# RWE Renewables UK Dogger Bank South (West) Limited

# RWE Renewables UK Dogger Bank South (East) Limited

# Dogger Bank South Offshore Wind Farms

**Environmental Statement**

**Volume 7**

**Appendix 20-3 Water Environment Regulations Compliance Assessment (Revision 3) (Clean)**

**January 2025**

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**Unrestricted**

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| 02 | 60 | Section 20.3.3.2.3 (Groundwater Bodies)<br>Table 20-3-6 | Appendix 20-3 - Water Environment Regulations Compliance Assessment [APP-167] has been updated following the identification of a typo by the Applicants when responding to the Environment Agency relevant representation RR-015:8 [APP-PDA-13]. The area of permanent infrastructure located within the groundwater catchment stated in Table 20-3-6 has been revised from 0.05% to 0.04% of the catchment area. No other changes have been made. |
| 03 | 83, 85, 86<br>89 | 20.3.3.3.1.1.1<br>20.3.3.3.1.1.2 | Appendix 20-3 - Water Environment Regulations Compliance Assessment (Revision 2) [AS-074] has been updated following the Issue Specific Hearing 2 whereby an Action Point was raised [EV2-002] which has resulted in a review and update of the total number of watercourse crossings reported within Chapter 20 and Appendix 20-3. |

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## Tables



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## Glossary

| Term | Definition |
|---|---|
| Coastal catchment | Land which drains directly to the coastal or estuarine waters, rather than through a river water body – not part of a river water body catchment. |
| Concurrent Scenario | A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time. |
| Development Scenario | Description of how the DBS East and/or DBS West Projects would be constructed either in isolation, sequentially or concurrently. |
| Dogger Bank South (DBS) Offshore Wind Farms | The collective name for the two Projects, DBS East and DBS West. |
| Haul Road | The track along the Onshore Export Cable Corridor used by traffic to access different sections of the onshore export cable route for construction. |
| Horizontal Directional Drill (HDD) | HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore. |
| In Isolation Scenario | A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation. |
| Jointing Bays | Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts. |
| Landfall | The point on the coastline at which the Offshore Export Cables are brought onshore, connecting to the onshore cables at the Transition Joint Bay (TJB) above mean high water. |

| Term | Definition |
| --- | --- |
| Link Boxes | An underground metal box placed within a concrete pit where the metal sheaths between adjacent export cable sections are connected and earthed, installed with a ground level manhole to allow access to the link box for regular maintenance or fault-finding purposes. |
| Main River | Main Rivers are usually large rivers or streams that are designated under the Water Resources Act (1991) and are shown on the statutory Main River Map. They are managed by the Environment Agency, who carry out construction, maintenance and improvement works to manage flood risk. |
| Nitrates Directive | The Nitrates Directive (91/676/EEC) aims to improve water quality by protecting water against pollution caused by nitrates from agricultural sources. |
| Onshore Converter Stations | A compound containing electrical equipment required to transform HVDC and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network as HVAC. There will be one Onshore Converter Station for each Project. |
| Onshore Development Area | The Onshore Development Area for ES is the boundary within which all onshore infrastructure required for the Projects would be located including Landfall Zone, Onshore Export Cable Corridor, accesses, Temporary Construction Compounds and Onshore Converter Stations. |
| Onshore Export Cable Corridor | This is the area which includes cable trenches, haul roads, spoil storage areas, and limits of deviation for micro-siting. For assessment purposes, the cable corridor does not include the Onshore Converter Stations, Transition Joint Bays or temporary access routes; but includes Temporary Construction Compounds (purely for the cable route). |
| Onshore Export Cables | Onshore Export Cables take the electric from the Transition Joint Bay to the Onshore Converter Stations. |

| Term | Definition |
|---|---|
| Onshore Substation Zone | Parcel of land within the Onshore Development Area where the Onshore Converter Station infrastructure (including the haul roads, Temporary Construction Compounds and associated cable routeing) would be located. |
| Ordinary watercourse | Rivers which are not Main Rivers are called 'ordinary watercourses'. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on ordinary watercourses. |
| Sequential Scenario | A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first. |
| The Projects | DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms). |
| Transition Joint Bay (TJB) | The Transition Joint Bay (TJB) is an underground structure at the landfall that houses the joints between the Offshore Export Cables and the Onshore Export Cables. |

## Acronyms

| Term | Definition |
|---|---|
| AIS | Automatic Identification System |
| Cefas | Centre for Environment, Fisheries and Aquaculture Science |
| DBS | Dogger Bank South |
| DCO | Development Consent Order |
| Defra | Department for Environment, Food and Rural Affairs |
| DWSZ | Drinking Water Safeguard Zones |
| EU | European Union |
| GEP | Good Ecological Potential |
| GES | Good Ecological Status |
| GWDTEs | Groundwater Dependent Terrestrial Ecosystems |
| HDD | Horizontal Directional Drilling |
| HVDC | High Voltage Direct Current |
| INNS | Invasive Non-Native Species |
| IP | In Place |
| NIP | Not In Place |
| NPPF | National Planning Policy Framework |
| NVZ | Nitrate Vulnerable Zones |
| OCoCP | Outline Code of Construction Practise |
| PBDE | Polybrominated diphenyl ethers |
| PFOS | Perfluoro octane sulphonate |

| Term | Definition |
|---|---|
| PPG | Pollution Prevention Guidance |
| PPP | Pollution Prevention Plan |
| RBMP | River Basin Management Plan |
| RIAA | Report to Inform Appropriate Assessment |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SPZ | Source Protection Zones |
| SuDS | Sustainable Urban Drainage System |
| UKTAG | UK Technical Advisory Group |
| WER | Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 |
| WFD | Water Framework Directive 2000/60/EC |

# 20.3 Water Environment Regulations (WER) Compliance Assessment

## 20.3.1 Introduction

1. The purpose of **Volume 7, Appendix 20-3 (application ref: 7.20.20.3)** of the Environmental Statement (ES) is to determine whether the Dogger Bank South (DBS) East and DBS West Offshore Wind Farm (herein referred to as the Projects) are compliant with the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Regulations continue to enforce Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000. They establish a framework for community action in the field of water policy and remain in force following Britain's withdrawal from the European Union.

### 20.3.1.1 Development Scenarios

2. The Environmental Statement considers:

- Either DBS East or DBS West is built In Isolation; or
- DBS East and DBS West are both built either Sequentially or Concurrently.

3. An In Isolation Scenario has been assessed within the ES on the basis that theoretically one Project could be taken forward without the other being built out. If an In Isolation Scenario is taken forward, either DBS East or DBS West may be constructed. As such the offshore assessment considers both DBS East and DBS West In Isolation.

4. If an In Isolation Scenario is taken forward, only the eastern Onshore Converter Station within the Onshore Substation Zone would be constructed. In either the Concurrent or Sequential Scenario, both Onshore Converter Station locations within the Onshore Substation Zone would be taken forward for the onshore assessment.

5. In order to ensure that a robust assessment has been undertaken, all Development Scenarios have been considered to ensure the realistic worst-case scenario for each topic has been assessed. A summary is provided here, and further details are provided in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**.

