BERWICK BANK WIND FARM
OFFSHORE ENVIRONMENTAL IMPACT ASSESSMENT

APPENDIX 19: WATER FRAMEWORK DIRECTIVE REPORT

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1. INTRODUCTION

1. This Water Framework Directive (WFD) Report provides a WFD Screening, Scoping and assessment of effects for the Berwick Bank Wind Farm offshore infrastructure (hereafter referred to as "the Proposed Development") against the objectives for the WFD water bodies relevant to the Proposed Development. It describes the current baseline conditions and quantifies the potential changes due to the installation and presence of the Proposed Development.

2. The WFD (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission in December 2000. The WFD requires that all European Union Member States prevent deterioration and protect, enhance and restore, all identified bodies of water. This means that Member States must ensure that new schemes do not adversely impact upon the status of aquatic ecosystems, and that they must address historical modifications that are already impacting an identified water body. Whilst the WFD originates from the EU it has been retained in UK law following the UK's exit from the European Union (EU). The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019 is the implementing legislation which ensures principals of the Directive are largely retained within Scottish legislation.

3. The WFD applies to all water bodies, including those that are both natural and man-made. Under the WFD, coastal waters, estuaries, rivers, man-made docks and canals are divided into a series of water bodies. Within each water body, the WFD sets ecological and chemical objectives. The aim of the WFD was for all EU water bodies covered by the Directive to achieve "good status" by 2015. This aim ("good status" for all water bodies by 2015) was not achieved by 2015, but by 2021 87% of water bodies had achieved good status (SEPA, 2021). The Scottish Environment Protection Agency (SEPA) is aiming to maintain this, and to achieve, or return to, good status in 94% of waters by 2027 (SEPA, 2015). Under all conditions, it requires that there should be no deterioration in status, unless caused by a new activity providing significant specified benefits to society or the wider environment (SEPA, 2014a).

4. Whilst Environmental Impact Assessment (EIA) is an efficient mechanism to gather the relevant information for WFD compliance assessment, it needs to be interpreted in relation to the WFD objectives. According to Environment Agency guidance, impacts of biology, chemistry and hydromorphology need to be considered in relation to WFD status classes and reported under a specific WFD section in any environmental statement or report produced or in a separate WFD compliance report (Environmental Agency, 2010). This guidance is followed as industry best practice also applicable to Scottish waters. Therefore, this WFD compliance assessment has been undertaken to demonstrate the potential impact on WFD receptors caused by the different activities associated with the Proposed Development in the context of the environmental objectives of any affected WFD surface water body. The compliance assessment also offers the opportunity to inform the detailed design of the Proposed Development to avoid, minimise, mitigate or compensate for the risks to the environmental objectives of WFD surface water receptors where the risk assessment determines that the activities have the potential to:

   - cause a surface water body to deteriorate from one WFD status class to another or cause significant localised impacts that could contribute to this happening; and
   - prevent or undermine action to get surface water bodies to good status (e.g. compromise the programme of measures put in place to achieve the ultimate water body objective).

5. Using the Environment Agency 'Clearing the Waters for All' guidance (Environment Agency, 2016) and referring to the relevant chapters of the Proposed Development EIA, a WFD assessment of the potential for the Proposed Development to have a significant non-temporary effect on WFD parameters at water body level has been carried out. This has been undertaken on the basis of the Proposed Development information detailed within volume 1 chapter 3. Temporary effects of the Proposed Development are not expected to be significant (see paragraph 27), and as such have not been included for assessment.

6. This report should be read alongside the following chapters of the Proposed Development Offshore EIA Report:

   - volume 2, chapters 7 to 9; and
   - volume 2, chapter 19.

2. METHODOLOGY

7. The following relevant national legislation was considered during the preparation of this chapter:

   - The Water Environment and Water Services (Scotland) Act 2003; this Act transposes the requirement of the WFD into Scottish law;
   - The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019; and
   - The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended); these regulations were introduced under the 2003 Act to specify the control regimes for discharges to, abstractions from and impoundments and engineering activities affecting the water environment (i.e. rivers, lochs, transitional waters (estuaries), coastal waters groundwater, and groundwater dependant wetlands).

8. 'Good status' comprises two parts. The first is 'good ecological status' (or 'good ecological potential', for water bodies classed as heavily modified or artificial). The second is 'good chemical status'. 'Good ecological status/potential' includes biological, hydromorphological and physicochemical quality elements and specific pollutants. 'Good chemical status' concerns a series of priority substances, including a number of priority hazardous substances. The WFD also requires that relevant protected area objectives (Environment Agency, 2015) are achieved.

9. The current status of water bodies is detailed within River Basin Management Plans (RBMPs) and supporting Appendices. Each RBMP includes the work undertaken over the preceding five years, and the plans/objectives for the next six years following publication. The first RBMPs were published in 2009 and have been superseded by the updated 2015 and 2021 plans (SEPA, 2015; 2021).

10. This WFD assessment focuses on those elements of the Proposed Development relevant to the offshore/coastal areas which are required to be assessed against the objectives for each WFD water body (i.e. extending out to 1 nm from Mean High Water Springs (MHWS), see Figure 2.1). As such, activities of relevance relate to the installation of the offshore export cables within 1 nm of the coast and at the landfall (i.e. rather than considering any of the offshore elements of the scheme seawards of 1 nm from the coast). Assessment of inland WFD water bodies is covered in the Berwick Bank Wind Farm Onshore EIA Report (SSER, 2022a) and therefore not considered further in this assessment. There are no transitional water bodies to be considered as all water bodies are coastal.

11. The 'Clearing the Waters for All' guidance (Environment Agency, 2016) stipulates that the footprint of the activity be considered when assessing the impact of the Proposed Development upon WFD water bodies and protected areas. 'Activity' refers to the construction works required for the installation of offshore export cables and associated infrastructure within 1 nm seaward of MHWS. 'Footprint' refers to the area of habitat potentially directly affected by the installation of the offshore export cables and associated infrastructure.

12. Offshore export cables are used for the transfer of power from the Offshore Substation Platforms (OSPs)/Offshore convertor station platforms to the onshore High Voltage Alternating Current (HVAC)/High Voltage Direct Current (HVDC) substation. Up to eight export cables will be required for the Proposed Development. The offshore export cables shall be located within the Proposed Development export cable

corridor and make landfall at Skateraw on the East Lothian coast. The Project Design Envelope for the Proposed Development export cable corridor and the Skateraw landfall area are set out in volume 1, chapter 3 of the Offshore EIA Report, and offshore export cables will be located wholly within the Proposed Development export cable corridor shown in Figure 2.1. A summary of the maximum design scenario for the offshore export cables is given in Table 2.1.

Table 2.1 Maximum Design Scenario for Offshore Export Cables, for Whole Proposed Development, and up to 1 nm from MHWS.

