovative Thinking - Sustainable Solutions

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# Potential Marine Impacts of the Proposed Portland Energy Recovery Facility

## Marine Conservation Zone Assessment

January 2022

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## Notice



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# 1 Introduction

The Marine and Coastal Access Act (2009) facilitates the establishment of an ecologically coherent network of Marine Protected Areas (MPAs). This Act aims to ensure clean, healthy, safe, productive and biologically diverse oceans and seas, by putting in place better systems for delivering sustainable development of marine and coastal environments. The Act creates a new type of MPA (Marine Protected Area) called a Marine Conservation Zone (MCZ).

There are four MCZs located within 20 km of the proposed Portland Energy Recovery Facility (ERF) including Chesil Beach and Stennis Ledge MCZ (1.6 km away, but more than 10 km by sea for marine impact pathways), South of Portland MCZ (6.9 km away, but more than 10 km by sea for marine impact pathways), Purbeck Coast MCZ (7.0 km away) and South Dorset MCZ (16.8 km away). Collectively, these sites constitute a diverse array of sediment types and support an abundance of marine life, including Native Oysters (*Ostrea edulis),* Pink sea-fans (*Eunicella verrucose*), Peacock's Tail (*Padina pavonica*), Stalked Jellyfish (*Haliclystus spp.),* Black Seabream (*Spondyliosoma cantharus*) and Maerl Beds. The location of these sites in relation to the proposed ERF is shown on Figure 1.

Under Section 126 of the Marine and Coastal Act 2009, an assessment is required to determine the potential significance of impacts from the proposed works to the features of these MCZs and whether there is any significant risk of hindering the Conservation Objectives of the MCZ. This report provides such an assessment.

# 2 MCZ Assessment Guidance

The Marine Management Organisation (MMO) and Natural England have produced general guidance for undertaking an MCZ assessment (MMO, 2013; Natural England, 2015). A framework illustrating the MCZ assessment process is shown in Figure 2. In summary, screening is undertaken to identify the potential for a licensable activity to have an effect (other than insignificantly) on MCZ interest features alone or in-combination with other plans and projects. A Stage 1 assessment is then undertaken if necessary, to determine whether there is a significant risk that the activity will hinder the Conservation Objectives of the screened in MCZ interest features. If avoidance of this risk is not possible and there are no other means of continuing with the works which would cause less of an environmental impact, then a Stage 2 assessment is necessary.