6. The three Development Scenarios to be considered for assessment purposes are outlined in **Table 20-3-1**.

*Table 20-3-1 Development Scenarios and Construction Durations*

| Development scenario | Description | Overall Construction Duration (Years) | Maximum construction Duration Offshore (Years) | Maximum construction Duration Onshore (Years) |
|---|---|---|---|---|
| **In Isolation** | Either DBS East or DBS West is built In Isolation | Five | Five | Four |
| **Sequential** | DBS East and DBS West are both built sequentially, either Project could commence construction first with staggered / overlapping construction. | Seven | A five year period of construction for each project with a lag of up to two years in the completion of construction of the second project (excluding landfall duct installation) – reflecting the maximum duration of effects of seven years. | Construction works (i.e. onshore cable civil works including duct installation) to be completed for both Projects simultaneously in the first four years, with additional works at the Landfall Zone, Onshore Substation Zone and at cable joint bays in the following two years. Maximum duration of effects of six years. |
| **Concurrent** | DBS East and DBS West are both built concurrently reflecting the maximum peak effects. | Five | Five | Four |

#### 20.3.1.2 Operation Scenarios

7. Operation scenarios are described in detail in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**. The assessment considers the following scenarios:

- Only DBS East in operation;
- Only DBS West in operation; and
- DBS East and DBS West operating concurrently with or without a lag of up to two years between each Project commencing operation.

8. If the Projects are built using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phases for the Projects have been assessed. See section 5.1.1 of **Volume 7, Chapter 5 Project Description (application ref: 7.5)** for further information on phasing scenarios for the Projects.

9. The operational lifetime of each Project is expected to be 30 years.

#### 20.3.1.3 Decommissioning Scenarios

10. Decommissioning scenarios are described in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**. Decommissioning arrangements would be agreed through the submission of a Decommissioning Plan, as required through the draft DCO, for the onshore works, to be submitted following permanent cessation of commercial operation of the onshore works. For the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

#### 20.3.1.4 Project Elements and Worst Case Scenarios

11. Full details of the construction and operational activities associated with the Projects can be found in **Volume 7**, **Chapter 5 Project Description (application ref: 7.5)**. A summary of different elements of the Projects are provided below and the worst case parameters for the offshore and onshore elements listed below are set out in **Table 20-3-2**.

12. Offshore construction and operation elements of the Projects are assessed out to one nautical mile. The key offshore components for this assessment comprise:

- Offshore export cables from the Array Areas to the landfall, including the Horizontal Directional Drilling (HDD) exit pits; intertidal construction of exit pits between MHWS and MLWS; and
- Scour/cable protection (where required).

13. The key onshore components for this assessment comprise:

- Transition joint bays (TJBs) at the landfall;
- Onshore Export Cables installed underground from the TJBs to the Onshore Converter Stations and associated joint bays and Link Boxes;
- Onshore Converter Stations and onward 400 kilovolt (kV) connection to the new National Grid substation close to the existing Creyke Beck substation known as Birkhill Wood;
- Trenchless crossing locations (e.g., HDD);
- Trenched crossings;
- Construction and operational accesses; and
- Construction compounds.

14. As described in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, a Sequential Scenario is considered the worst case for construction. Although the worst case parameters for Concurrent and Sequential construction are the same in terms of the dimensions of the corridor swathe and temporary compounds, the longer duration of Sequential construction means that temporary structures associated with watercourse crossings would be in place for a longer continuous period compared to construction In Isolation or Concurrently.

15. For construction impacts associated with the supply of fine sediment and contaminants, and changes in surface runoff and groundwater flows, the longer duration of Sequential construction would mean there is a greater chance accidental spills or leakages.

16. For operational activities, Concurrent or Sequential Scenarios are the worst case, as both scenarios would lead to a greater area of permanent infrastructure than construction In Isolation.

17. For offshore activities out to one nautical mile Sequential construction is the worst case because of the longer total duration of activities.

*Table 20-3-2 Realistic Worst Case Design Maximum Parameters*

| **Impacts** | **Parameter** | | | |
|---|---|---|---|---|
| | **DBS East or DBS West In Isolation** | **DBS East and DBS West Concurrently** | **DBS East and DBS West Sequentially** | **Notes and Rationale** |
| **Construction** | | | | |
| Offshore | • 6 separate cable trenches measuring 1,767m in length (assumes no cable trenching between MHWS and MLWS).<br>• 20m disturbance width from cable trenching activities. | | | Sequential construction is considered the worst case due to the longer duration and greater area of work in the intertidal zone (e.g.; number of trenchless crossing exits). |
| Intertidal | • A trenchless solution is to be used to install ducts that will house the cables under the beach. The ducts will run from the Transition Joint Bay (TJB), located landward of landfall, to an exit location which may be at an intertidal location ("short HDD") or further offshore ("long HDD").<br>• Duct extensions may be required to enable the landfall HDD ducts to be extended further offshore to facilitate cable installation from an installation vessel situated offshore. | | | |
| | • For a short HDD there would be up to 3 exit pits in the intertidal zone<br>• Dimensions of exit pits (m): 20 x 10 per trenchless crossing exit<br>• Number of support vessels: 2<br>• Number of pontoons: 1<br>• Pontoon working area (m): 12x50<br>• There would be no permanent infrastructure in the intertidal<br>• Duration of works in the intertidal zone (months): 18 (not continuous). | • For a short HDD there would be up to 6 exit pits in the intertidal zone<br>• Dimensions of exit pits (m): 20 x 10 per trenchless crossing exit<br>• Number of support vessels: 2<br>• Number of pontoons: 1<br>• Pontoon working area (m): 12x50<br>• There would be no permanent infrastructure in the intertidal<br>• Duration of works in the intertidal zone (months): 18 (not continuous). | • For a short HDD there would be up to 3 exit pits in the intertidal zone<br>• Dimensions of exit pits (m): 20 x 10 per trenchless crossing exit<br>• Number of support vessels: 2<br>• Number of pontoons: 1<br>• Pontoon working area (m): 12x50<br>• There would be no permanent infrastructure in the intertidal<br>• Duration of works in the intertidal zone (months): 48 (not continuous). | |
| Landfall Zone | • Total landfall zone area: 420,000m$^2$<br>• Number of completed trenchless crossing ducts (maximum): 3 (2 for power cables, 1 for fibre optic cables)<br>• Indicative trenchless crossing depth (m): 20<br>• No. of transition joint bays: 2<br>• Transition joint bay dimensions (m): 5 x 20<br>• Permanent land take for TJBs (m$^2$): 200 – including below ground infrastructure | • Total landfall zone area: 420,000m$^2$<br>• Number of completed trenchless crossing ducts: 6 (4 for power cables, 2 for fibre optic cables)<br>• Indicative trenchless crossing depth (m): 20<br>• No. of transition joint bays: 4<br>• Transition joint bay dimensions (m): 5 x 20<br>• Permanent land take for TJBs (m$^2$): 400 – including below ground infrastructure | • Total landfall zone area: 420,000m$^2$<br>• Number of completed trenchless crossing ducts: 6 (4 for power cables, 2 for fibre optic cables)<br>• Indicative trenchless crossing depth (m): 20<br>• No. of transition joint bays: 4<br>• Transition joint bay dimensions (m): 5 x 20<br>• Permanent land take for TJBs (m$^2$): 400 – including below ground infrastructure | The TJB compound works area and TJBs locations within the landfall zone are subject to detailed design.<br><br>The TJB's would be at set back from the cliffs to account for potential coastal erosion over time. |

