Berwick Bank Wind Farm

Additional Environmental Information (AEI) Submission

AEI03: Supplementary Information
Section 6 Torness Power Station

sse Renewables

BERWICK BANK WIND FARM
POST APPLICATION SUPPORT
EDF TORNESS CONSULTATION RESPONSE

Berwick Bank Wind Farm
Post-Application Support –
Consultation Response
Final
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FIGURES

ACRONYMS

Acronym	Description
CAD	Computer Aided Design
EDF	Électricité de France
ENGL	EDF Energy Nuclear Generation Limited
GOOS	Global Ocean Observing System
HDD	Horizontal Directional Drilling
LAT	Lowest Astronomical Tide
MS-LOT	Marine Scotland Licensing Operations Team
SSER	SSE Renewables
TOR	Torness Nuclear Power Station

UNITS

Unit	Description
km	Kilometres
km^2	Square Kilometres
m	Metre

1. CONSULTATION RESPONSE

1. This advice note is provided on behalf of SSE Renewables (SSER), in response to EDF Energy Nuclear Generation Limited's (ENGL) concerns raised as a consultation response to the Berwick Bank Wind Farm (the Proposed Development) offshore Application on the 18 February 2022. This consultation response relates to the potential for suspended sediment and detached macroalgae from cable lay during export cable installation and operation and maintenance, which may lead to blockage of the cooling water intake at Torness Nuclear Power Station (TOR). It is of note that TOR is due to be decommissioned in 2028.

2. The specific concerns raised within this consultation response were as follows:

    1. Operational impacts to TOR through potential blockages to the cooling water intakes due to kelp/seaweed detachment and sediment disturbance; and
    2. To mitigate the above, ENGL have previously undertaken measures to harvest kelp (note that TOR have implemented an existing seaweed management zone within the area).

3. A second consultation response was submitted by EDF to the Marine Scotland Licensing Operations Team (MS-LOT) on the 21 February 2023, outlining the same concerns, along with the following requests:

    1. Provide further justification for the location of the landfall site and cable routes taking into account the potential risks to the operation of TOR;
    2. Provide to Marine Scotland a legible plan and Computer Aided Design (CAD) file for the red line boundary proposed in the Applications to better understand the proximity of the proposed works to the cooling water intake for TOR (this has been supplied directly to ENGL by SSER);
    3. Provide to Marine Scotland an indicative plan for the location of landfall infrastructure and subsea cables within the red line boundary proposed in the Applications to better understand the proximity of the proposed works to the cooling water intake (this has been supplied directly to ENGL by SSER);
    4. Provide to Marine Scotland an indicative plan showing the entry and exit points for proposed Horizontal Directional Drilling for cable laying in the intertidal area (this has been supplied directly to ENGL by SSER);
    5. Work with ENGL to assess the risk of blockage to the cooling water intakes and consider appropriate mitigation and measures to mitigate the risk of blockage to avoid potential outages to electricity generation.
    6. Identify and commit to appropriate cable laying methodologies and subsequent maintenance requirements including the harvesting of kelp.

1.1. LANDFALL LOCATION AND CABLE ROUTE SITE SELECTION

4. The site selection of the Proposed Development was based on a grid connection agreement with National Grid Electricity System Operator. The landfall selection at Skateraw was preferred against six other options due to it allowing for a shorter and less challenging and environmentally constrained onshore cable route to connect to the Branxton Substation location. The Proposed Development Export Cable Corridor route is based upon metocean surveys, as well as the Indicative Export Cable Corridor Design study and geotechnical surveys, both carried out by the SSER in 2020. The nearshore export cable corridor boundary and indicative Horizontal Directional Drilling (HDD) punchout location options are given in Figure 1.