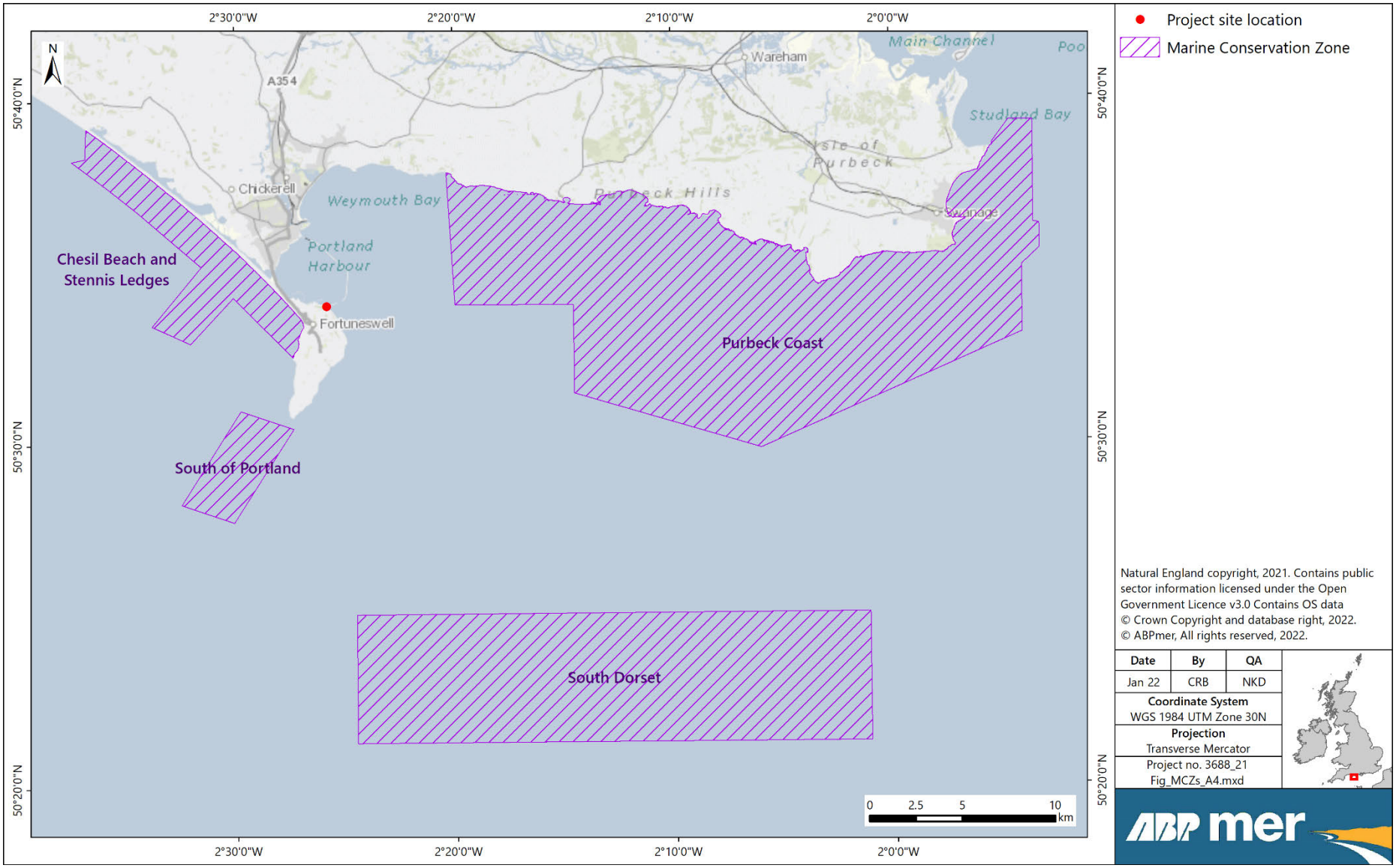
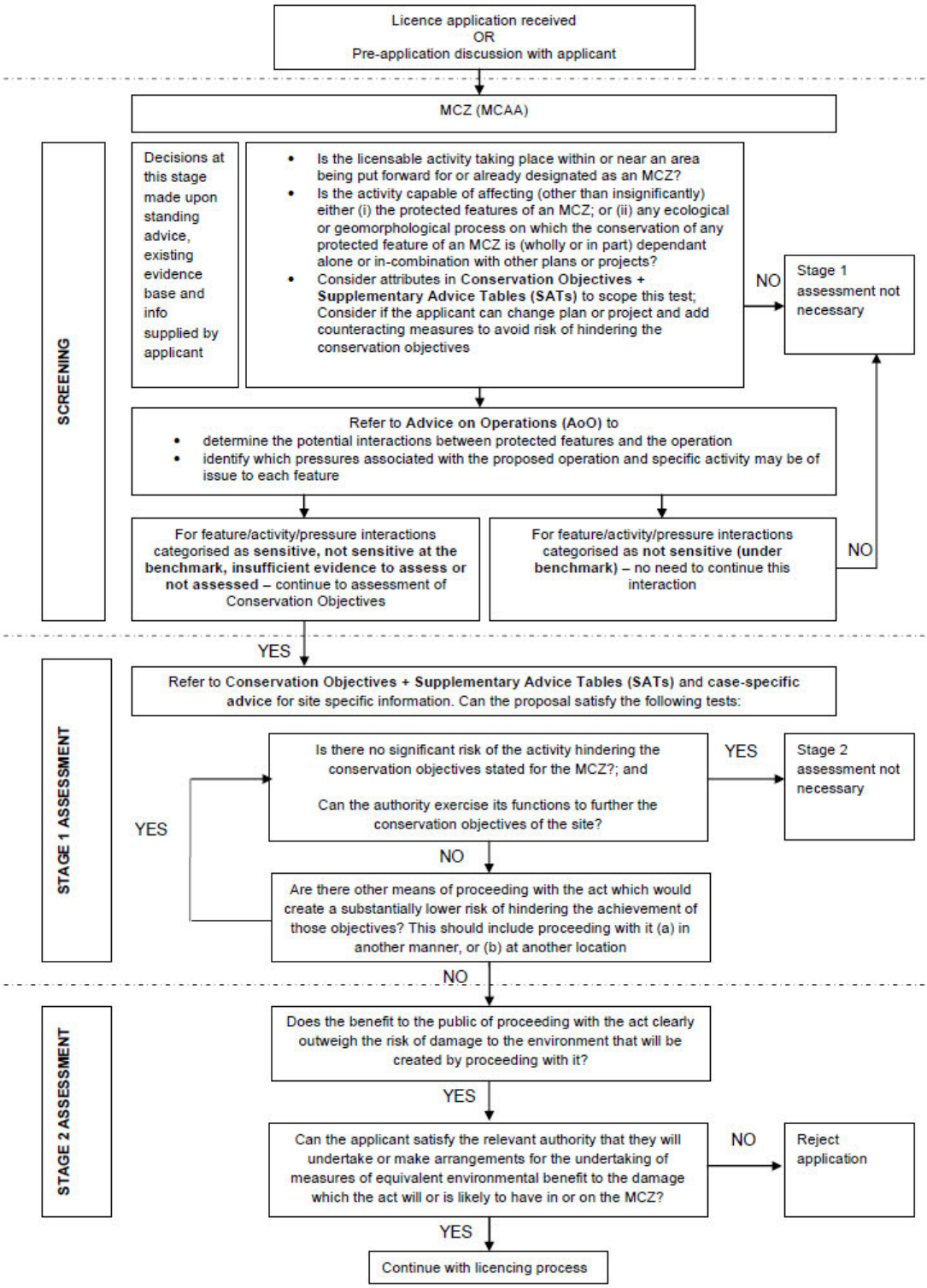