Parameter	Maximum Design Scenario	
	Whole of Proposed Development	**1 nm from MHWS**
Maximum number of offshore export cables	8	8
Maximum total offshore export cables length (km)	872	1.85
Maximum cable diameter (mm)	260	260
Cable installation methodologies – seaward of MLWS	Jet trencher/mechanic trencher/cable plough/deep trencher	Jet trencher/mechanic trencher/cable plough/deep trencher
Cable installation methodologies – landward of MLWS	Trenchless installation	Trenchless installation
Maximum sand wave (and similar bedforms) clearance width (m)	25	25
Minimum distance of trenchless (e.g. HDD) exit punch out from MHWS (km)	0.488	0.488
Maximum distance of trenchless (e.g. HDD) exit punch out from MHWS (km)	1.50	1.50
Target Minimum cable burial depth (m)	0.5	0.5
Maximum cable burial depth (m)	3	3
Maximum width of cable trench (per circuit) (m)	2	2
Maximum width of seabed disturbed by cable installation (per cable (m))	15	15
Total maximum width of seabed disturbed by cable installation tool (m)	15	15
Maximum area of seabed disturbed for offshore export cable route (km^2) (cable installation)	12.43	0.030
Maximum area of seabed disturbed for offshore export cable route (km^2) (site preparation works)	8.72	0.046
Maximum length of offshore export cables buried (km)	828.40	1.5
Maximum anchor footprint for offshore export cable route (m^2)	174,400	0.0003
Maximum number of anchors and anchors reposition per km of offshore export cables	One every 500 m	One every 500 m

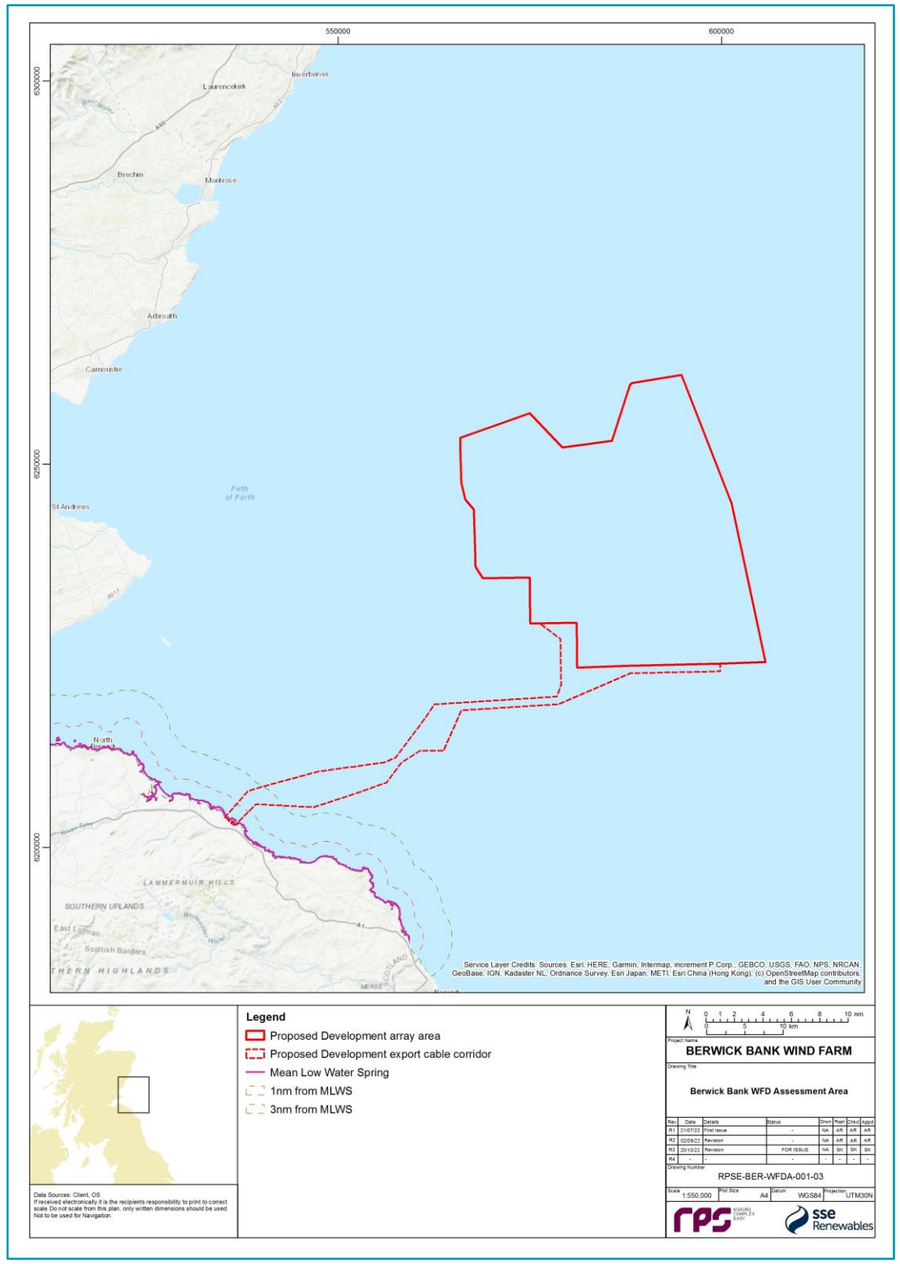

Figure 2.1: Proposed Development WFD Assessment Area

13. Drawing on the information outlined in volume 1 chapter 3, the primary effects associated with laying of the offshore export cables (hereinafter referred to as 'the activity') that are considered to be relevant to the WFD assessment are:

- offshore export cables installation (via possible combination of jet trencher, mechanical trencher, cable ploughs, deep jet trencher and trenchless technique), including trenchless (e.g. HDD) punch out excavation and sand wave clearance; and
- crossing the intertidal via trenchless technology.

14. The effects of operation and maintenance activities (i.e. cable inspection, repair and reburial) during the lifetime of the Proposed Development are not expected to exceed those during the construction phase. These have been considered in the scoping process where relevant, however no additional effect pathway is likely given the nature and scale of the activities.

15. The effects of decommissioning activities at the end of the Proposed Development are not expected to exceed those during the construction phase. Cables and cable protection will be removed where possible and practicable to do so, and this approach will be kept under review during the operational life of the Proposed Development and finalised at decommissioning, following the most up to date and best available guidance. Decommissioning has been considered in the scoping process where relevant, however no additional effect pathway is likely given the nature and scale of the activities.