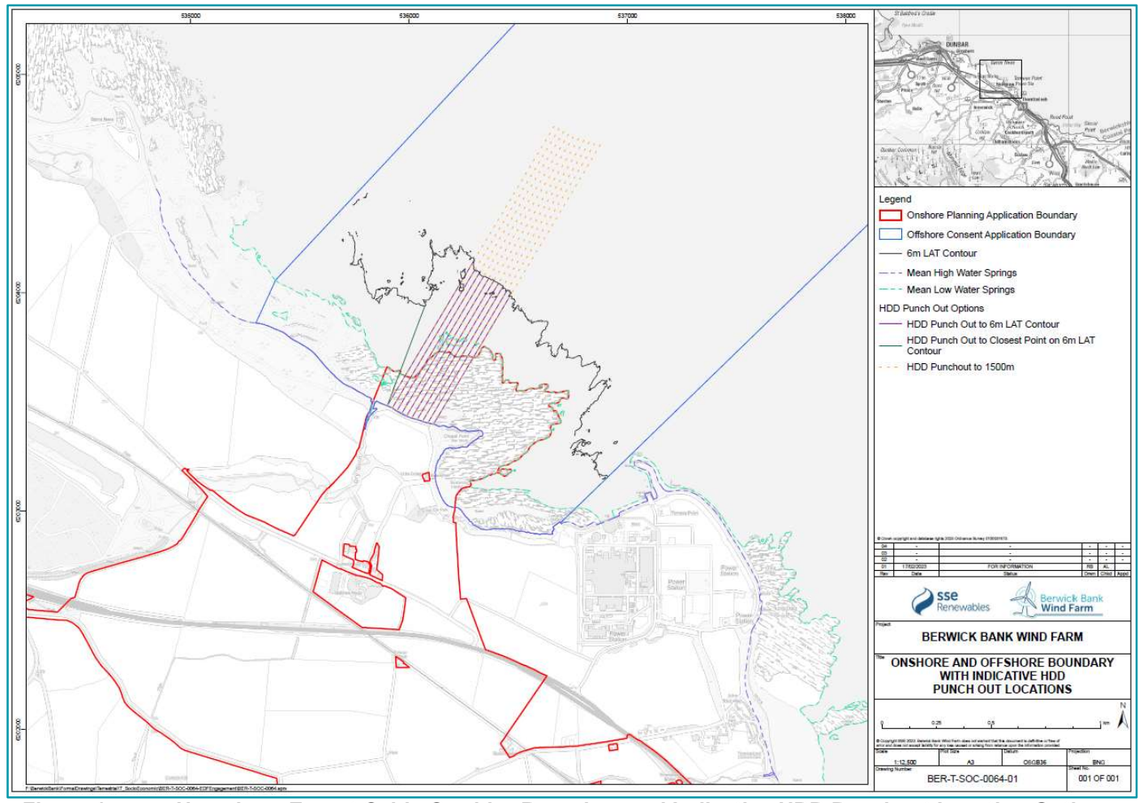

Figure 1: Nearshore Export Cable Corridor Boundary and Indicative HDD Punchout Location Options

1.2. CABLE INSTALLATION

5. The planned construction phase for the Proposed Development is between Q1 2025 to Q1 2033. Cable installation methods are being considered and may involve jet trenchers or mechanical trenchers if the cable is to be buried. Cable ploughs are also being considered (either through a displacement or non-displacement plough), as well as a trenchless technique through HDD to bring cables ashore under the intertidal zone. Pre-sweeping or dredging of the final construction corridor may be required prior to installation of the cable.

6. The operation and maintenance phase of the Proposed Development is expected to commence in 2030, however substantial maintenance of export cables is unlikely to be required in the early years of operation. With TOR's decommissioning planned to start in 2028, there is no overlap expected between the operational phases of both projects, therefore cable repair and maintenance events are not considered herein.