**Figure 1. Marine Conservation Zones in the vicinity of the proposed works**




Source: Natural England (2015)

**Figure 2. MCZ assessment framework**

# 3 Interest Features and Conservation Objectives

The features and conservation objectives of Chesil Beach and Stennis Ledge MCZ, South of Portland MCZ, Purbeck Coast MCZ and South Dorset MCZ are provided below in Table 1 to Table 4 below.

**Table 1. Chesil Beach and Stennis Ledge MCZ interest features and conservation objectives**

| Feature | Conservation Objectives |
|---|---|
| High Energy Circalittoral Rock | Maintain to favourable condition |
| High Energy Infralittoral Rock | |
| High Energy Intertidal Rock | |
| Intertidal Coarse Sediment | |
| Subtidal Coarse Sediment | |
| Subtidal Mixed Sediment | |
| Subtidal Sand | |
| Native Oyster (*Ostrea edulis*) | Recover to favourable condition |
| Pink Sea-fan (*Eunicella verrucose*) | |

Source: Defra (2019a)

**Table 2. South of Portland MCZ interest features and conservation objectives**

| Feature | Conservation Objectives |
|---|---|
| High Energy Circalittoral Rock | Recover to favourable condition |
| Moderate Energy Circalittoral Rock | |
| Subtidal Mixed Sediment | |
| Subtidal Coarse Sediment | |
| Subtidal Sand | Maintain in favourable condition |
| Portland Deep Geological Feature | |

Source: Defra (2019b)

**Table 3. Purbeck Coast MCZ interest features and conservation objectives**

| Feature | Conservation Objectives |
|---|---|
| High Energy Intertidal Rock | Maintain to favourable condition |
| Intertidal Coarse Sediment | |
| Moderate Energy Intertidal Rock | |
| Peacock's Tail (*Padina pavonica*) | |
| Stalked Jellyfish (*Haliclystus spp.*) | |
| Subtidal Coarse Sediment | |
| Subtidal Mixed Sediment | |
| Black Seabream (*Spondyliosoma cantharus*) | Recover to favourable condition |
| Maerl Beds | |

Source: Defra (2019c)

**Table 4. South Dorset MCZ interest features and conservation objectives**

| Feature | Conservation Objectives |
|---|---|
| Subtidal Coarse Sediment | Maintain to favourable condition |
| High Energy Circalittoral Rock | |
| Moderate Energy Circalittoral Rock | Recover to favourable condition |
| Subtidal Chalk | |

Source: Defra (2019d)

For all MCZs, the site's conservation objectives apply to the MCZ and the individual species and/or habitat for which the site has been designated (the "Designated features" listed above). The conservation objectives of the MCZs are that the protected features are maintained in favourable condition or recovered to favourable condition.

For the habitat feature, favourable condition means that within an MCZ:

1. Its extent is stable or increasing; and
2. Its structure and function, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

For the species of marine fauna, favourable condition means that within an MCZ the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

For all MCZs any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery. Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

# 4 Screening

Table 5 to Table 8 present the qualifying features of the four MCZs located within 20 km of the proposed Portland ERF, and provides a brief rationale for screening them in or out of the assessment based on a review of the Advice on Operations (Natural England, 2021), which takes account of feature sensitivity to anthropogenic pressures and an understanding of the nature and spatio-temporal scale of environmental changes associated with the proposed works and potential impacts on marine habitats and species.