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West In Isolation | DBS East and DBS West Concurrently | DBS East and DBS West Sequentially | Notes and Rationale |
| | • Number of Link Boxes (2.5 x 4m): 2 – the only above ground infrastructure<br>• Permanent land take for total number of Link Boxes ($m^2$): 20<br>• Landfall TJB compound works area (m): 110 x 75<br>• Landfall satellite compound (m): 75x 75<br>• Temporary access: Route from the existing road system<br>• Temporary lighting during working hours. Temporary out-of-hours security lighting.<br>• Duration of works: 18 months overall (not continuous) | • Number of Link Boxes (2.5 x 4m): 4 – the only above ground infrastructure<br>• Permanent land take for total number of Link Boxes ($m^2$): 40<br>• Landfall TJB compound works area (m): 190 x 75<br>• Landfall satellite compound (m): 75x 75<br>Temporary access: Route from the existing road system<br>• Temporary lighting during working hours. Temporary out-of-hours security lighting.<br>• Duration of works: up to 18 months overall (not continuous) | • Number of Link Boxes (2.5 x 4m): 4 – the only above ground infrastructure<br>• Permanent land take for total number of Link Boxes ($m^2$): 40<br>• Landfall TJB compound works area (m): 190 x 75<br>• Landfall satellite compound (m): 75x 75<br>• Duration of works: up to 48 months overall (not continuous) | |
| Onshore Export Cable Corridor from Landfall Zone to the Onshore Substation Zone | • Indicative corridor length between Landfall Zone and the Onshore Substation Zone (km): 32<br>• Number of earth cables per circuit: 1<br>• Number of trenches: Up to 2<br>• Number of temporary construction compounds: 17 (2 main compounds, 15 satellite compounds including Landfall Zone satellite compound)<br>• Size of main construction compound ($m^2$): 10,000 (roughly 100x100m)[1]<br>• Size of satellite construction compounds ($m^2$): 5625 (roughly 75x75m)<br>• Cable corridor width (m): 41<br>• Cable corridor width at trenchless crossings (m): 45 | • Indicative corridor length between Landfall Zone and the Onshore Substation Zone (km): 32<br>• Number of earth cables per circuit: 1<br>• Number of trenches: Up to 4<br>• Number of temporary construction compounds: 17 (2 main compounds, 15 satellite compounds including Landfall Zone satellite compound)<br>• Size of main construction compound ($m^2$): 10,000 (roughly 100x100m)<br>• Size of satellite construction compounds ($m^2$): 5625 (roughly 75x75m)<br>• Cable corridor width (m): 75<br>• Cable corridor width at trenchless crossings (m): 90 | • Indicative corridor length between Landfall Zone and the Onshore Substation Zone (km): 32<br>• Number of earth cables per circuit: 1<br>• Number of trenches: Up to 4<br>• Number of temporary construction compounds: 17 (2 main compounds, 15 satellite compounds including Landfall Zone satellite compound)<br>• Size of main construction compound ($m^2$): 10,000 (roughly 100x100m)<br>• Size of satellite construction compounds ($m^2$): 5625 (roughly 75x75m)<br>• Cable corridor width (m): 75<br>• Cable corridor width at trenchless crossings (m): 90 | Deeper burial depth may be required if open cut crossing of obstacle such as utility / watercourse / road etc.<br><br>The Concurrent and Sequential Scenarios will involve a greater extent of construction works. The Sequential Scenario will result in the longest duration. Therefore, the DBS East and DBS West Sequential Scenario is considered worst case and assessed in this chapter. |

[1] Actual size may vary due to site specifics

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West In Isolation | DBS East and DBS West Concurrently | DBS East and DBS West Sequentially | Notes and Rationale |
| | • Maximum number of trenches: 2<br>• Approximate depth of trench to top of duct / cables (m): 1.3 – 1.7<br>• Maximum burial depth (m) where restrictions are not present: 2<br>• Indicative burial depth (m): 1.6<br>• Cable duct trench dimensions: 1.1m base to 3.9m surface for each single. 3.35m base to 6.15m surface for dual HVDC<br>• Jointing Bays (km): every 0.75 – 1.5<br>• Indicative number of Jointing Bays: 103<br>• Jointing Bay construction dimensions (per bay) (m): 10 x 25<br>• Jointing Bay infrastructure dimensions (all below ground) (m): 3x8<br>• Jointing Bay burial depth from existing ground level to bottom of Jointing Bay (m): 2.2<br>• Jointing Bay depth from existing ground level to top of Jointing Bay (m): 1.35m<br>• Number of Earth / Link Boxes and associated manhole covers: 103<br>• Link Box dimensions / manhole cover permanent infrastructure above ground (m): 2.5x4<br>• Link Box construction dimensions (m): 6.5x8<br>• Haul Road: 5m (increasing to 8m at passing places)<br>• Approximate permanent easement along the cable corridor (m): 15<br>• Expected maximum trenchless crossing depth (m): 20 | • Maximum number of trenches: 4<br>• Approximate depth of trench to top of duct / cables (m): 1.3 – 1.7<br>• Maximum burial depth (m) where restrictions are not present: 2<br>• Indicative burial depth (m): 1.6<br>• Cable duct trench dimensions: 1.1m base to 3.9m surface for each single. 3.35m base to 6.15m surface for dual HVDC<br>• Jointing Bays (km): every 0.75 – 1.5<br>• Indicative number of Jointing Bays: 205<br>• Jointing Bay construction dimensions (per bay): 10 x 25m<br>• Jointing Bay infrastructure dimensions (all below ground) (m): 3x8<br>• Jointing Bay burial depth from existing ground level to bottom of Jointing Bay (m): 2.2<br>• Jointing Bay depth from existing ground level to top of Jointing Bay (m): 1.35m<br>• Number of Earth / Link Boxes and associated manhole covers: 205<br>• Link Box dimensions / manhole cover permanent infrastructure above ground (m): 2.5x4<br>• Link Box construction dimensions (m): 6.5x8<br>• Haul Road: 5m (increasing to 8m at passing places)<br>• Approximate permanent easement along the cable corridor (m): 24<br>• Expected maximum trenchless crossing depth (m): 20 | • Maximum number of trenches: 4<br>• Approximate depth of trench to top of duct / cables (m): 1.3 – 1.7<br>• Maximum burial depth (m) where restrictions are not present: 2<br>• Indicative burial depth (m): 1.6<br>• Cable duct trench dimensions: 1.1m base to 3.9m surface for each single. 3.35m base to 6.15m surface for dual HVDC<br>• Jointing Bays (km): every 0.75 – 1.5<br>• Indicative number of Jointing Bays: 205<br>• Jointing Bay construction dimensions (per bay): 10 x 25m<br>• Jointing Bay infrastructure dimensions (all below ground) (m): 3x8<br>• Jointing Bay burial depth from existing ground level to bottom of Jointing Bay (m): 2.2<br>• Jointing Bay depth from existing ground level to top of Jointing Bay (m): 1.35m<br>• Number of Earth / Link Boxes and associated manhole covers: 205<br>• Link Box dimensions / manhole cover permanent infrastructure above ground (m): 2.5x4<br>• Link Box construction dimensions (m): 6.5x8<br>• Haul Road: 5m (increasing to 8m at passing places)<br>• Approximate permanent easement along the cable corridor (m): 24<br>• Expected maximum trenchless crossing depth (m): 20 | Sequential construction would result in a longer duration of temporary watercourse crossings being in place along the Onshore Export Cable Corridor. |