1.3. SUMMARY OF THE DISTRIBUTION OF KELP ALONG THE PROPOSED EXPORT CABLE CORRIDOR

7. The Proposed Development Export Cable Corridor identified commences at the south/southwest boundary of the Proposed Development Array Area (Figure 2), making landfall at Skateraw (East Lothian coast). The bathymetry along the Proposed Development Export Cable Corridor is from the low water mark to 69.8 m below the Lowest Astronomical Tide (LAT). Biotope mapping has shown that kelp beds exist offshore from TOR, primarily consisting of the tangle/cuvie kelp *Laminaria hyperborea* (ABPmer, 2019). These kelp beds are present along the proposed export cable route for the Proposed Development.

8. Figure 2 shows the extent of mapped macroalgal canopy cover, comprised predominantly of kelp and fucoid algae, in the area of the planned landfall location for the Proposed Development, derived from the Global Ocean Observing System (GOOS; EMODnet, 2021).

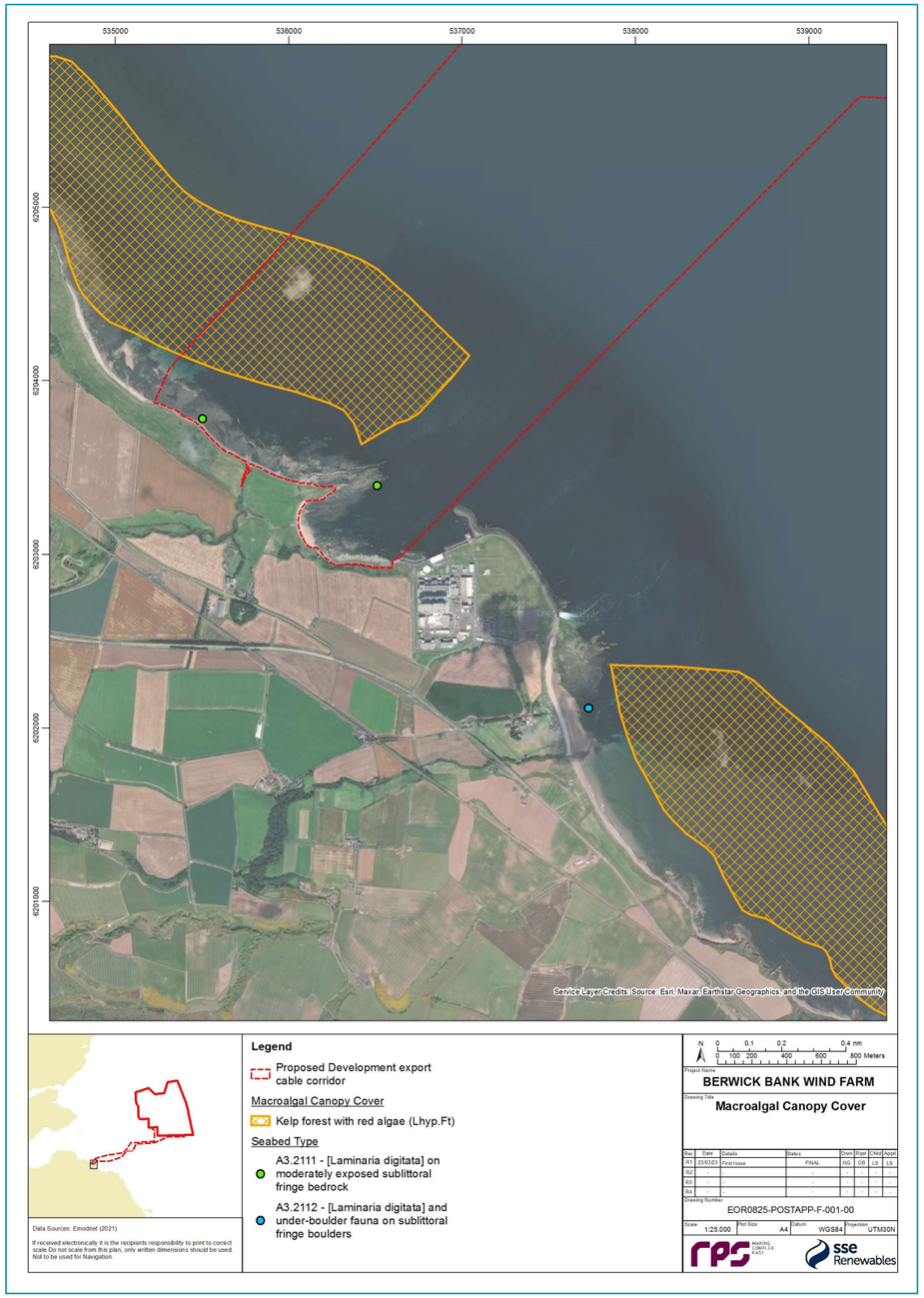

Figure 2: Mapped Macroalgal Canopy Cover (EMODnet, 2021)

1.4. THE POTENTIAL FOR SUSPENDED SEDIMENTS TO REACH TORNESS NUCLEAR POWER STATION

9. Physical Processes modelling undertaken by RPS as part of the pre-application assessment has shown that the nature and location of the sediment release due to trenching operations means that material will be progressively transported to the northwest and southeast on the residual current (see Figure 3 to Figure 7). The sediment, which is released at the bed will settle during slack tides and be remobilised as tidal currents increase over repeated tidal cycles. The nature of the material, which is predominantly fine sand with some coarse silt, coupled with the physics of the near bed mobilisation means that it would not be dispersed into the bay at Skateraw between Chapel Point and Torness Point. There, tidal current speeds are much lower but may reach the shoreline and settle to the east of the site at Torness Point.

10. It is noted that the material released at the HDD breakout will be finer grained drilling mud and a proportion of material would be released close to the water surface as part of the dredging process. This finer material would remain in suspension much longer and be more widely dispersed than that associated with the cable trenching operations. There is therefore potential for this material to reach the TOR's water intake, albeit at suspended sediment levels comparable to those associated with storm conditions.