**Table 5. Screening review for Chesil Beach and Stennis Ledges MCZ**

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| High Energy Circalittoral Rock, High Energy Infralittoral Rock, High Energy Intertidal Rock, Intertidal Coarse Sediment, Subtidal Coarse Sediment, Subtidal Mixed Sediment, Subtidal Sand | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework Construction Environmental - Management Plan (CEMP) has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at Weymouth wastewater treatment works (WWTW) and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall within the Chesil Beach and Stennis Ledges MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place, the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ habitat features are assessed as negligible. | There is no potential for a significant impact to occur and, therefore, these features have been screened out of further assessment |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ habitat features are assessed as negligible. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with the accumulation of mercury and dioxins in marine waters and sediments within Portland Harbour and surrounding regions as a result of the proposed works.<br><br>In order to assess the potential risk of accumulation of mercury within local marine waters, a simple model was developed and applied (ABPmer, 2021). The model estimates that the potential worst-case aerial deposition of mercury would increase the background concentration of dissolved mercury by less than 2 % and ambient concentrations of dissolved mercury will remain at around 10 % of the saline Environmental Quality Standards (EQS) value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury was assessed as not significant.<br><br>In order to assess the potential risk of accumulation of mercury within local sediments, a separate model was developed and applied which assumed that all of the mercury released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the Interim Sediment Quality Guidelines (ISQG) designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999).<br><br>On this basis, it is concluded that there are no significant risks to these MCZ habitat features associated with mercury emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination.<br><br>Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model was developed and applied which assumed that any dioxin released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). On this basis, risks associated with dioxin emissions to MCZ habitat features are assessed as not significant. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of oxides of nitrogen (NOx) and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast, background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ habitat features are assessed as negligible. | |
| Native Oyster (*Ostrea edulis*) | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall within the Chesil Beach and Stennis Ledges MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ native oyster feature are assessed as negligible. | There is no potential for a significant impact to occur and, therefore, the native oyster feature has been screened out of further assessment |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ native oyster feature are assessed as negligible. | |
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks to fish and shellfish associated with deposition of persistent contaminants such as mercury and dioxins within Portland Harbour and surrounding regions as a result of the proposed works. A simple model was developed and applied to estimate the potential contribution that deposition from air emissions from the proposed ERF might make to concentrations of mercury and dioxins in seawater and marine sediments (ABPmer, 2021) to inform an assessment of risks to native oyster.<br><br>The daily average worst-case potential input of mercury into the 4,000-hectare area surrounding Portland Harbour is 1,720 mg $day^{-1}$. Based on a daily average tidal exchange of 10 % from the model domain and using a simple box model, it is estimated that the background concentration of mercury might increase from 0.005 µg $l^{-1}$ to 0.00508 µg $l^{-1}$ within one month and remain this level thereafter (i.e. an increase in background concentration of less than 2 %). On this basis, the marginal increase in ambient concentration as a result of worst-case deposition of mercury is assessed as not significant.<br><br>The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999). The potential worst case increases in mercury in local sediments would, therefore, not be significant. Furthermore, any mercury in the sediments would not be bioavailable to native oyster. The risk to the MCZ native oyster feature is, therefore, assessed as not significant.<br><br>Dioxins will strongly adsorb to sediments and concentrations in the water column are therefore likely to be negligible. An assessment of the potential accumulation of dioxins in sediments estimated that deposition would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The potential worst case increases in dioxins in local sediments would, | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | therefore, not be significant. Furthermore, any dioxins in the sediments would not be bioavailable to native oyster. The risk to native oyster is, therefore, assessed as not significant.<br><br>Overall, given the negligible magnitude of the changes, the potential effects on the native oyster feature are assessed as negligible. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ native oyster feature are assessed as negligible. | |
| Pink Sea-fan (*Eunicella verrucose*) | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall within the Chesil Beach and Stennis Ledges MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures. | There is no potential for a significant impact to occur and, therefore, the pink sea-fan feature has been screened out of further assessment |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | With these measures in place the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ pink sea-fan feature are assessed as negligible. | |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ pink sea-fan feature are assessed as negligible. | |
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with deposition of persistent contaminants such as mercury and dioxins within Portland Harbour and surrounding regions as a result of the proposed works. A simple model was developed and applied to estimate the potential contribution that deposition from air emissions from the proposed ERF might make to concentrations of mercury and dioxins in seawater and marine sediments (ABPmer, 2021) to inform an assessment of risks to pink sea-fan.<br><br>The daily average worst-case potential input of mercury into the 4,000-hectare area surrounding Portland Harbour is 1,720 mg $day^{-1}$. Based on a daily average tidal exchange of 10 % from the model domain and using a simple box model, it is estimated that the background concentration of mercury might increase from 0.005 µg $l^{-1}$ to 0.00508 µg $l^{-1}$ within one month and remain this level thereafter (i.e. an increase in background concentration of less than 2 %). On this basis, the marginal increase in ambient concentration as a result of worst-case deposition of mercury is assessed as not significant.<br><br>The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999). The potential worst case increases in mercury in local sediments would, therefore, not be significant. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | Furthermore, any mercury in the sediments would not be bioavailable to pink sea fan. The risk to the MCZ pink sea-fan feature is, therefore, assessed as not significant.<br><br>Dioxins will strongly adsorb to sediments and concentrations in the water column are therefore likely to be negligible. An assessment of the potential accumulation of dioxins in sediments estimated that deposition would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The potential worst case increases in dioxins in local sediments would therefore not be significant. Furthermore, any dioxins in the sediments would not be bioavailable to the pink sea fan. The risk to pink sea-fan is, therefore, assessed as not significant.<br><br>Overall, given the negligible magnitude of the changes, the potential effects on the pink sea-fan feature are assessed as negligible. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 1.6 km), the potential effects on the MCZ pink sea-fan feature are assessed as negligible. | |
| * Pressures that features are considered to be potentially sensitive to (Natural England, 2021). | | | |