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | **DBS East or DBS West In Isolation** | **DBS East and DBS West Concurrently** | **DBS East and DBS West Sequentially** | **Notes and Rationale** |
| | • Trenchless crossing compound dimensions: 60 x 40m assumed for the Project's compounds on each side of the obstacle (entry and exit compounds).<br>• No. of trenchless crossings compounds: Min 41 and up to maximum of 147 entry compounds<br>• Min 36 and up to maximum of 147 exit compounds<br>• All other crossings assumed to be open cut (see **Volume 7, Appendix 5-2 Obstacle Crossing Register (application ref: 7.5.5.2)**)<br>• Total onshore cable corridor works area (est.) (m$^2$): 4,252,209<br>• Duration: 33 months | • Trenchless crossing compound dimensions: 60 x 40m per project assumed for the Project's compounds on each side of the obstacle (entry and exit compounds).<br>• No. of trenchless crossings compounds: Min 82 and up to maximum of 294 entry compounds<br>• Min 82 and up to maximum of 294 exit compounds<br>• All other crossings assumed to be open cut (see **Volume 7, Appendix 5-2, Obstacle Crossing Register (application ref: 7.5.5.2)**)<br>• Total onshore cable corridor works area (est.) (m$^2$): 4,503,397<br>• Duration: 33 months | • Trenchless crossing compound dimensions: 60 x 40m per project assumed for the Project's compounds on each side of the obstacle (entry and exit compounds).<br>• No. of trenchless crossings compounds: Min 82 and up to maximum of 294 entry compounds<br>• Min 82 and up to maximum of 294 exit compounds<br>• All other crossings assumed to be open cut (see **Volume 7, Appendix 5-2, Obstacle Crossing Register (application ref: 7.5.5.2)**)<br>• Total onshore cable corridor works area (est.) (m$^2$): 4,503,397<br>• Duration of works: up to 57 months overall (note this would not be continuous working within that timeframe) | |
| Onshore Substation Zone | • Operational compounds for Convertor Station (m): 244 x 264 (HVDC Convertor)<br>• Permanent area (m$^2$): 64,000m$^2$ (based on one HVDC Convertor Station)<br>• Total construction area (m$^2$): 94,000 (based on one HVDC convertor station + temporary construction compound area)<br>  o Area of Converter station (m$^2$): 64,000<br>  o No. of Converter station compounds: 1 main temporary compound (3 location options identified) | • Operational compounds for Convertor Station (m): 244 x 264 (HVDC Convertor) plus 244 x 264 (HVDC Convertor)<br>• Permanent area (m$^2$): 129,000(based on two HVDC Convertor Stations)<br>• Total construction area (m$^2$): 189,000 (based on two HVDC convertor station + temporary construction compound areas)<br>  o Area of Converter station(s) (m$^2$): 129,000<br>  o No. of Converter station compounds: 2 (1 main temporary construction compound and 1 satellite temporary construction compound) | • Operational compounds for Convertor Station (m): 244 x 264 (HVDC Convertor) plus 244 x 264 (HVDC Convertor)<br>• Permanent area (m$^2$): 129,000 (based on two HVDC convertor stations)<br>• Total construction area (m$^2$): 189,000 (based on two HVDC convertor station + temporary construction compound area)<br>  o Area of Converter station(s) (m$^2$): 129,000<br>  o No. of Converter station compounds: 2 (1 main temporary construction compound and 1 satellite temporary construction compound) | The Concurrent and Sequential Scenarios will involve a greater extent of construction works. The Sequential Scenario will result in the longest duration. Therefore, the DBS East and DBS West Sequential Scenario is considered worst case and assessed in this Appendix. |

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West In Isolation | DBS East and DBS West Concurrently | DBS East and DBS West Sequentially | Notes and Rationale |
| | ○ Converter station compound (m²): 30,000<br>• Duration: 4 years | ○ Converter station compounds total area (m²): 60,000<br>• Duration: 4 years | ○ Converter station compounds total area (m²): 60,000<br>• Duration: 6 years | |
| Onward Cable Connection to Proposed Birkhill Wood National Grid Substation | • Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5<br>• Number of export circuits: 4x400kV<br>• Technology: HVAC<br>• Cabling from project substation to National Grid Substation: Buried<br>• General cable corridor approximate permanent easement swathe (m): 20<br>• Cable corridor construction swathe (m): 53.5<br>• Cable construction satellite construction compound dimensions (m) : 75x75<br>• Number of earth / Link Boxes: 35 | • Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5<br>• Number of export circuits: 8x400kV<br>• Technology: HVAC<br>• Cabling from project substation to National Grid Substation: Buried<br>• General cable corridor approximate permanent easement swathe (m): 34<br>• Cable corridor construction swathe (m): 100<br>• Cable construction satellite construction compound dimensions (m) : 75x75<br>• Number of earth / Link Boxes: 70 | • Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5<br>• Number of export circuits: 8x400kV<br>• Technology: HVAC<br>• Cabling from project substation to National Grid Substation: Buried<br>• General cable corridor approximate permanent easement swathe (m): 34<br>• Cable corridor construction swathe (m): 100<br>• Cable construction satellite construction compound dimensions (m) : 75x75<br>• Number of earth / Link Boxes: 70 | |
| **Operation and Maintenance** | | | | |
| Landfall Zone | • Permanent land take for the total number of TJBs (m²): 200<br>• Number of manhole covers within Landfall Zone: 2<br>• Total area of permanent land take for manhole covers above ground (m²): 20<br>• All other construction disturbance restored to pre-existing condition. | • Permanent land take for the total number of TJBs (m²): 400<br>• Number of manhole covers within Landfall Zone: 4<br>• Total area of permanent land take for manhole covers above ground (m²): 40<br>• All other construction disturbance restored to pre-existing condition. | • Permanent land take for the total number of TJBs (m²): 400<br>• Number of manhole covers within Landfall Zone: 4<br>• Total area of permanent land take for manhole covers above ground (m²): 40<br>• All other construction disturbance restored to pre-existing condition. | Concurrent or Sequential are considered the worst case as they would result in a greater area of permanent land take/permanent infrastructure. |
| Onshore Export Cable Corridor from Landfall Zone to the Onshore Substation Zone | • Jointing Bay permanent infrastructure dimensions (all below ground): 3x8m | • Jointing Bay permanent infrastructure dimensions (all below ground): 3x8m | • Jointing Bay permanent infrastructure dimensions (all below ground): 3x 8m | Concurrent or Sequential are considered the worst case as they would result in a greater area of permanent land |