16. This WFD Assessment, as advised by the Marine Scotland Licensing Operations Team (MS-LOT) Scoping Opinion (MS-LOT, 2022), adheres to the Environment Agency guidance on WFD Assessment of estuarine (transitional) and coastal waters, 'Clearing the waters for All'. As outlined in this guidance, WFD Assessment is undertaken in three stages:

- screening – excludes any activities that do not need to go through the scoping or assessment of effects stages;
- scoping – identifies the receptors that are potentially at risk from your activity and need assessment of effects; and
- assessment of effects – considers the potential impacts of your activity, identifies ways to avoid or minimise impacts, and demonstrates if your activity may cause deterioration or jeopardise the water body achieving good status.

17. SEPA does not issue specific guidance on the WFD assessment and although Environment Agency jurisdiction does not extend to Scottish waters, the guidance contained within 'Clearing the Waters for All' provides an appropriate outline for WFD assessment in Scotland. Moreover, the spatial contiguity of European Sites and Annex I habitats across English and Scottish boundaries, and the cross-jurisdiction habitat use by biological qualifying features, support the relevance of this guidance.

18. The assessment presented in this appendix covers the screening, scoping and assessment stages of the WFD assessment process for the Proposed Development; identifying all potential risks to the relevant receptors associated with the proposed activity/activities; identifying those receptors which may require further assessment; receptors that can be scoped out of the WFD assessment and undertaking an assessment for those receptors where a potential risk is identified. The assessment focuses on the receptors where risks have been identified and which according to the Environment Agency 'Clearing the Waters for All' (2016) guidance should be scoped into the assessment.

19. Where designed in mitigation measures are followed (e.g. avoidance of EQSD-listed chemicals, selection of low sediment-mobilising trenching methods), these mitigation measures are taken into account at the scoping stage of the WFD assessment and comprise:

- development of, and adherence to, an appropriate Code of Construction Practice (CoCP) to include strategies, control measures and monitoring procedures for managing the potential environmental impacts of constructing the Project and limiting disturbance from construction activities as far as reasonably practicable;
- an Environmental Management Plan (EMP) (volume 4, appendix 22), to be prepared and implemented during the construction, operation and maintenance and decommissioning phases of the Proposed Development;
- a Marine Pollution Contingency Plan (MPCP), included within the EMP, containing measures to be adopted to ensure that the potential for release of pollutants from construction, operation and decommissioning plant is minimised;
- an Invasive Non-Native Species (INNS) Management Plan (INNSMP), included within the EMP, to be implemented to manage and reduce the risk of potential introduction and spread of INNS so far as reasonably practicable; and
- the use of drilling fluids that are on the Poses Little or No Risk (PLONOR) to the environment list.

2.2. SCREENING

20. According to the Environment Agency 'Clearing the Waters for All' guidance (Environment Agency, 2016), screening is required for the Proposed Development as it is not a low risk activity, is not a fast-track or accelerated marine licence activity (i.e. it is not part of ongoing dredging operations) and does not fall into any of the categories of projects where screening is not required. An activity is considered low-risk if it involves:

- maintaining pumps at pumping stations;
- removing blockages within 10 m of an existing structure;
- replacing or removing existing pipes; or
- 'over water' replacement or repairs (e.g. to bridges, piers, jetties, etc.) (Environment Agency, 2016).

21. Initial screening information is necessary as part of the scoping stage to inform the WFD assessment Additionally, screening the construction and operational activities of projects enables a high-level initial assessment of those activities that could impact on compliance parameters within WFD water bodies.

22. The necessary screening information is provided in the scoping section (section 2.3) of this assessment.

2.3. SCOPING

23. The Scoping stage identifies the receptors that are potentially at risk from the proposed activity and therefore may need assessment of effects.

24. At the scoping stage it is necessary to identify all potential risks to each receptor associated with the proposed activity/activities. The receptors, as specified in the 'Clearing the Waters for All' guidance, are:

- hydromorphology;
- biology – habitats;
- biology – fish;
- water quality;
- protected areas; and
- INNS.

25. The 'Clearing the Waters for All' guidance provides specific criteria for each of the receptors outlined above to determine if an assessment of effects is required and recommends the use of a scoping template as part of the WFD assessment process. These criteria are considered for each receptor in section 4 of this appendix, using the recommended scoping template.

2.4. ASSESSMENT OF EFFECTS

26. Following the Scoping stage, if it is determined that the assessment of effects stage is required, 'Clearing the Waters for All' guidance sets out that an assessment of effects should be undertaken for each receptor identified as being at risk from the activity. The assessment of effects should consider what (if any) pressures the activity may create on the marine environment and specifically the receptors identified. The key aim of the assessment of effects is to determine whether there is potential for deterioration in the status of the water body receptor.

27. Deterioration is when the status of a quality element reduces by one class. For example, biological quality elements move from good to moderate status. If a quality element is already at the lowest status, then any reduction in its condition counts as deterioration. According to the 'Clearing the Waters for All' guidance, temporary effects due to short-duration activities like construction or maintenance are not considered to cause deterioration if the water body would recover in a short time without any restoration measures. Where relevant, mitigation measures should be included to avoid or minimise risks of deterioration.

28. If the activity could result in a risk of deterioration, either of the quality element or supporting habitat, an explanation must be provided of how this deterioration could occur, including consideration of whether the impact is:

- direct and immediate – it will happen at the same time and place as the activity; or
- indirect – it will happen later or further away, including in other linked water bodies.

29. Where the activity may cause deterioration, alternatives should be considered to minimise the impact, including changes to the materials or substances used, the size, scale or timing of the activity/activities or methods of working and/or how equipment or services are used.

30. In addition to assessing the potential for deterioration of the current status of a water body, the assessment of effects must consider the risk of jeopardising the achievement of the water body's environmental objectives (e.g. good status). Every water body has a target status that it is expected to achieve, with an expected date by when this should be achieved. Where the status of a water body or quality element is less than "Good", the assessment of effects should consider whether the activity may jeopardise the water body achieving "Good" status in the future. These may include activities which reduce the effectiveness of improvement activities taking place or prevent improvement activities taking place in the future. Details of these improvement activities, or measures, can be found in the RBMPs.

3. BACKGROUND INFORMATION ON WFD WATER BODIES

3.1. IDENTIFICATION OF WATER BODIES

31. The 'Clearing the Waters for All' guidance stipulates that the WFD Assessment helps the developer and the regulator understand the impact the activity may have on the immediate water body and any linked water bodies.

32. The Proposed Development has the potential to directly impact the Barns Ness to Wheat Stack water body (ID: 200038) as the Proposed Development export cable corridor will cross through this water body. The Barns Ness to Wheat Stack water body is located directly adjacent to two other WFD water bodies and the Proposed Development export cable corridor is located approximately 1 km from the boundary of the North Berwick to Barns Ness water body (ID: 200467, to the north-west) and 3 km from the boundary of the Wheat Stack to Berwick-Upon-Tweed water body (ID: 200031, to the south-east). Figure 3.1 indicates the location of the Proposed Development export cable corridor in relation to these WFD water bodies. All water bodies considered are coastal.