**Table 6. Screening review for South of Portland MCZ**

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| High Energy Circalittoral Rock, Moderate Energy Circalittoral Rock, Subtidal Mixed Sediment, Subtidal Coarse Sediment, Subtidal Sand, Portland Deep Geological Feature^ | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework Construction Environmental - Management Plan (CEMP) has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall more than 5 km from the South of Portland MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality and the distance of the ERF and the marine outfall from the MCZ (approximately 6.9 km), the potential effects on the MCZ habitat and geological features are assessed as negligible. | There is no potential for a significant impact to occur and, therefore, these features have been screened out of further assessment |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 6.9 km), the potential effects on the MCZ features are assessed as negligible. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with the accumulation of mercury and dioxins in marine waters and sediments within Portland Harbour and surrounding regions as a result of the proposed works.<br><br>In order to assess the potential risk of accumulation of mercury within local marine waters, a simple model was developed and applied (ABPmer, 2021). The model estimates that the potential worst-case aerial deposition of mercury would increase the background concentration of dissolved mercury by less than 2 % and ambient concentrations of dissolved mercury will remain at around 10 % of the saline EQS value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury was assessed as not significant.<br><br>In order to assess the potential risk of accumulation of mercury within local sediments, a separate model was developed and applied which assumed that all of the mercury released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999).<br><br>On this basis, and recognising that the MCZ is several km south of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to MCZ habitat and geological features associated with mercury emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination.<br><br>Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model was developed and applied which assumed that any dioxin released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | On this basis, and recognising that the MCZ is several km south of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to MCZ habitat and geological features associated with dioxin emissions. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 6.9 km), the potential effects on the MCZ features are assessed as negligible. | |

* Pressures that features are considered sensitive to (Natural England, 2021).

^ Although the sensitivity of the MCZ Portland Deep Geological Feature to pressures from activities has not been assessed by Natural England (2021), it has been included in this screening assessment on the basis that it may be sensitive to the same pressures as MCZ habitat features as a precaution.