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | **DBS East or DBS West In Isolation** | **DBS East and DBS West Concurrently** | **DBS East and DBS West Sequentially** | **Notes and Rationale** |
| | • Jointing Bay depth (m): 2.2 (from existing ground level to the bottom of the joint bay)<br>• Number of Earth/Link Boxes (buried, manhole at the surface and the only above ground permanent infrastructure along the cable corridor): up to 103 (up to 2 Link Boxes per HVDC circuit)<br>• Link Box dimensions (permanent infrastructure/manhole covers) (m) : 2.5x4<br>• Total permanent land take for Link Boxes/manhole covers ($m^2$): 1,030<br>• All construction disturbance restored to pre-existing condition<br>• Approximate permanent easement along the cable corridor (m): 15. | • Jointing Bay depth (m): 2.2 (from existing ground level to the bottom of the joint bay)<br>• Number of Earth/Link Boxes (buried, manhole at the surface and the only above ground permanent infrastructure along the cable corridor): up to 205 (up to 2 Link Boxes per HVDC circuit)<br>• Link Box dimensions (permanent infrastructure/manhole covers): 2.5x4m<br>• Total permanent land take for Link Boxes/manhole covers ($m^2$): 2,050<br>• All construction disturbance restored to pre-existing condition<br>• Approximate permanent easement along the cable corridor (m): 24 | • Jointing Bay depth (m): 2.2 (from existing ground level to the bottom of the joint bay)<br>• Number of Earth/Link Boxes (buried, manhole at the surface and the only above ground permanent infrastructure along the cable corridor): up to 205 (up to 2 Link Boxes per HVDC circuit)<br>• Link Box dimensions (permanent infrastructure/manhole covers): 2.5x4m<br>• Total permanent land take for Link Boxes/manhole covers ($m^2$): 2,050<br>• All construction disturbance restored to pre-existing condition<br>• Approximate permanent easement along the cable corridor (m): 24. | take/permanent infrastructure. |
| Onshore Substation Zone | • Permanent Convertor Station area ($m^2$): 64,416 (244m x 264m) (based on one HVDC convertor station)<br>• All other construction disturbance restored to pre-existing condition.<br>• Operational duration: 30 years | • Permanent Convertor Station area ($m^2$): 128,832 (244m x 264m plus 244m x 264m) (based on two HVDC convertor stations)<br>• All other construction disturbance restored to pre-existing condition.<br>• Operational duration: 30 years | • Permanent Convertor Station area ($m^2$): 128,832 (244m x 264m plus 244m x 264 m) (based on two HVDC convertor stations)<br>• All other construction disturbance restored to pre-existing condition.<br>• Operational duration: 32 years | The Concurrent and Sequential Scenarios will require two converter stations within the Onshore Substation Zone and therefore will have greater effects than DBS West or DBS East In Isolation Scenario. The Sequential Scenario will result in a slightly longer operational duration, due to the assumed two-year lag in construction between the two Projects. Therefore, the DBS East and DBS West Sequential Scenario is considered worst case and assessed in this Appendix. |
| Onshore Onward Cable Route to the | • 35 manholes at the surface | • 70 manholes at the surface | • 70 manholes at the surface | |

| Impacts | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West In Isolation | DBS East and DBS West Concurrently | DBS East and DBS West Sequentially | Notes and Rationale |
| Proposed Birkhill Wood National Grid Substation | • Approximate total area of permanent land take for Link Boxes/manhole covers ($m^2$): 350<br>• General cable corridor approximate permanent easement swathe (m): 34 | • Approximate total area of permanent land take for Link Boxes/manhole covers ($m^2$): 700<br>• General cable corridor approximate permanent easement swathe (m): 34 | • Approximate total area of permanent land take for Link Boxes/manhole covers ($m^2$): 700<br>• General cable corridor approximate permanent easement swathe (m): 34 | |
| **Decommissioning** | | | | |
| No final decision regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route and onshore substation has yet been made. It is also recognised that legislation and industry best practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused or recycled wherever possible and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst case scenario, the impacts will be no greater than those identified for the construction phase. A decommissioning plan for the onshore works would be submitted prior to any decommissioning commencing. | | | | |

### 20.3.2 Assessment Methodology

18. A published methodology for undertaking WER compliance assessments across all types of water bodies is not available. However, the following relevant guidance and case law exists to support the assessment of various water body types:

- 'Advice Note 18' (Planning Inspectorate, 2017): This advice note provides an overview of the WFD and provides an outline methodology for considering the WFD as part of the Development Consent Order Process;
- 'Clearing the waters for all' (Environment Agency, 2017): Outlines a methodology for assessing impacts on transitional and coastal water bodies;
- 'WFD risk assessment' (Environment Agency, 2016a): This provides information on how to assess the risk of a proposed activity, as well as guidance for proposed developments planning to undertake activities that would require a flood risk activity permit;
- 'Protecting and improving the water environment' (Environment Agency, 2016b): Provides guidance on the WFD compliance of physical works and other activities in river water bodies; and
- EUECJ C-461-13. Bund für Umwelt und Naturshutz Deutschland eV v Bundesrepublik Deutschland (ECJ, 2015). This case confirms the detail around determining a deterioration in the status of a water body.

19. For the purposes of this assessment, the broad methodologies outlined in the guidance documents listed above have been brought together to develop an assessment methodology that can be used for strategies in all types of water body. The assessment process therefore covers the following stages, which are described in more detail in the subsequent sections:

- Stage 1: Screening Assessment;
- Stage 2: Scoping Assessment; and
- Stage 3: Detailed Compliance Assessment.

#### 20.3.2.1 Stage 1: Screening Assessment

20. This stage consists of an initial screening exercise to identify relevant water bodies in the proposed Onshore and Offshore Development Areas. Water bodies would be selected for inclusion in the early stages of the compliance assessment using the following criteria, with reference to the Humber River Basin District Management Plan (RBMP), as presented in the online Catchment Data Explorer (Environment Agency, 2022):

- All surface water bodies that could potentially be directly impacted by the Projects – including coastal water bodies crossed by the Offshore Development Area out to one nautical mile;
- Any surface water bodies that have direct connectivity (e.g., downstream) that could potentially be affected by the Projects; and
- Any groundwater bodies that underlie the Projects.

#### 20.3.2.2 Stage 2: Scoping Assessment

21. This stage identifies whether there is potential for deterioration in water body status or failure to comply with objectives for any of the water bodies identified in Stage 1. This stage considers potential non-temporary impacts of the Projects and impacts on critical or sensitive habitats. Potential impacts on water body mitigation measures are also evaluated.

22. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there would be no impacts. If impacts are predicted, it would be necessary to undertake a detailed compliance assessment. The water body and activity under assessment would be progressed to the detailed compliance assessment (Stage 3) if potential impacts on quality elements cannot be ruled out.

#### 20.3.2.3 Stage 3: Detailed Compliance Assessment

23. If appropriate, a Stage 3 impact assessment would consider whether any activities that have been carried forward from Stage 2 would cause deterioration, and whether any such deterioration would have a significant effect on the status of one or more quality elements at water body level.

24. Potential measures to avoid effects or achieve reasonable improvements would be investigated if it is established that:

- The Projects are likely to affect status at water body level (that is, by causing deterioration in status or by preventing achievement of objectives and the implementation of mitigation measures for HMWBs); and

- An opportunity may exist to contribute to improving status at a water body level.

25. Where applicable, this stage considers such measures and, where necessary, evaluates them in terms of cost and proportionality in relation to the scale of the proposed activity and the nature of any impacts.

#### 20.3.2.3.1 Determination of Deterioration

26. The Environment Agency has not issued guidance on how deterioration in the status of water bodies should be assessed. If the potential for a deterioration in water body status is identified, the assessment would draw upon a set of relevant guidance documents. These documents would be outlined further if a deterioration in status is considered likely.

27. The assessment considers the potential for deterioration in water body status between classes, within classes, and including temporary deterioration. Where deterioration is not predicted, the activity would also be considered against the water body objectives to ensure the achievement of status objectives, i.e., Good Ecological Status (GES) or Good Ecological Potential (GEP)) would not be prevented.

#### 20.3.2.3.2 Approach to Decommissioning

28. No decision has yet been made regarding the final decommissioning policy for onshore and offshore project infrastructure. It is recognised that legislation and industry best practice change over time.

29. The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would be agreed with the regulator. It is anticipated that for the purposes of a worst case scenario, the impacts would be no greater than those identified for the construction phase.