33. Assessment of inland WFD water bodies from the RBMP for Scotland 2021-2027 was scoped out of the Berwick Bank Wind Farm Onshore EIA (SSER, 2022a) on the grounds that no onshore pathways to transitional water bodies exist and is therefore not considered further in this assessment.

34. The Berwick Bank Wind Farm Onshore EIA considers the potential for pollution to enter inland watercourses, and the Thorntonloch Bathing Water indirectly, as a consequence of runoff from construction areas, chemical/fuel spills and untreated foul water discharge. This impact was assessed as having a negligible magnitude on a high sensitivity receptor (the WFD water bodies at 'Good' status) and considered to be of minor adverse significance. Potential cumulative effects are considered in paragraphs 65 to 67.

3.1.2. NORTH BERWICK TO BARNS NESS (ID: 200467)

35. North Berwick to Barns Ness is a coastal water body which covers approximately 134.5 km^2, located within the 'Scotland' river basin district, managed by the Forth Area advisory group (SEPA, 2014a). North Berwick to Barns Ness is not classed as an artificial or heavily modified water body and has an overall status in 2020 of Good, with an ecological status of Good and a chemical status of Pass (SEPA, 2022). The water body has an objective of maintaining Good overall status by 2027, and there are currently no pressures identified on this water body that would cause a deterioration from Good status (SEPA, 2014a).

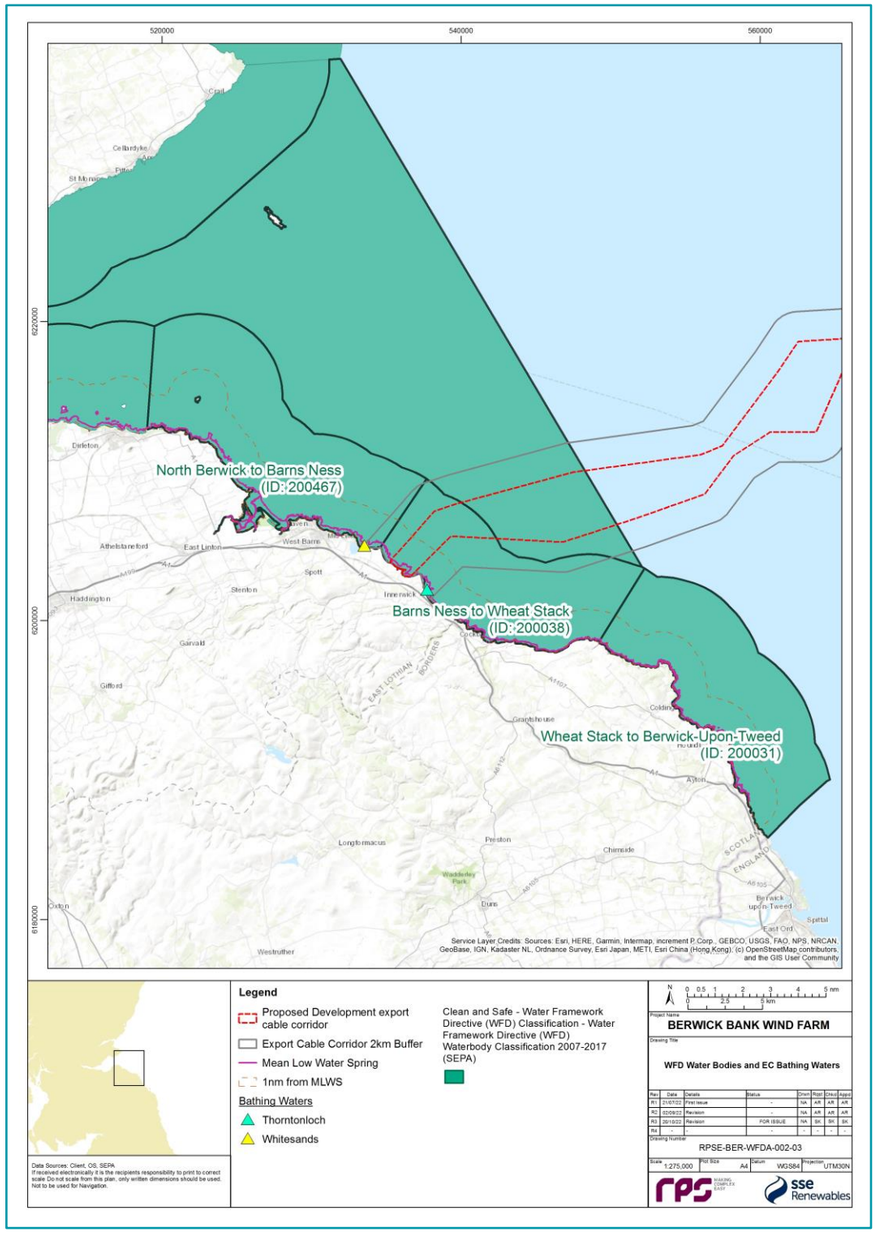

Figure 3.1: WFD Coastal Water Bodies and Bathing Water Sampling Locations Relevant to the Proposed Development

36. The North Berwick to Barns Ness water body overlaps with the following WFD protected areas (SEPA, 2014a):

- Firth of Forth Special Protection Area (SPA);
- Outer Firth of Forth and St Andrews Bay Complex (SPA);
- Forth Islands (SPA);
- Barns Ness Coast Site of Special Scientific Interest (SSSI);
- Firth of Forth (SSSI);
- Bass Rock (SSSI);
- Lothian/Borders Nitrate Vulnerable Zone (NVZ);
- Seacliff (European Community (EC) Bathing Water);
- Dunbar (Belhaven) (EC Bathing Water);
- Dunbar (East) (EC Bathing Water); and
- Whitesands (EC Bathing Water).

37. The WFD protected areas that overlap the North Berwick to Barns Ness water body contain the following WFD habitats (NatureScot, 2011a; JNCC, 2015), although these do not coincide with the offshore export cables works, and may not coincide with the WFD water body:

- saltmarsh;
- cobbles, gravel and shingle;
- intertidal soft sediments like sand and mud; and
- rocky shore.