**Table 7. Screening review for Purbeck Coast MCZ**

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| High Energy Intertidal Rock, Intertidal Coarse Sediment, Moderate Energy Intertidal Rock, Subtidal Coarse Sediment, Subtidal Mixed Sediment | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall more than 10 km from the Purbeck Coast MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality, and recognising that the nearest point of the Purbeck Coast MCZ is 7 km from the ERF and more than 10 km from the marine outfall, the potential effects on the MCZ habitat features are assessed as negligible. | There is no potential for a significant impact to occur and, therefore, these features have been screened out of further assessment |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ habitat features are assessed as negligible. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with the accumulation of mercury and dioxins in marine waters and sediments within Portland Harbour and surrounding regions as a result of the proposed works.<br><br>In order to assess the potential risk of accumulation of mercury within local marine waters, a simple model was developed and applied (ABPmer, 2021). The model estimates that the potential worst-case aerial deposition of mercury would increase the background concentration of dissolved mercury by less than 2 % and ambient concentrations of dissolved mercury will remain at around 10 % of the saline EQS value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury was assessed as not significant.<br><br>In order to assess the potential risk of accumulation of mercury within local sediments, a separate model was developed and applied which assumed that all of the mercury released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999).<br><br>On this basis and recognising that the MCZ is several km east of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to Purbeck Coast MCZ habitat features associated with mercury emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination.<br><br>Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model was developed and applied which assumed that any dioxin released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | On this basis and recognising that the MCZ is several km to the east of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to MCZ habitat features associated with dioxin emissions. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ features are assessed as negligible. | |
| Stalked Jellyfish (*Haliclytus spp.),* Peacock's Tail (*Padina pavonica)* | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall more than 10 km from the Purbeck Coast MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place the effects on marine water quality as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible | There is no potential for a significant impact to occur and, therefore, these features have been screened out of further assessment |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | magnitude of the changes in marine water quality, and recognising that the nearest point of the Purbeck Coast MCZ is 7 km from the ERF and more than 10 km from the marine outfall, the potential effects on the MCZ stalked jellyfish and peacock's tail features are assessed as negligible. | |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ stalked jellyfish and peacock's tail features are assessed as negligible. | |
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with deposition of persistent contaminants such as mercury and dioxins within Portland Harbour and surrounding regions as a result of the proposed works. A simple model was developed and applied to estimate the potential contribution that deposition from air emissions from the proposed ERF might make to concentrations of mercury and dioxins in seawater and marine sediments (ABPmer, 2021) to inform an assessment of risks to stalked jellyfish and peacock's tail.<br><br>The daily average worst-case potential input of mercury into the 4,000-hectare area surrounding Portland Harbour is 1,720 mg $day^{-1}$. Based on a daily average tidal exchange of 10 % from the model domain and using a simple box model, it is estimated that the background concentration of mercury might increase from 0.005 µg $l^{-1}$ to 0.00508 µg $l^{-1}$ within one month and remain this level thereafter (i.e. an increase in background concentration of less than 2 %).<br><br>The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999). The potential worst case increases in mercury in local sediments would, therefore, not be significant. Furthermore, any mercury in the sediments would not be bioavailable to stalked jellyfish and peacock's tail. The risk to these MCZ features is, therefore, assessed as not significant.<br><br>Dioxins will strongly adsorb to sediments and concentrations in the water column are therefore likely to be negligible. An assessment of the potential accumulation of dioxins in sediments estimated that deposition would increase the sediment | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The potential worst case increases in dioxins in local sediments would, therefore, not be significant. Furthermore, any dioxins in the sediments would not be bioavailable to stalked jellyfish and peacock's tail. The risk to these MCZ features is, therefore, assessed as not significant.<br><br>On this basis, and recognising that the MCZ is several km east of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to Purbeck Coast MCZ stalked jellyfish and peacock's tail features associated with mercury or dioxin emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, that the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site, the potential effects on the MCZ stalked jellyfish and peacock's tail features are assessed as negligible. | |
| Black Seabream (*Spondyliosoma cantharus*) | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall more than 10 km from the Purbeck Coast MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP. | There is no potential for a significant impact to occur and, therefore, black seabream have been screened out of further assessment |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place, and recognising that and recognising that the nearest point of the Purbeck Coast MCZ is 7 km from the ERF and more than 10 km from the marine outfall, the effects on marine water and sediment quality within the Purbeck Coast MCZ as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible. Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ black seabream feature are also assessed as negligible. | |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ black seabream feature are assessed as negligible. | |
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks to fish and shellfish associated with deposition of persistent contaminants such as mercury and dioxins within Portland Harbour and surrounding regions as a result of the proposed works. A simple model was developed and applied to estimate the potential contribution that deposition from air emissions from the proposed ERF might make to concentrations of mercury and dioxins in seawater and marine sediments (ABPmer, 2021) to inform an assessment of risks to Black seabream.<br><br>The daily average worst-case potential input of mercury into the 4,000-hectare area surrounding Portland Harbour is 1,720 mg $day^{-1}$. Based on a daily average tidal exchange of 10 % from the model domain and using a simple box model, it is estimated that the background concentration of mercury might increase from 0.005 µg $l^{-1}$ to 0.00508 µg $l^{-1}$ within one month and remain this level thereafter (i.e. an increase in background concentration of less than 2 %). On this basis, the marginal increase in ambient concentration as a result of worst-case deposition of mercury is assessed as not significant. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the Interim Sediment Quality Guideline (ISQG) designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999). The potential worst case increases in mercury in local sediments would, therefore, not be significant. Furthermore, any mercury in the sediments would not be bioavailable to black seabream. The risk to the MCZ black seabream feature is, therefore, assessed as not significant.<br><br>Dioxins will strongly adsorb to sediments and concentrations in the water column are therefore likely to be negligible. An assessment of the potential accumulation of dioxins in sediments estimated that deposition would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The potential worst case increases in dioxins in local sediments would, therefore, not be significant. Furthermore, any dioxins in the sediments would not be bioavailable to black seabream. The risk to black seabream is, therefore, assessed as not significant.<br><br>On this basis and recognising that the MCZ is several km east of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to Purbeck Coast MCZ black seabream feature associated with mercury or dioxin emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3^-}$ ; $NO_{2^-}$ ; $NH_3$) in seawater (primarily as $NO_{3^-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ black seabream feature are assessed as negligible. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Visual disturbance<br>Underwater noise disturbance | The proposed works are located approximately 7 km away from the Purbeck Coast MCZ and, therefore, there will be no significant visual or underwater noise disturbance effects on the MCZ black seabream feature. | |
| Maerl Beds | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km, west of Portland via an existing long sea outfall more than 10 km from the Purbeck Coast MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place, and recognising that and recognising that the nearest point of the Purbeck Coast MCZ is 7 km from the ERF and more than 10 km from the marine outfall, the effects on marine water and sediment quality within the Purbeck Coast MCZ as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible.<br>Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ maerl beds feature are also assessed as negligible. | There is no potential for a significant impact to occur and, therefore, maerl beds have been screened out of further assessment |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ maerl beds feature are assessed as negligible. | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with the accumulation of mercury and dioxins in marine waters and sediments within Portland Harbour and surrounding regions as a result of the proposed works.<br>In order to assess the potential risk of accumulation of mercury within local marine waters, a simple model was developed and applied (ABPmer, 2021). The model estimates that the potential worst-case aerial deposition of mercury would increase the background concentration of dissolved mercury by less than 2 % and ambient concentrations of dissolved mercury will remain at around 10 % of the saline EQS value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury was assessed as not significant.<br><br>In order to assess the potential risk of accumulation of mercury within local sediments, a separate model was developed and applied which assumed that all of the mercury released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999).<br><br>On this basis, it is concluded that there are no significant risks to the MCZ associated with mercury emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination.<br><br>Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model was developed and applied which assumed that any dioxin released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The risks associated with dioxin emissions were assessed as not significant.<br><br>On this basis, and recognising that the MCZ is several km east of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to the Purbeck Coast MCZ | |