30. For the purposes of this assessment, it is assumed that:

- The same water bodies screened into the assessment for construction and operation (section 20.3.3.1) would also be affected during decommissioning. No additional water bodies would be affected;
- Scoping answers would be the same for decommissioning as for construction and operation (20.3.3.1). No additional quality elements for river, coastal or groundwater bodies would be scoped in or out; and

- Detailed compliance assessment results (section 20.3.3.3) and overall conclusions (section 20.3.1.1) would be the same for decommissioning as for construction and operation.

##### 20.3.2.3.3 Article 4.7

31. Article 4.7 of the WFD allows derogation from the Directive; where its requirements are met, Member States can fail to achieve the objectives or cause a deterioration in status. Article 4.7 of the WFD is only applicable to new modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater, or for deterioration from high to good status for surface water bodies related to new sustainable human development activities.

32. In the unlikely event that no suitable measures can be identified to mitigate potential adverse impacts of the Projects, it may be necessary to present a case for a derogation under Article 4.7.

33. It should be noted that the Projects have sought to prevent deterioration in water body status in the first instance, e.g., through project design and, where necessary, the adoption of further mitigation measures, therefore avoiding the need for an application for an exemption under Article 4.7.

34. If a derogation application was required then, to determine the scope of any assessment required to demonstrate compliance with the requirements of Article 4.7, consultation with the Environment Agency would be required.

## 20.3.3 Results

### 20.3.3.1 Stage 1: Screening

#### 20.3.3.1.1 Identification of Water Bodies

35. River, groundwater and coastal water bodies that could potentially be affected by the Projects are listed in **Table 20-3-3** and shown in **Figure 20-3-1** and **Figure 20-3-2**. Details of water body status are taken from the Environment Agency's Catchment Data Explorer.

36. Cycle 2 (2019) chemical status is shown as parameters have not been assessed in Cycle 3 (2022). This is because all water bodies in England are at Fail for chemical status due to a range of global pollutants for which there is no known technical solution. The timescale objective for reaching Good status is set as 2063 by the Environment Agency for all water bodies, which reflects the natural recovery time chemical status.

37. Water bodies have been screened into the assessment where there is potential for hydrological connectivity (direct or indirect) between the water body and construction and operational activities associated with the Projects.

*Table 20-3-3 Water Bodies Screening Assessment*

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| Barmston Sea Drain/ Skipsea Drain to Conf<br>GB104026077770 | River | Not designated as an artificial or heavy modified water body. At Moderate Ecological Status due to Moderate classifications for invertebrates and macrophytes and phytobenthos combined, and Poor classifications for ammonia and dissolved oxygen.<br>Failed chemical status due to high levels of polybrominated diphenyl ethers (PBDE) and mercury and its compounds.<br>Ecological status objective of Moderate ecological status by 2021. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| Barmston Sea Drain from Skipsea Drain to N Sea<br>GB104026077780 | River | Artificial water body at Moderate ecological potential due to Moderate classifications for (macrophytes and phytobenthos combined (macrophytes sub element)), dissolved oxygen and phosphate. The catchment's mitigation measures assessment is Moderate or less. | Out | Less than 400m$^2$ of the catchment (0.006%) would be affected by construction, which relates to a short section of existing access track. Onshore infrastructure would not be installed in |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | | | this catchment in any scenario. Impacts are therefore considered extremely unlikely. |
| Old Howe/ Frodingham Beck to River Hull<br><br>GB104026067021 | River | Heavily modified water body at Moderate Ecological Potential because The catchment's mitigation measures assessment is Moderate or less.<br><br>Failed chemical status due to high levels of polybrominated diphenyl ethers (PBDE) and mercury and its compounds.<br><br>Ecological status objective of Good ecological potential by 2027. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| Mickley Dike<br><br>GB104026066990 | River | Artificial water body at Moderate Ecological Potential due to Poor dissolved oxygen. The catchment's mitigation measures assessment is Moderate or less.<br><br>Failed chemical status due to high levels of PBDE and mercury and its compounds. | In | Screened in because components of the Projects would be located within the catchment of this water body. |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | Ecological status objective of Good ecological potential by 2027. | | |
| Catchwater Drain<br><br>GB104026066970 | River | Artificial water body at Moderate Ecological Potential due to Bad ammonia and Bad dissolved oxygen classifications. Invertebrates and phosphate are also Poor.<br><br>Failed chemical status due to high levels of PBDE and mercury and its compounds.<br><br>Ecological status objective of Moderate ecological potential by 2015. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| Foredyke Stream Upper<br><br>GB104026066890 | River | Artificial water body at Moderate Ecological Potential due to Moderate classifications for invertebrates and dissolved oxygen, and mitigation measures assessment is Moderate or less. Ammonia and phosphate are Poor.<br><br>Failed chemical status due to high levels of PBDE and mercury and its compounds. | In | Screened in because components of the Projects would be located within the catchment of this water body. |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | Ecological status objective of Good ecological potential by 2027. | | |
| Foredyke Stream Lower to Holderness Drain<br>GB104026066910 | River | Artificial water body at Moderate Ecological Potential due to Poor phosphate and Bad classifications for fish and dissolved oxygen. The catchment's mitigation measures assessment is Moderate or less.<br>Failed chemical status due to high levels of perfluorooctane sulphonate (PFOS), PBDE and mercury and its compounds.<br>Ecological status objective of Moderate ecological potential by 2015. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| Holderness Drain Source to Foredyke Stream<br>GB104026066950 | River | Artificial water body at Moderate Ecological Potential due to Moderate ammonia and Poor dissolved oxygen. The catchment's mitigation measures assessment is Moderate or less.<br>Failed chemical status due to high levels of PBDE and mercury and its compounds. | In | Screened in because components of the Projects would be located within the catchment of this water body. |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | Overall status objective of Good ecological potential by 2027. | | |
| Hull from Arram Beck to Humber<br>GB104026067212 | River | Heavily Modified water body at Moderate Ecological Potential due to Moderate phosphate. The catchment's mitigation measures assessment is Moderate or less.<br>Failed chemical status due to high levels of benzo(b)fluoranthene, benzo(g-h-i) perylene, benzo(k)fluoranthene, PBDE, mercury and its compounds and tributyltin compounds.<br>Ecological status objective of Good ecological potential by 2027. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| Beverley and Barmston Drain<br>GB104026067211 | River | Artificial water body at Moderate Ecological Potential due to Moderate classifications for invertebrates and phosphate, and a classification for Bad dissolved oxygen. The catchment's mitigation measures assessment is Moderate or less. | In | Screened in because components of the Projects would be located within the catchment of this water body. |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | Failed chemical status due to high levels of PBDE and mercury and its compounds.<br><br>Ecological status objective of Good ecological potential by 2027. | | |
| High Hunsley to Arram Area<br><br>GB104026066841 | River | Artificial water body at Moderate Ecological Potential due to Moderate classifications for macrophytes sub element, and the catchment's mitigation measures assessment is Moderate or less.<br><br>Failed chemical status due to high levels of benzo(b)fluoranthene, benzo(g-h-i) perylene, benzo(k)fluoranthene, PBDE, and mercury and its compounds.<br><br>Ecological status objective of Moderate ecological potential by 2015. | In | Screened in because components of the Projects would be located within the catchment of this water body. |
| High Hunsley to Woodmansey Area<br><br>GB104026066820 | River | Artificial water body at Moderate Ecological Potential due to Moderate classifications for fish, and Moderate or less for mitigation measures Oassessment). | In | Screened in because components of the Projects would be located within the catchment of this water body. |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | Failed chemical status due to high levels of PBDE and mercury and its compounds.<br>Overall status objective of Good ecological potential by 2027. | | |
| Humber Middle<br>GB530402609202 | Transitional | Heavily modified water body and Moderate ecological potential due to Moderate classifications for angiosperms (saltmarsh), dissolved inorganic nitrogen, and Moderate or less for mitigation measures assessment. | Out | Lower reaches of the River Hull are included in the transitional water body. The inland (freshwater) River Hull will be crossed by trenchless technique 10km upstream. Parts of the Onshore Development Area are 5km away but there is poor hydrological connectivity to the River Hull. Given the distances involved and control measures that would be in place for construction works and negligible impacts from operational activity, impacts on the |