38. A summary of the North Berwick to Barns Ness water body is provided in Table 3.1.

Table 3.1: Summary of North Berwick to Barns Ness Water Body Features (SEPA, 2014a), and Classifications as at 2020 (SEPA, 2022)

North Berwick to Barns Ness	
Water body ID	200467
Water body total area (km2)	134.50
Water body type	Coastal
River basin district name	Scotland
Area advisory group	Forth
Responsible body	SEPA (Edinburgh & Lothians)
Heavily modified	No
Artificial	No
Overall water body status	Good
Ecological status	Good
Phytoplankton status	High
Chemical status	Pass

North Berwick to Barns Ness	
Target water body status and deadline	Good: 2027
Hydromorphology status of water body	High

3.1.3. BARNS NESS TO WHEAT STACK (ID: 200038)

39. Barns Ness to Wheat Stack is a coastal water body which covers approximately 98.3 km^2, located within the 'Scotland' river basin district, managed by the Forth Area advisory group (SEPA, 2014b). Barns Ness to Wheat Stack is not classed as an artificial or heavily modified water body and has an overall status in 2020 of Good, with an ecological status of Good and a chemical status of Pass (SEPA, 2022). The status of the water body has an objective of maintaining Good overall status by 2027. There are currently no pressures identified on this water body that would cause long-term deterioration from Good status (SEPA, 2014b).

40. The Barns Ness to Wheat Stack water body overlaps with the following WFD protected areas (SEPA, 2014b):

- Berwickshire and North Northumberland Coast Special Area of Conservation (SAC);
- St Abb's Head to Fast Castle (SAC);
- St Abbs Head to Fast Castle (SPA);
- Outer Firth of Forth and St Andrews Bay Complex (SPA);
- Barns Ness Coast (SSSI);
- Siccar Point (SSSI);
- Pease Bay Coast (SSSI);
- St Abbs Head to Fast Castle Head (SSSI);
- Berwickshire Coast (Intertidal) (SSSI);
- Lothian/Borders (NVZ);
- Thorntonloch (EC Bathing Water); and
- Pease Bay (EC Bathing Water).

41. The WFD protected areas that overlap the Barns Ness to Wheat Stack water body contain the following WFD habitats (NatureScot, 2011b; NatureScot, 2011c; JNCC, 2015). Figures in parentheses indicate the area of each habitat within the WFD water body:

- Saltmarsh (0 km^2);
- cobbles, gravel and shingle (0 km^2);
- intertidal soft sediments like sand and mud (0.5 km^2); and
- rocky shore (23.4 km^2).

42. A summary of the Barns Ness to Wheat Stack water body is provided in Table 3.2.

Table 3.2: Summary of Barns Ness to Wheat Stack Water Body Features (SEPA, 2014b) and Classifications as at 2020 (SEPA, 2022)

Barns Ness to Wheat Stack	
Water body ID	200038
Water body total area (km^2)	98.30
Water body type	Coastal
River basin district name	Scotland
Area advisory group	Forth
Responsible body	SEPA (Borders, Edinburgh & Lothians)
Heavily modified	No
Artificial	No
Overall water body status	Good
Ecological status	Good
Phytoplankton status	High
Chemical status	Pass
Target water body status and deadline	Good: 2027
Hydromorphology status of water body	High

3.1.4. WHEAT STACK TO BERWICK-UPON-TWEED (ID: 200031)

43. Wheat Stack to Berwick-upon-Tweed is a coastal water body which covers approximately 115.2 km^2, located within the 'Scotland' river basin district, managed by the Forth Area advisory group (SEPA, 2014c). Wheat Stack to Berwick-upon-Tweed is not classed as an artificial or heavily modified water body and has an overall status in 2020 of Good, with an ecological status of Good and a chemical status of Pass (SEPA, 2022). The water body has an objective of maintaining Good overall status by 2027, and there are currently no pressures identified on this water body that would cause long-term deterioration from Good status (SEPA, 2014c).

44. The Wheat Stack to Berwick-upon-Tweed water body overlaps with the following WFD protected areas (SEPA, 2014c):

- Berwickshire and North Northumberland Coast (SAC);
- St Abb's Head to Fast Castle (SAC);
- St Abbs Head to Fast Castle (SPA);
- Outer Firth of Forth and St Andrews Bay Complex (SPA);
- Burnmouth Coast (SSSI);
- St Abbs Head to Fast Castle Head (SSSI);
- Berwickshire Coast (Intertidal) (SSSI);
- Lothian/Borders (NVZ);

- Coldingham (EC Bathing Water); and
- Eyemouth (EC Bathing Water).

45. The WFD protected areas that overlap the Wheat Stack to Berwick-upon-Tweed water body contain the following WFD habitats (NatureScot, 2011d; JNCC, 2015), although these do not coincide with the offshore export cables works, and may not coincide with the WFD water body:

- cobbles, gravel and shingle;
- intertidal soft sediments like sand and mud; and
- rocky shore.

46. A summary of the Wheat Stack to Berwick-upon-Tweed water body is provided in Table 3.3.

Table 3.3: Summary of Wheat Stack to Berwick-upon-Tweed Water Body Features (SEPA, 2014c) and Classifications as at 2020 (SEPA, 2022)

Wheat Stack to Berwick-upon-Tweed	
Water body ID	200031
Water body total area (km^2)	115.70
Water body type	Coastal
River basin district name	Scotland
Area advisory group	Forth
Responsible body	SEPA (Borders)
Heavily modified	No
Artificial	No
Overall water body status	Good
Ecological status	Good
Phytoplankton status	High
Chemical status	Pass
Target water body status and deadline	Good: 2027
Hydromorphology status of water body	High

4. SCOPING

47. The following details the findings of the Scoping stage of the WFD Assessment. This template follows guidance produced by the 'Clearing the Waters for All'. The potential risks of the activity to each of the key receptor groups across all water bodies identified in section 3 are considered in the sections below.

4.2. HYDROMORPHOLOGY

48. Specific risk information relating to hydromorphology is provided in Table 4.1.

Table 4.1: Hydromorphology Risks

Consider if Your Activity[1]:	Yes	No	Hydromorphology Risk/Issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	-	Assessment of effects not required	The activities associated with the Proposed Development will not impact on the hydromorphology of a High status water body. Changes to hydromorphological regimes (tidal currents, wave climate, littoral currents and sediment transport) are modelled in volume 3, appendix 7.1, and discussed in volume 2, chapter 7. Hydromorphology at the three water bodies identified in section 3.1 is not expected to be influenced by changes of the magnitude of the Proposed Development, and the impact on hydromorphology at coastal and intertidal receptors is therefore of negligible adverse significance.
Could significantly impact the hydromorphology of any water body	-	Assessment of effects not required	Hydromorphology will not be significantly impacted at any of the relevant water bodies. Changes to hydromorphological regimes (tidal currents, wave climate, littoral currents and sediment transport) are modelled in volume 3, appendix 7.1, and discussed in volume 2, chapter 7. Hydromorphology at the three water bodies identified in section 3.1 is not expected to be influenced by changes of the magnitude of the Proposed Development, and the impact on hydromorphology at coastal and intertidal receptors is therefore of negligible adverse significance.
Is in a water body that is heavily modified for the same use as your activity	-	Assessment of effects not required	The three water bodies identified in section 3.1 are not classified as heavily modified, therefore no assessment of effects is required.