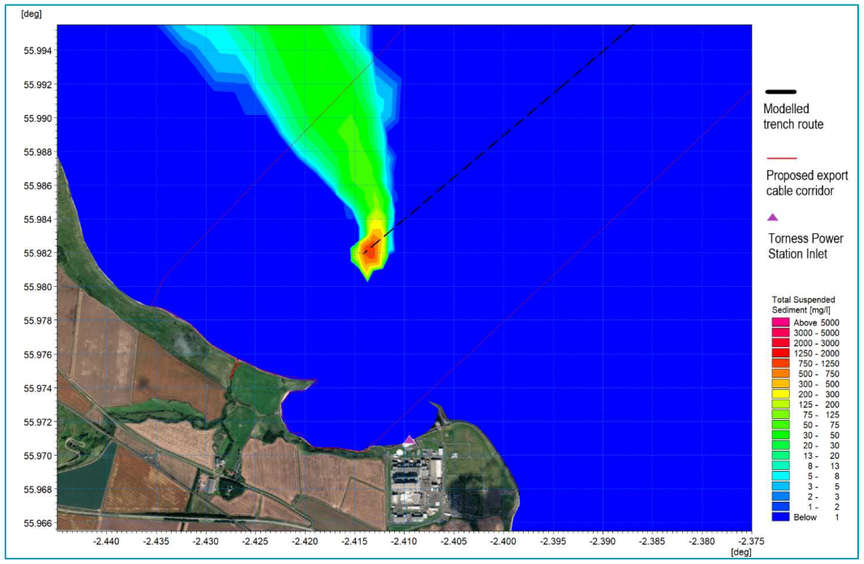

Figure 3: Concluding Stage of Cable Trenching

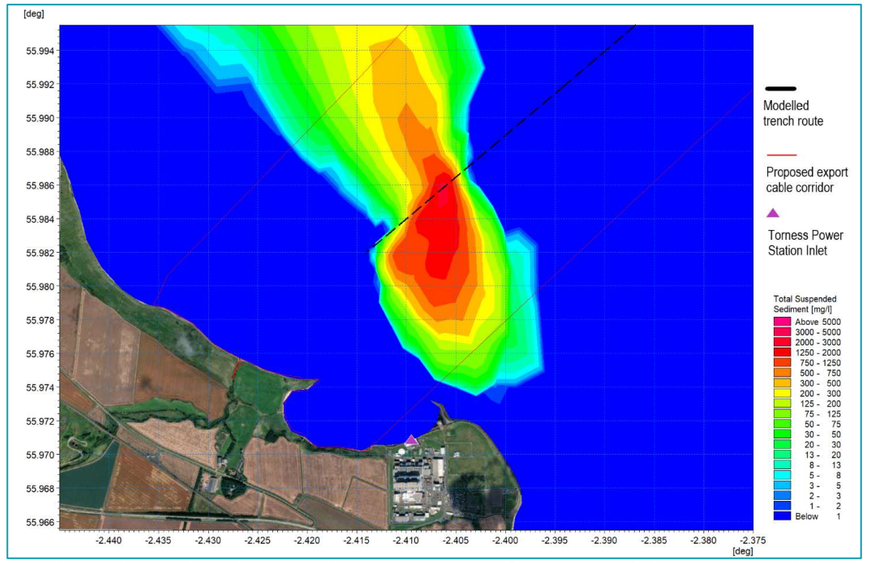

Figure 4: Peak Flood Tide Current 2 Hours Following Cessation of Trenching (High Water - 1 Hour)

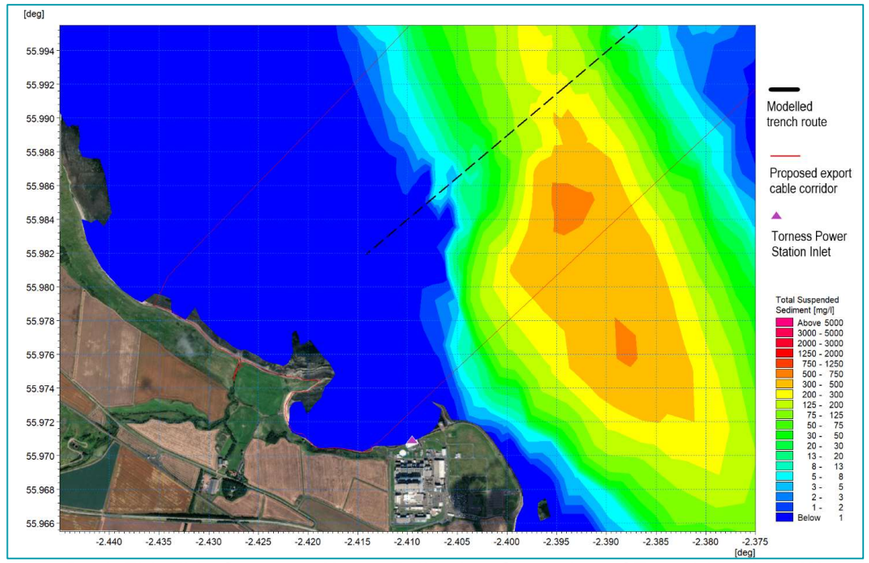

Figure 5: Peak Ebb Tide Current 8 Hours Following Cessation of Trenching (Low Water - 1 Hour)