| Feature | Pressure* | Screening Assessment | Screening Conclusion |
|---|---|---|---|
| | | maerl beds feature associated with mercury or dioxin emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significantly increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 7 km), the potential effects on the MCZ maerl beds feature are assessed as negligible. | |
| * Pressures that features are considered sensitive to (Natural England, 2021). | | | |

**Table 8. Screening review for South Dorset MCZ**

| Feature | Pressure | Screening assessment* | Screening conclusion |
|---|---|---|---|
| Subtidal Coarse Sediment, High Energy Circalittoral Rock, Moderate Energy Circalittoral Rock, Subtidal Chalk | Smothering and siltation rate changes<br>Synthetic compound contamination | During construction, while there are no specific marine works, it is recognised that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework CEMP has been developed that will be agreed with the Environment Agency and Dorset Council. Any discharges from construction activity will be made to sewer. These will be treated at WWTW and discharged to the sea 1 km offshore, west of Portland via an existing long sea outfall more than 10 km from the South Dorset MCZ.<br><br>Any accidental spillages during construction will be managed and minimised through application of the CEMP.<br><br>The process and foul water effluent from the ERF during operation will be discharged to sewer and also treated at WWTW prior to discharge to the sea. These operational discharges will be a minor component of the overall discharge from the WWTW.<br><br>Any accidental spillages during operation will be managed and minimised through application of site operating procedures.<br><br>With these measures in place, and recognising that and recognising that the nearest point of the South Dorset MCZ is around 17 km from the ERF and more than 10 km from the marine outfall, the effects on marine water and sediment quality within the South Dorset MCZ as a result of smothering and siltation rate changes and synthetic compound contamination during both construction and operation are assessed as negligible.<br><br>Given the negligible magnitude of the changes in marine water quality, the potential effects on the MCZ habitat features are also assessed as negligible. | There is no potential for a significant impact to occur and, therefore, these features have been screened out of further assessment |
| | Ocean acidification | There is a potential risk of ocean acidification as a result of $SO_2$ and $CO_2$ emissions to air. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of $SO_2$ or $CO_2$ into the marine environment. Anthropogenic releases of $CO_2$ are recognised as contributing to ocean acidification at a global scale. The contribution of $CO_2$ from the proposed ERF is negligible in a global context. Given the negligible magnitude of the changes and the distance from the site (approximately 16.8 km), the potential effects on the MCZ habitat features are assessed as negligible. | |

| Feature | Pressure | Screening assessment* | Screening conclusion |
|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | Stakeholder representations have identified potential risks associated with the accumulation of mercury and dioxins in marine waters and sediments within Portland Harbour and surrounding regions as a result of the proposed works.<br><br>In order to assess the potential risk of accumulation of mercury within local marine waters, a simple model was developed and applied (ABPmer, 2021). The model estimates that the potential worst-case aerial deposition of mercury would increase the background concentration of dissolved mercury by less than 2 % and ambient concentrations of dissolved mercury will remain at around 10 % of the saline EQS value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury was assessed as not significant.<br><br>In order to assess the potential risk of accumulation of mercury within local sediments, a separate model was developed and applied which assumed that all of the mercury released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 0.09 % of the ISQG designed to protect sea life (0.13 mg $kg^{-1}$ dry weight sediment) (CCME, 1999).<br><br>On this basis, it was concluded that there are no significant risks to this MCZ associated with mercury emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination.<br><br>Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model was developed and applied which assumed that any dioxin released to air entered the local marine environment and became incorporated within marine sediments (ABPmer, 2021). Both of these assumptions are highly conservative. The model estimated that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng $kg^{-1}$ sediment (dry weight) per year. This equates to 1.5 % of the ISQG designed to protect sea life (0.85 ng $kg^{-1}$ dry weight sediment) (CCME, 2001). The risks associated with dioxin emissions were assessed as not significant. | |