[1] "Activity" refers to the seabed preparation, installation works, maintenance and decommissioning of the offshore export cables and associated works (e.g. HDD exit punches out).

4.3. BIOLOGY

4.3.1. HABITATS

49. The 'Clearing the Waters for All' scoping template provides a list of habitats which have a sensitivity to human pressures; split into higher and lower sensitivities. Table 4.2 is a reproduction of the list of sensitive habitats from the WFD scoping template, and Table 4.3 presents the specific risk information for biology habitat receptors.

Table 4.2: WFD Habitat Sensitivity to Human Pressures

Higher Sensitivity Habitats	Lower Sensitivity Habitats
Chalk reef	Cobbles, gravel and shingle
Clam, cockle and oyster beds	Intertidal soft sediments like sand and mud
Intertidal seagrass	Rocky shore
Maerl	Subtidal boulder fields
Mussel beds, including blue and horse mussel	Subtidal rocky reef
Polychaete reef	Subtidal soft sediments like sand and mud
Saltmarsh	
Subtidal kelp beds	
Subtidal seagrass	

Table 4.3: Biology - Habitats Risks

Consider if the Footprint[2] of Your Activity is:	Yes	No	Biology Habitats Risk Issue(s)
0.5 km^2 or larger	-	Assessment of effects not required	The maximum length of the offshore export cable route that crosses the Barns Ness to Wheat Stack water body within 1 nm is 1 nm (1.85 km). Site preparation works may require sand wave clearance with a maximum width of 25 m for 8 cables. Were this required for the entire length of the offshore export cables within 1.85 km, the affected seabed would be 8 x 1,850 m x 25 m = 0.370 km^2. However, trenchless methods (e.g. HDD) will be employed in the intertidal, and the exit punch out is a minimum of 488 m from MHWS so the actual area affected would be much less than this. Trenchless (e.g. HDD) cable exit punches out will be excavated between 488 m and 1,500 m seaward of MHWS, and the greatest impact to nearshore receptors would be expected at 488 m. The footprint of works for trenchless (e.g. HDD) exit punch out excavation would not exceed the footprint of other cable installation works. Cable protection may be required for up to 15% of the offshore export cables length. Assuming that 100% of 8 cables to 1nm offshore will require protection with a maximum width of 20 m, the footprint for 1,850 m of cable protection will be 20 x 1,850 x 8 = 0.296 km^2, which does not exceed the footprint estimated for sand wave clearance. Cable buried by trenching methods would require a 2 m wide trench (per cable) of the same 1.85 km length (8 x 2 m x 1,850 m = 0.030 km^2). The footprint for the associated sediment plume, based upon that stipulated for dredging, would be 1.5x the area of seabed affected = 0.044 km^2. This does not exceed the footprint estimated for sand wave clearance. Offshore export cable exit punch out will be excavated a minimum 488 m from MHWS. The total length of potential sand wave clearance out to 1 nm would therefore be 1,362 m. Based on the activity with the largest footprint (maximum 25 m wide sand wave clearance) over the entire 1,362 m of the offshore export cable route that crosses the Barns Ness to Wheat Stack water body, the maximum total area affected by offshore export cables landfall works is 0.272 km^2. Were sand wave clearance to mobilise sediment to the same extent as dredging, then the maximum footprint (increased by 1.5x the area) would by 0.409 km^2. However, sand wave clearance of this magnitude is very unlikely to be required here, and the calculated footprint is considered to fall sufficiently far below the threshold for assessment. Effects during decommissioning would not exceed those during construction (are also predicted to be negligible), therefore negligible effect is expected to last continuously for longer than one tidal cycle.
1% or more of the water body's area	-	Assessment of effects not required	The maximum area of seabed affected within the Barns Ness to Wheat Stack water body (0.069 km^2) represents 0.071% of the total area of the water body (98.3 km^2).
Within 500 m of any higher sensitivity habitat	-	Assessment of effects not required	Areas of saltmarsh are present within the Barns Ness Coast SSSI, however there are no such features within the offshore export cable route or wider Barns Ness to Wheat Stack water body. As such, this high sensitivity habitat is not considered to be at risk to a direct impact (i.e. habitat loss) as a result of the Proposed Development.
1% or more of any lower sensitivity habitat	-	Assessment of effects not required	Areas of lower sensitivity habitats 'cobbles, gravel and shingle', 'intertidal soft sediments like sand and mud' and 'rocky shore' are present within the Barns Ness to Wheat Stack water body. The footprint of the offshore export cables works does not coincide with areas of 'cobbles, gravel and shingle' or 'intertidal soft sediments like sand and mud'.

Consider if the Footprint[2] of Your Activity is:	Yes	No	Biology Habitats Risk Issue(s)
			The footprint of the offshore export cables works, including dredge plume (0.069 km^2) represents approximately 0.3% of the area of 'rocky shore' habitat (23.41 km^2) within the Barns Ness to Wheat Stack water body. This impact has therefore been scoped out of the Assessment of effects.

[2] "Footprint" here refers to the area of seabed directly affected by seabed preparation, installation works maintenance and decommissioning of the offshore export cables and associated works (e.g. HDD exit punches out). For activities resulting in sediment mobilisation, the footprint is 1.5 times the size of the associated works.

4.3.2. FISH

50. The 'Clearing the Waters for All' scoping template provides a list of criteria which may impact fish species within relevant water bodies. Table 4.4 presents the specific risk information for biology fish receptors.

Table 4.4: Biology – Fish Risks

Consider if Your Activity:	Yes	No	Biology Fish Risk Issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	-	Assessment of effects not required	The Proposed Development is located within the Firth of Forth, which provides a transitory route for several diadromous fish species, moving primarily between marine feeding grounds and their natal freshwater rivers. No spawning grounds or nursery habitat have been identified to overlap with the Proposed Development (within 1 nm of MLWS), and no fish species are recorded as features of the relevant protected areas.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	-	Assessment of effects not required	The Proposed Development will not present an obstruction to fish, either by preventing or delaying their movement through the estuary. Fish and shellfish receptors are likely to be vulnerable to changes to or loss of habitat in the short-term (days) but are considered likely to recover rapidly following short to medium term (months) disturbance. Spatially, the extent of physical disturbance or temporary loss of habitat is expected to be minimal, particularly in the context of the wider available habitat of the Firth of Forth.
Could cause entrainment or impingement of fish		Assessment of effects not required	The Proposed Development construction work would be undertaken over a period of up to 96 months. Following completion of the construction work no further activities would take place in relation to this assessment. No entrainment or impingement will occur as a result of the construction, operation and maintenance or decommissioning of the Proposed Development.