| Water Body Theme | Water Body Type | Description | Screened in/ out? | Reason for Screening Decision |
|---|---|---|---|---|
| | | | | water body are not anticipated. |
| Yorkshire South<br>GB640402491000 | Coastal | Designated as a heavily modified water body. At Moderate Ecological Status due to Moderate classifications for invertebrates, and Moderate or less for mitigation measures assessment.<br>Failed chemical status due to high levels of benzo(g-h-i) perylene, PBDE, mercury and its compounds and tributyltin compounds.<br>Ecological water body objective of Good by 2027. | In | Screened in because components of the Projects would be located within this water body. |
| Hull and East Riding Chalk<br>GB40401G700700 | Groundwater | Groundwater body that underlies the Onshore Development Area.<br>At Poor Quantitative and Poor chemical status.<br>Overall water body objective of Poor by 2015. | In | Screened in because components of the Projects would be underlain by this water body. The Projects could affect the quality and quantity of groundwater. |

## 20.3.3.2 Stage 2: Scoping

38. The aim of this section is to highlight the quality elements within each water body that could be impacted by the Projects, as identified in Stage 1 of the compliance assessment. This assessment therefore determines the scope for any future detailed compliance assessment (Stage 3) which may be required for the Projects.

39. Potential impacts of the Projects on quality elements for river, coastal and groundwater bodies are presented in **Table 20-3-4**, **Table 20-3-5** and **Table 20-3-6**.

40. Section 20.3.3.2.4 evaluates impacts on RBMP improvement and mitigation measures, and section 20.3.3.2.5 discusses protected areas that could be affected by the Projects. Section 20.3.3.2.6 provides a summary of Stage 2 scoping.

#### 20.3.3.2.1 River Water Bodies

*Table 20-3-4 Scoping Assessment for the River Water Bodies*

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| Water bodies assessed: all river water bodies screened into the assessment (**Table 20-3-3**) | | | |
| Project elements assessed: Landfall, Onshore Export Cable Corridor, onshore substations | | | |
| Biology | Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or modification of habitats for aquatic plants? | **Construction**<br>Impacts from ground disturbance at the TJBs, Onshore Export Cables (including use of a temporary Haul Road and associated culverts and bridges at watercourse crossings) and construction of the onshore substations could increase the supply of fine sediment to river water bodies. This could smother bed habitats and reduce light penetration. This could also lead to the loss or modification of aquatic flora communities. Changes to physico-chemistry from proposed onshore construction activities resulting from the supply of in situ nutrients and contaminants from ground disturbance, and contaminants from accidental spills and leakage from construction plant could also lead to loss or modification of habitats for aquatic plants. | In |
| | | **Operation** | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km$^2$ for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br><br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Due to the very small area of each catchment that could be affected by operational activities, changes to hydromorphology and/or physico-chemistry are not anticipated. | |
| | Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or | **Construction**<br><br>Impacts from ground disturbance at the TJBs, Onshore Export Cables (including use of a temporary Haul Road) and construction of the onshore substations could increase the supply of fine sediment to river water bodies. This could smother bed habitats and reduce light penetration. This could lead to the loss or modification of habitats which support benthic invertebrates. | In |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
| --- | --- | --- | --- |
| | modification of habitats for aquatic invertebrates? | Changes to physico-chemistry from onshore construction activities could also lead to loss or modification of aquatic invertebrate habitat. | |
| | | **Operation**<br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km2 for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Due to the very small area of each catchment that could be affected by operational activities, changes to hydromorphology and/or physico-chemistry that could lead to impacts on habitats for aquatic invertebrates are not anticipated. | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or modification of shelter, feeding and spawning habitats for fish? | **Construction**<br>Increased turbidity due to increased fine sediment loads from onshore construction activities could alter niche habitats and lead to the loss or modification of shelter, feeding and spawning habitats for fish. Culverts used at temporary crossings also affect fish habitats by disturbing the channel bed and impounding sediment if not set at the correct level. Furthermore, potential changes to physico-chemistry could also reduce the capacity of the water body to support feeding and spawning fish. | In |
| | | **Operation**<br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km2 for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | effect no worse than **minor adverse** (due to medium and high sensitivity). Permanent infrastructure at river crossings would also be buried below the channel, avoiding any direct impacts on fish. Due to the very small area of each catchment that could be affected by operational activities, impacts on fish are not anticipated. | |
| Hydromorphology | Could the activity change the volume, energy or distribution of flows in the water body? | **Construction**<br>Impacts from ground disturbance and changes in land use at the TJBs, Onshore Export Cables (including use of a temporary Haul Road and associated culverts and bridges at watercourse crossings) and onshore substations could potentially alter the hydrological regime of river water bodies screened into the assessment. More impermeable surfaces and disturbed ground could alter surface water drainage pathways, resulting in changes to the volume, energy or distribution of flows. | In |
| | | **Operation**<br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km$^2$ for the groundwater catchment. These areas equate to | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br><br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Due to the very small area of each catchment that could be affected by operational activities, changes to the volume, energy or distribution of flows in any river water body are not anticipated. | |
| | Could the activity change the width, depth, bank conditions, bed substrates and structure of the riparian zone? | **Construction**<br><br>Impacts from ground disturbance at the TJBs, Onshore Export Cables (including use of a temporary Haul Road) and construction of the onshore substations may increase fine sediment input to water bodies, which could have impacts on hydromorphology. Any increase in surface runoff has the potential to increase scour to the bed and banks and structure of the riparian zone. Temporary crossings (e.g. culverts or Bailey bridges) would alter bank conditions and the channel bed for culverts. | In |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | **Operation**<br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km$^2$ for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Due to the very small area of each catchment that could be affected by operational activities, changes to the width, depth, bank conditions, bed substrates and structure of the riparian zone in any river water body are not anticipated. | Out |
| | Could the activity create a permanent barrier to the downstream movement of water | **Construction and operation**<br>Onshore infrastructure would not create a permanent barrier to the downstream movement of water or sediment, or the upstream movement of fish. Although temporary barriers to river continuity | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | and/or sediment, or the upstream movement of fish? | may be required during construction (e.g., to facilitate watercourse crossings), they would be removed following construction and any effects would be reversed. The maximum duration for Sequential construction onshore is six years, during which time temporary crossings could be in place for the duration.<br><br>Operational infrastructure at river crossings would be buried below the channel (typically 2m depth at trenched crossings). No permanent mechanism for impact on the movement of sediment or fish has been identified. | |
| Physio-chemistry and chemistry | Could the activity change the temperature, pH, oxygenation, salinity or nutrient concentrations in the water body? | **Construction**<br><br>Impacts from ground disturbance at the TJBs, Onshore Export Cables (including use of a temporary Haul Road) and construction of the onshore substations may increase sediment supply to watercourses, which could impact on turbidity levels and oxygenation within the water body. There would also be increased risk of contaminant supply to water bodies, from accidental spillage or leakage of fuel oils or lubricants from construction vehicles. This has the potential to impact on physico-chemistry. | In |
| | | **Operation**<br><br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | surface water catchments (Beverley and Barmston Drain), and 0.91km$^2$ for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br><br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Due to the very small area of each catchment that could be affected by operational activities, changes to temperature, pH, oxygenation, salinity or nutrient concentrations are not anticipated. | |
| | Could the activity dangerous chemicals into the water body? | **Construction**<br><br>Construction machinery in or adjacent to water bodies has the potential to accidentally release lubricants, fuels and oils into a surface water body. This could also be caused by spillage, leakage and in-wash from vehicle storage areas following rainfall, accidental release of foul waters (e.g., from welfare facilities) and construction materials, such as concrete and inert drilling fluids | In |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | from trenchless crossings. Dangerous chemicals could also be released from construction materials (e.g., concrete). | |
| | | **Operation**<br>The area of each river catchment occupied by permanent infrastructure is very small, with a maximum of 0.29km$^2$ for surface water catchments (Beverley and Barmston Drain), and 0.91km$^2$ for the groundwater catchment. These areas equate to very small proportions of each catchment, reaching a maximum of 0.50% for the High Hunsley to Woodmansey Area catchment.<br>As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, the magnitude of impact for operational activities associated with the accidental release of contaminants to surface and groundwater, and changes to surface and groundwater flows and flood risk, is negligible, and significance of effect no worse than **minor adverse** (due to medium and high sensitivity). Best practice mitigation would be in place to reduce the likelihood of any spills during any local maintenance work resulting from accidental damage. Due to the very small area of each catchment that could be affected by operational activities, it | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | is not anticipated that dangerous chemicals would be released into any water body. | |