| Feature | Pressure | Screening assessment* | Screening conclusion |
|---|---|---|---|
| | | On this basis, and recognising that the MCZ is more than 10 km south of the model area boundary (and thus would be subject to even smaller changes than those indicated above), it is concluded that there are no significant risks to the South Dorset MCZ habitat = features associated with mercury or dioxin emissions, either in terms of risk to marine water quality standards or as a result of sediment contamination. | |
| | Nutrient enrichment | Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment. Emissions from the proposed Portland ERF during both construction and operation do not exceed critical levels or critical loads from ecologically important pollutants (ABPmer, 2021). The process contribution from the ERF plume to ground level concentrations of $NO_2$ and ammonia is very small (< 1 µg $m^{-3}$ for $NO_2$ and negligible for ammonia). In contrast background concentrations of nitrogen ($NO_{3-}$ ; $NO_{2-}$ ; $NH_3$) in seawater (primarily as $NO_{3-}$) are many orders of magnitude greater. On this basis, the small process contribution from the ERF will not materially contribute to nutrient concentrations in adjacent marine waters and thus will not significant increase the risk of any eutrophication. Given the negligible magnitude of the changes and the distance from the site (approximately 16.8 km), the potential effects on the MCZ habitat features are assessed as negligible. | |
| * Pressures that features are considered sensitive to (Natural England, 2021). | | | |

# 5 Conclusions

The four MCZs located within 20 km of the proposed Portland ERF, specifically Chesil Beach and Stennis Ledges MCZ, South of Portland MCZ, Purbeck Coast MCZ and South Dorset MCZ, are not exposed to any direct changes as a result of the construction and operation of the proposed ERF. There is some potential for features to be exposed to indirect changes during construction and operation, primarily as a result of aerial deposition of contaminants within the marine environment, or through planned or accidental marine discharges. However, all such indirect changes have been assessed as negligible and not significant in terms of risks to MCZ features taking account of the magnitude of the changes, the distance from the sites and the sensitivity of features to those changes. On this basis there is no significant risk that the proposed project will hinder the Conservation Objectives for any of the MCZ features at any of the four sites and, therefore, there is considered to be no need for a Stage 1 assessment to be undertaken.

# 6 References

ABPmer. (2021). Potential Marine Impacts of the Propose Portland Energy Recovery Facility (ERF). ABP Marine Environmental Research Ltd.

CCME. (1999). Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Mercury. Canadian Council of Ministers of the Environment. Available at: https://www.ccme.ca/en/res/mercury-canadian-sediment-quality-guidelines-for-the-protection-of-aquatic-life-en.pdf (accessed December 2021).

CCME. (2001). Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Polychlorinated dibenzo-p=dioxins and polychlorinated dibenzofurans (PCDD/Fs). Canadian Council of Ministers of the Environment. Available at: https://ccme.ca/en/res/polychlorinated-dioxins-and-furans-pcdd_fs-canadian-sediment-quality-guidelines-for-the-protection-of-aquatic-life-en.pdf (accessed December 2021)

Defra. (2019a). Chesil Beach and Stennis Marine Conservation Zone. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914539/mcz-chesil-beach-stennis-ledges-2019 (accessed December 2021).

Defra. (2019b). South of Portland Marine Conservation Zone. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915689/mcz-south-portland-2019https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914539/mcz-chesil-beach-stennis-ledges-2019 (accessed December 2021).

Defra. (2019c). Purbeck Coast Marine Conservation Zone. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915664/mcz-purbeck-coast-2019 (accessed December 2021).

Defra. (2019d). South Dorset Marine Conservation Zone. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915683/mcz-south-dorset-2019https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914539/mcz-chesil-beach-stennis-ledges-2019 (accessed December 2021).

MMO. (2013). Marine Conservation Zones and Marine Licensing. April 2013. 9p.

Natural England. (2015). Available online at: https://www.gov.uk/conservation-advice-for-marine-protected-areas-how-to-use-site-advice-packages (accessed December 2021).

Natural England. (2021). MCZ: Advice on Operations. Available at: https://designatedsites.naturalengland.org.uk/SiteSearch.aspx (accessed December 2021).

# 7 Abbreviations/Acronyms

| | |
|---|---|
| AoO | Advice on Operations |
| CCME | Canadian Council of Ministers of the Environment |
| CEMP | Construction Environmental Management Plan |
| $CO_2$ | Carbon Dioxide |
| Defra | Department for Environment, Food & Rural Affairs |
| EQS | Environmental Quality Standards |
| ERF | Energy Recovery Facility |
| ISQG | Interim Sediment Quality Guidelines |
| MCAA | Marine and Coastal Access Act |
| MCZ | Marine Conservation Zone |
| MMO | Marine Management Organisation |
| MPA | Marine Protected Areas |
| $NH_3$ | Ammonia |
| $NO_2$ | Nitrogen Dioxide |
| $NO_3$ | Nitrate |
| $NO_x$ | Oxides of nitrogen |
| SAT | Supplementary Advice Table |
| $SO_2$ | Sulphur Dioxide |
| TBT | Tributyltin |
| UTM | Universal Transverse Mercator |
| WGS | World Geodetic System |
| WWTW | Weymouth Wastewater Treatment Works |

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated

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