4.4. WATER QUALITY

51. Table 4.5 provides the specific risk information for water quality receptors.

Table 4.5: Water Quality Risk

Consider if Your Activity:	Yes	No	Water Quality Risk Issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring-neap tidal cycle (about 14 days)?		Assessment of effects not required	Water clarity is likely to be affected following trenching during cable installation and due to the excavation of trenchless technology exit punches out. The impact of suspended sediment has been modelled in volume 3, appendix 7.1 and discussed in volume 2, chapter 7. Seabed preparation via dredging and disposal/relocation is expected to increase suspended sediment concentration (SSC), but modelling indicates that dispersal of suspended material will not extend beyond a couple of tidal cycles following completion of works. Any effects from trenching are expected to be of local spatial extent, and no material is expected to reach the intertidal zone. Impacts are also expected to be of short-term duration (i.e. plume effects lasting seconds to minutes in any one location) and highly reversible, resulting in effects that are of minor adverse significance and therefore not significant in EIA terms. Up to 14 cable repairs and reburials (ten for inter-array cables and four for offshore export cables) are expected, and these have been assessed in volume 2, chapter 7, and deemed to be of negligible adverse significance. Bathing water quality is measured in terms of biological indicators, so it is expected that the sensitivity of this receptor to changes following offshore export cables installation will be negligible.

Consider if Your Activity:	Yes	No	Water Quality Risk Issue(s)
			Effects during decommissioning are also predicted to be negligible, and negligible effect is expected to last continuously for longer than one spring-neap tidal cycle
Is in a water body with a phytoplankton status of moderate, poor or bad		Assessment of effects not required	The three water bodies considered for WFD assessment are classified as having a phytoplankton status of High.
Is in a water body with a history of significant and persistent algal blooms or toxic algal blooms		Assessment of effects not required	The three water bodies do not have a history of significant and persistent algal blooms or toxic algal blooms.

52. Table 4.6 provides the specific risk information for water quality receptors in relation to the release of chemicals. Table 4.7 provides the specific risk information for water quality receptors in relation to mixing zones.

Table 4.6: Water Quality Risks in Relation to the Use or Release of Chemicals

If Your Activity Uses or Releases Chemicals Consider if:	Yes	No	Water Quality Risk Issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	-	Assessment of effects not required	No drilling fluids, or their constituent components, are listed on the EQSD list. Any potential risk of accidental release of contaminants will be minimised through the implementation of an Environmental Management Plan (volume 4, appendix 22) during the construction, and operation and maintenance phases. No infrastructure within the coastal water bodies is expected to require painting or use of priority or priority hazardous substances as part of the maintenance schedule. All offshore export cables repair work will be conducted from a cable installation vessel, following a Project Environmental Monitoring Plan (PEMP) and pollution mitigation protocols.
It disturbs sediment with contaminants above Centre for Environment Fisheries and Aquaculture Science (Cefas) Action Level 1	-	Assessment of effects not required	The sediments present do not contain significant levels of fine material, being composed of coarse sand and gravel. Therefore, it is unlikely that significant amounts of contaminants will be present in sediments. Sampling during the site-specific environmental surveys (see volume 2, chapter 8) indicated there are no contaminants that exceed the Cefas Action Level 1 in the nearshore environment (both within and adjacent to the WFD water bodies).

Table 4.7: Water Quality Risks in Relation to Mixing Zone

If Your Activity Has a Mixing Zone Consider if:	Yes	No	Water Quality Risk Issue(s)
It will release EQSD listed chemicals.	-	Assessment of effects not required	The Proposed Development does not include a discharge pipeline or outfall, and will not release EQSD-listed chemicals.

4.5. PROTECTED AREAS

53. The WFD assessment considers if WFD protected areas are at risk from the proposed activity. These include:

- SACs;
- SPAs;
- shellfish waters;

- bathing waters;
- nutrient sensitive areas – polluted or eutrophic; and
- NVZs – polluted or sensitive.

54. As referred to in paragraph 32, the Proposed Development export cable corridor overlaps with one WFD water body (Barns Ness to Wheat Stack), is within 1 km of one other WFD water body (North Berwick to Barns Ness) and within 3 km of one other WFD water body (Wheat Stack to Berwick-Upon-Tweed).

55. Between them, these three WFD water bodies contain 15 WFD protected areas: four SPAs, two SACs, one NVZ, and eight designated bathing waters. Eight SSSIs are also contained within these water bodies but are not subject to WFD scoping assessment (Figure 3.1).

56. Only three WFD protected areas lie within 2 km of the Proposed Development (Table 4.8): the Outer Firth of Forth and St Andrew's Bay Complex SPA, the Lothian and Borders NVZ, and the Thorntonloch bathing water.

Table 4.8: Protected Areas Risks

Consider if Your Activity is:	Yes	No	Protect Areas Risk Issue(s)
Within 2 km of any WFD protected area	Requires assessment of effects	-	The Proposed Development overlaps with the Outer Firth of Forth and St Andrew's Bay Complex SPA and the Lothian and Borders NVZ and is within 2 km of the Thorntonloch bathing water. Since NVZs are designated as areas vulnerable to nitrate from agricultural practices, and the Proposed Development involves no use of nitrates or agricultural activities, this WFD protected area will be screened out of further assessment.

4.6. INVASIVE NON-NATIVE SPECIES (INNS)

57. Table 4.9 outlines the INNS risk for the Proposed Development.

Table 4.9: Invasive Non-Native Species Risks

Consider if Your Activity Could	Yes	No	INNS Risk Issue(s)
Introduce or spread INNS	-	Assessment of effects not required	The installation of offshore export cables for the Proposed Development is unlikely to increase the risk of introducing INNS as the designed in measures including a Marine Pollution Contingency Plan and a Marine Environment Monitoring and Management Plan and vessels complying with the International Maritime Organization (IMO) ballast water management guidelines (IMO, 2004) will ensure that the risk of potential introduction and spread of INNS will be minimised. The additional hard substrate from cable protection is likely to provide additional habitat for fish and shellfish species, but the designed-in measures discussed above are expected to provide sufficient mitigation for introduction and colonisation by INNS. The impact of INNS on WFD water bodies is discussed in volume 2, chapter 19, and has been assessed as having negligible to minor adverse significance during all phases of the Proposed Development, which is not significant in EIA terms.

58. The footprint of the Proposed Development offshore export cables works within 1 nm seaward of MHWS lies entirely within the Barns Ness to Wheat Stack water body. Given the small scale of the activity here (detailed above), and the limited receptors for which an effect pathway has been identified, the impact of the activity is unlikely to extend beyond the boundary of the Barns Ness to Wheat Stack water body. Receptors in adjoining WFD water bodies will not be affected to a greater extent than those located within the Barns Ness to Wheat Stack water body, and as such the effect pathway will not exceed that assessed here. Assessment of the effects of the activity has therefore been restricted to the Barns Ness to Wheat Stack water body only.