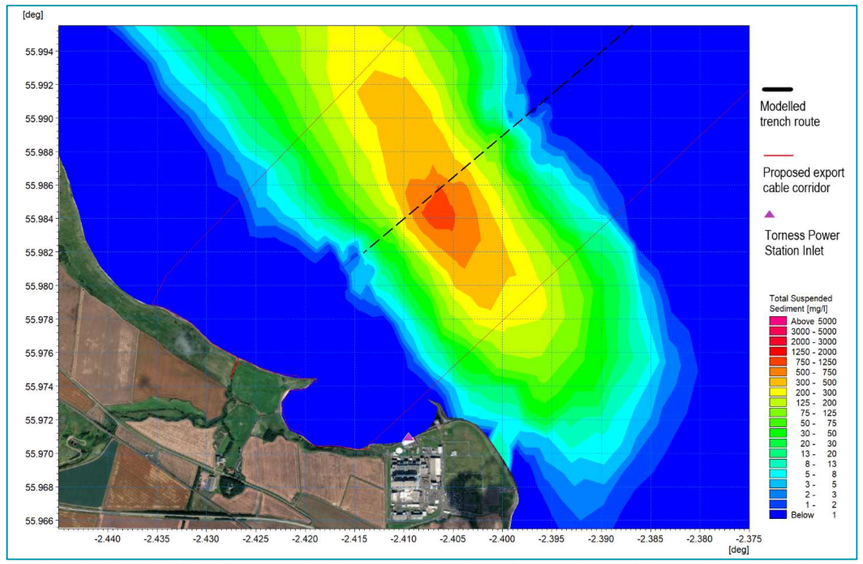

Figure 6: **Peak Flood Tide Current 14 Hours Following Cessation of Trenching (High Water - 1 Hour)**

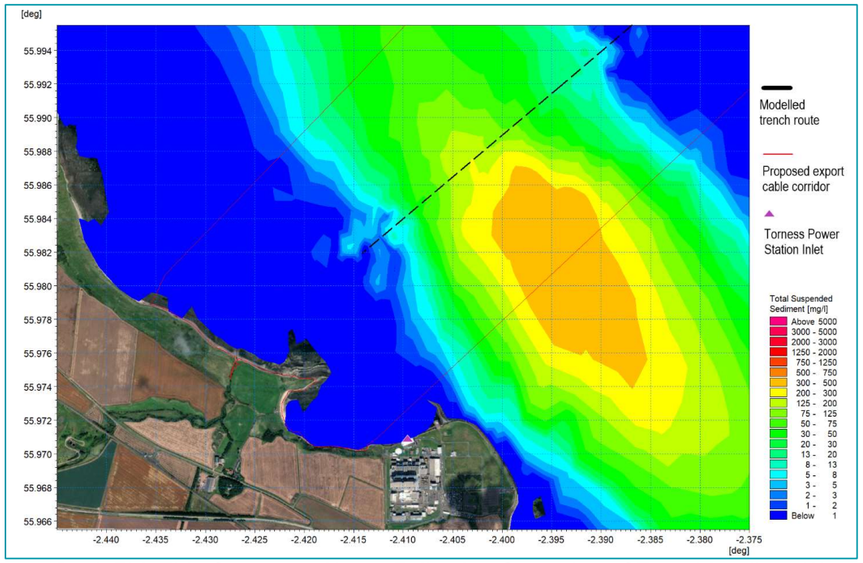

Figure 7: **Peak Ebb Tide Current 20 Hours Following Cessation of Trenching (Low Water - 1 Hour)**

1.5. IMPLICATIONS FOR THE TRANSPORT OF KELP

11. A study by Partrac in 2022 commissioned by SSER to assess the likely connectivity and potential impacts to the TOR cooling water intake through kelp entrainment considered that kelp dislodged as a result of the proposed works would ordinarily be transported south eastwards and with limited interaction with the TOR cooling water intake. This study complements RPS' suspended sediments modelling (section 1.2) with the same conclusions reached. Conditions which would transport floating kelp towards the intake were considered atypical. Further, Partrac (2022) anticipates the magnitude of the proposed works initiating a significant seaweed ingress at TOR's cooling water intake as low, with consideration that wave action during higher energy storm events is a higher contributing factor to seaweed becoming entrained on the intake drum screens (ABPmer, 2019).