4.7. SUMMARY

59. Table 4.10 presents a summary of the WFD scoping exercise presented in this section.

Table 4.10: WFD Scoping Summary

Receptor	Potential Risk to Receptor?	Risk Issues(s) for Assessment of effects
Hydromorphology	No	
Biology – habitats	No	
Biology – fish	No	

Receptor	Potential Risk to Receptor?	Risk Issues(s) for Assessment of effects
Water quality	No	
Protected areas	Yes	The Proposed Development overlaps the Outer Firth of Forth and St Andrews Bay Complex SPA and is within 2 km of the Thorntonloch bathing water.
INNS	No	

5. ASSESSMENT OF EFFECTS

5.1. PROTECTED AREAS

60. As detailed in section 4.5, the offshore export cable route overlaps with the Outer Firth of Forth and St Andrew's Bay Complex SPA and is within 2 km of the Thorntonloch bathing water, and therefore has the potential to affect the interest features of these sites.

61. The Outer Firth of Forth and St Andrew's Bay Complex SPA is designated for its breeding and non-breeding seabird assemblage and is also an important feeding ground for overwintering waterfowl (NatureScot, 2020a). The conservation objective of the SPA is to avoid deterioration of the habitats of, or significant disturbance to, the qualifying species to ensure that the integrity of the site is maintained in the long-term and it continues its contribution to achieving the aims of the Birds Directive for the qualifying species. This contribution would be achieved by a) avoiding significant mortality, injury and disturbance of the qualifying features, and b) maintaining the habitats and food resources of the qualifying features in favourable condition.

62. Information to support the competent authority in its assessment of the potential impacts on this SPA is provided in the Berwick Bank Wind Farm Offshore HRA Screening Report (SSER, 2021b) and the Berwick Bank Wind Farm Report to Inform Appropriate Assessment (SSER, 2022c). The latter provides an updated HRA Screening and gives consideration to adverse effects on the integrity of protected areas that may arise from the Proposed Development. These reports accompany this Offshore EIA Report to support the Habitats Regulations Appraisal (HRA) of the Project and the information therein is not, therefore repeated here in full.

63. The Berwick Bank Wind Farm Offshore HRA Screening Report (SSER, 2021b) provided information to consider the potential for likely significant effects (LSE) associated with accidental pollution and activities associated with the offshore export cables. The risk of pollution events occurring will be managed by the implementation of measures set out in environmental management plans (e.g. a PEMP including a Marine Pollution Contingency Plan) which will be implemented as part of the Proposed Development. Furthermore, in their response to the LSE Screening Report for the 2020 Berwick Bank Wind Farm Proposal, Marine Scotland Science (MSS) and MS-LOT recommended that this impact could be screened out of the HRA.

64. No likely significant effects from the Proposed Development export cable corridor are predicted to result on the features of the coastal portion of the Outer Firth of Forth and St Andrew's Bay Complex SPA with respect to water quality pathways. Therefore, there is no potential for the conservation objectives of the site to be hindered with respect to water quality parameters.

65. Thorntonloch is a designated EC bathing water and has returned water quality classifications of Good in the 2017-2018 sampling season, and Excellent in the 2018-2019, 2019-2020 and 2021-2022 sampling seasons (SEPA, 2020). There were no classifications calculated for 2020-2021 due to the shortened season and reduced sampling during the COVID pandemic.

66. Effects of cable works during construction, and the presence of cable protection during operation, are expected to be of local spatial extent, long term duration (i.e. the 35-year design life of the Proposed Development) and highly reversible, resulting in effects that are of minor adverse significance. Effects during decommissioning are also predicted to be of minor adverse significance (see volume 2, chapter 19).

67. As discussed above with respect to the HRA for the construction phase, accidental pollution will be subject to other regulatory control through both legislation and the requirements for contingency plans (NatureScot, 2020a; MSS, 2020a). A potential effect pathway from accidental pollution during onshore works was identified in the Berwick Bank Wind Farm Onshore EIA and assessed as being of minor adverse significance.

68. Therefore, alongside negligible significant effects predicted from the offshore export cables, an overall negligible magnitude, minor significant cumulative effect on the classification of the Thorntonloch bathing water is anticipated.

69. The footprint of the Proposed Development does not coincide with the North Berwick to Barns Ness and Wheat Stack to Berwick-Upon-Tweed water bodies so the magnitude of effects of the Proposed Development upon receptors within these water bodies is expected to be lower than those assessed for the Barns Ness to Wheat Stack water body. Receptors in these water bodies, besides the two protected areas that coincide with the Barns Ness to Wheat Stack water body, were therefore not taken forward for assessment in their own right.

70. In conclusion, therefore, there is no potential for significant impacts on the protected area objectives of these water-dependent protected areas and therefore on the environmental objectives of the Barns Ness to Wheat Stack water body, or the water bodies adjacent to it.

6. CONCLUSION

71. Based on the WFD Scoping presented in section 4 and the assessment of effects in section 5, there is no potential for deterioration of the status of the three water bodies identified in section 3.1. In most instances, the relevant activities for the construction and installation of the Proposed Development export cable corridor have been scoped out of the assessment as they are below the thresholds set by the 'Clearing the Waters for All' guidance.

72. With respect to protected areas, the criteria which determine whether an assessment of effects is required were met for activity occurring within 2 km of a WFD protected area. The Proposed Development offshore export cable route coincides with the Outer Firth of Forth and St Andrew's Bay Complex SPA and is within 2 km of the Thorntonloch bathing water, and the features of these protected areas have the potential to be impacted by the activities.

73. Based on the low likely effects related to the offshore export cables, there is no potential for deterioration of the status of the water body in relation to water quality nor is there potential for jeopardising the potential of this quality element achieving good status in the future.

74. The Berwick Bank Wind Farm Offshore HRA Screening Report (SSER, 2021b) and the Berwick Bank Wind Farm Report to Inform Appropriate Assessment (SSER, 2022c) have been submitted alongside the EIA to support the HRA for the Proposed Development. With respect to effect-pathways pertinent to changes in

water quality due to offshore export cable works, the HRA documents provide information to support a finding of no LSE on the Outer Firth of Forth and St Andrew's Bay Complex SPA. Similarly, therefore, there is no potential for significant impacts on the protected area objectives the Thorntonloch bathing water.

75. In conclusion, therefore, there is no potential for significant impacts on the protected area objectives of these water dependent protected areas and therefore on the environmental objectives of the Barns Ness to Wheat Stack water body, the Thorntonloch bathing water or the Outer Firth of Forth and St Andrew's Bay Complex SPA.

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