1.6. KELP HARVESTING

12. A seaweed management zone exists in the area of the HDD punchout location and nearshore export cable corridor extent, meeting land north of TOR and with an area of approximately 1.29 km^2 (Figure 8). There, it was proposed in 2019 that kelp can be harvested using a Norwegian-style kelp rake which would remove up to 150 tonnes (wet weight) of seaweed per campaign (up to two campaigns per annum over a two-year marine licence period and with a three-month gap minimum between campaigns). This method leaves a proportion of smaller/juvenile kelp in situ, thereby reducing the overall density of kelp as opposed to complete removal (ABPmer, 2019). It was suggested that harvested kelp from TOR's seaweed management zone would be taken onshore and would be managed in accordance with waste management policy and legislation, with an aim to follow composting or energy recovery routes as opposed to landfill disposal (ABPmer, 2019). It is anticipated that further licence renewals would be required to capture kelp regrowth.

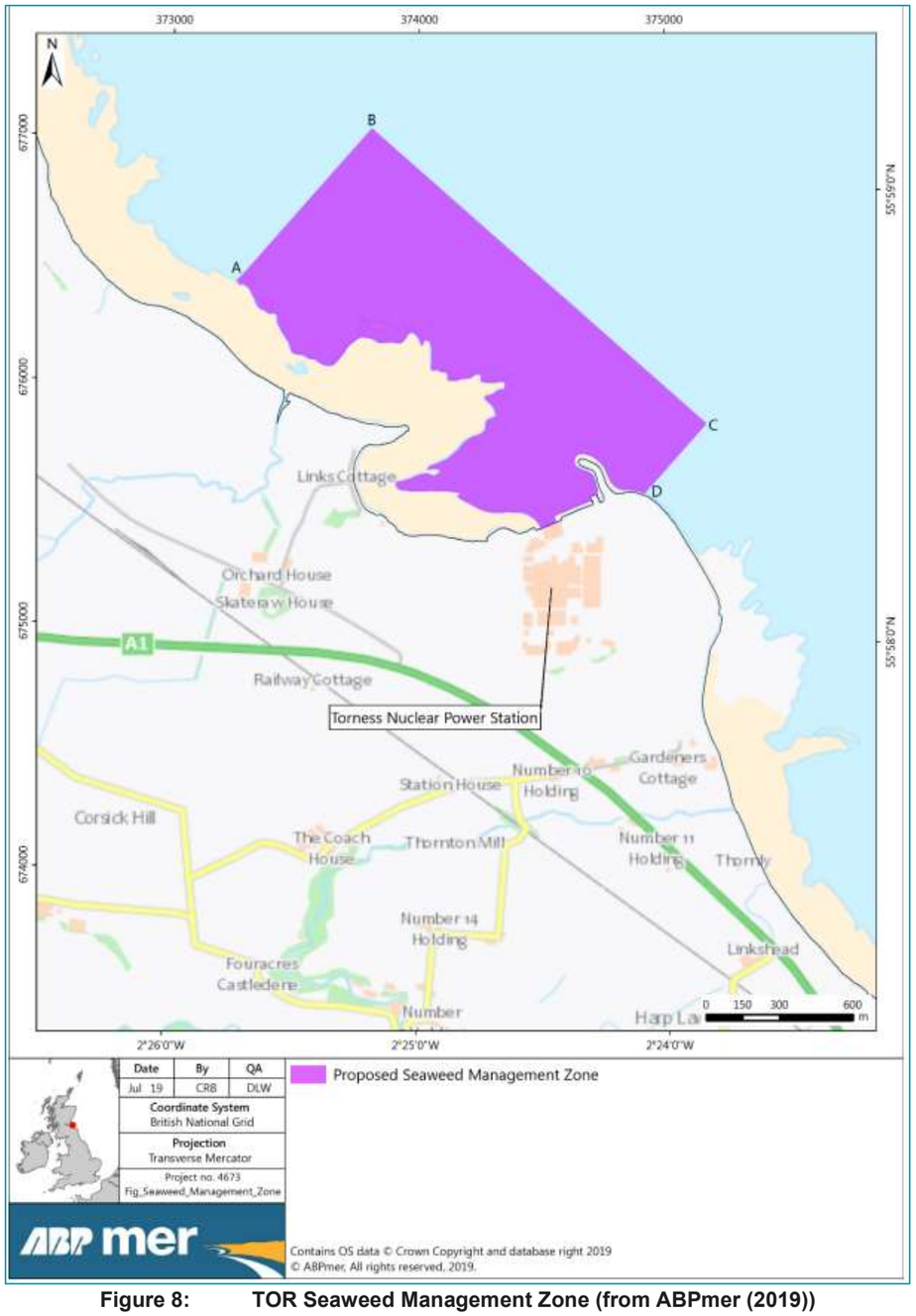

Figure 8: TOR Seaweed Management Zone (from ABPmer (2019))

13. RPS recommend that, as storm weather is the most likely cause of kelp detachment and entrainment on TOR's drum screens, during the construction phase of the Proposed Development, SSER could impose a weather constraint and refrain from carrying out HDD in storm events. Tracking storm forecasts will allow for HDD and nearshore export cable works to be ceased until the weather is considered appropriate. Given the wide distribution of kelp within the area and the overlap with the existing TOR seaweed management zone, it is envisaged that no further management zone would be required for the Proposed Development. Due to the overlap with the existing TOR seaweed management zone outlined by ABPmer (2019), it is expected that this area has already been subject to kelp harvesting, therefore forward management of this zone is assumed to target regrowth since the most recent harvesting event (timeline for completed harvesting events is not known).

1.7. CONCLUSION

14. Historically, storm events, which, coinciding with particular wind directions and tidal states, have carried detached kelp to TOR's cooling water intake. The detached macroalgae have become entrained on the intake drum screens and in extreme cases have led to reactor shut down.

15. The existing TOR seaweed management zone described in ABPmer (2019) appears to overlap the proposed HDD punchout location and nearshore extent of the export cable corridor. This area is expected to have been subject to historic kelp harvesting under license associated with the existing management zone. Whilst the additional seaweed management required by ENGL for the Proposed Development may help to reduce seaweed from otherwise becoming detached within the project footprint during storm events near TOR, it is unlikely that any reduced effects would be significant given the extent of the kelp beds around TOR, which are classed as 'super abundant' within approximately 500 m of the coast (ABPmer, 2019).

16. Further, physical processes modelling of suspended sediments (see section 1.2) and a study of kelp-TOR interactions (see section 1.3) highlight that suspended sediments and detached kelp are most likely to be transported southeast and are not expected to enter the bay or reach TOR's cooling water intake, instead potentially reaching the coastline to the east of TOR.

17. It is acknowledged that, during atypical conditions, kelp has the potential to reach TOR's cooling water intake. Tracking storm forecasts and ceasing HDD and nearshore export cable works in storm events will help to alleviate the likelihood of detached kelp reaching said cooling water intake during these atypical events.

18. With TOR due to decommission in 2028 and proposed development expected to enter the operation and maintenance phase in 2030, we do not envisage a need for kelp management beyond the construction phase, during pre-lay and seabed preparation works immediately prior to installation of the export cable and construction of the HDD punchout location. Kelp management, during the construction phase, will encompass operational management with regards to storm forecasting, as outlined above in section1.6. Operation and maintenance activities for the Proposed Development are not expected to impact the decommissioning of TOR.

1.8. REFERENCES

ABPmer (2019). Torness Seaweed Removal. Environmental Appraisal. Available at: https://marine.gov.scot/sites/default/files/environmental_appraisal_redacted.pdf. Accessed on: 8 March 2023.

EMODnet (2021). From: O'Keeffe, E. & Lillis, H. (2019). Generating Essential Ocean Variables. EMODnet report. Available at: https://www.emodnet-seabedhabitats.eu/media/1626/c20190514_generating_eovs.pdf. Accessed on: 27 March 2023.

Partrac (2022). Torness seawater intake suspended sediment assessment (not publicly available).


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