### 20.3.3.2.2 Coastal Water Bodies

*Table 20-3-5 Scoping Assessment for Coastal Water Bodies*

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| Water bodies assessed: Yorkshire South GB640402491000 | | | |
| Project components assessed: offshore export cables (Including intertidal works on the beach), emergency access; cable protection | | | |
| Biology | Is the footprint of the activity 0.5km$^2$ or larger? | **Construction**<br>The Offshore Development Area within the coastal water body is 3.1km$^2$. However, this is the area within which offshore infrastructure would be sited. The worst case for all scenarios during construction is the indicative width of disturbance from boulder plough below, which is 20m for each of the four export cables and two fibre optic cables, in addition to the area for intertidal works (including emergency beach access). This equates to an area of disturbance of 0.21km$^2$. This is a worst case figure as the main disturbance on the beach would cover a smaller area associated with the installation of six exit pits (10 x 20m each (0.0012km$^2$)). | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | **Operation**<br>For operational activities, the worst case would require the offshore exports cables to be protected with a rock berm out to one nautical mile. The maximum indicative width of rock berm protection (major base) is 15.2m. This would equate to an area of gives an area of 0.16km$^2$. | Out |
| | Is the area of either activity greater than 1% or more of the water body's area? | **Construction and operation**<br>The Yorkshire South coastal water body has a total area of 163.3km$^2$.<br>For construction the worst case scenario equates to 0.12%.<br>For operation the worst case scenario equates to and 0.01%. | Out |
| | Is the footprint of activity within 500m of any higher sensitivity habitat? | **Construction and operation**<br>The Offshore Development Area is not located within 500m of a coastal higher sensitivity habitat. The nearest higher sensitivity habitat is 9.6km away at Bridlington. | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
| --- | --- | --- | --- |
| | Is the footprint of activity 1% or more of any lower sensitivity habitat? | **Construction**<br>The Offshore Development Area crosses a zone of subtidal soft sediment (sand, mud and mixed A5.2, A5.3, A5.4). Subtidal soft sediment characterises nearly all of the coastal water body out to one nautical mile (approximately 151km$^2$). For construction, the percentage of lower sensitivity habitat affected is 0.17%.<br>The intertidal beach area is classified as intertidal soft sediment (sand, mud and mixed). In the worst case (intertidal exit pits and including emergency beach access) this equates to an area that could be affected by construction of 0.12km$^2$, which equates to approximately 1.8% of the habitat in the water body. As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)** (Impact C1d: Changes in Suspended Sediment Concentration and Transport Due to Exit Cable Installation), as a result of the excavation process, suspended sediment concentrations will be elevated above prevailing conditions but are likely to remain within the range of background nearshore levels (which are high close to the coast because of increased wave activity) and lower than those concentrations that would develop during storm conditions. Also, once excavation and backfill is completed, the high energy nearshore zone is likely to rapidly disperse the suspended sediment (i.e., over a period of a few hours) | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | in the absence of any further sediment input. For all scenarios significance of effect has been assessed as **negligible**.<br><br>In addition, the northern boundary of the Offshore Development Area overlaps a very small area (0.0018km$^2$) of subtidal rocky reef (infralittoral and circalittoral rock). The total area of this habitat in the coastal water body is 8.61km$^2$. If all of the subtidal rocky reef within the Offshore Development Area was affected this would equate to 0.02% of the habitat in the water body. However, the location of the reef at the very edge of the Offshore Development Area means impacts are unlikely. | |
| | | **Operation**<br><br>The area of subtidal soft sediment that would be affected during operation is approximately 0.071%.<br><br>The intertidal beach area measures approximately 85m from MHWS to MLWS. Cable protection will not be used on the beach meaning the intertidal soft sediment habitat will not be affected once the Projects are operational.<br><br>If all of the subtidal rocky reef within the Offshore Development Area was affected by cable protection this would equate to 0.02% of the habitat in the water body. However, the location of the reef at the | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | very edge of the Offshore Development Area means impacts are unlikely. | |
| | 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? | **Construction and operation**<br>The Offshore Development Area is not located close to an estuary. The closest estuary (entrance to the Humber estuary) is approximately 46km to the south. | Out |
| | Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a | **Construction and operation**<br>The area of construction work within the water body would be small scale and would occur in an open area of coastline. This would therefore not create a physical barrier to fish that could hinder movement or migration. **Volume 7, Chapter 10 Fish and Shellfish Ecology (application ref: 7.10)** has assessed construction and operational impacts and residual effects for temporary habitat disturbance, increased suspended sediment concentrations and noise and vibration as negligible to low magnitude of impact, resulting in negligible to minor adverse effects. Minor adverse | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
| --- | --- | --- | --- |
| | change in depth or flow)? | effects are associated with medium sensitivity receptors. Effects are therefore not significant in EIA terms. Given the small area of coastal water body affected by construction and operation, impacts on normal fish behaviour are not anticipated. | |
| | Could cause entrainment or impingement of fish? | **Construction and operation**<br>No mechanism for fish entrainment or impingement has been identified for construction or operation. | Out |
| | Could introduce or spread Invasive non-native species (INNS)? | **Construction and operation**<br>Works have the potential to contribute to the spread of invasive species if materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. However, good practice measures would be employed to ensure all equipment is cleaned and checked before use. | Out |
| Hydromorphology | Could impact on the hydromorphology, e.g., for example morphology or tidal | **Construction**<br>It is assumed seabed clearance and levelling (pre-sweeping) may be required prior to cable installation. The worst-case scenario assumes that sediment would be dredged and returned to the water column at the sea surface as overflow from a dredge vessel. This | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | patterns, of a water body at high status? | process would cause localised and short-term increases in suspended sediment both at the point of dredging at the seabed and at the point of its discharge back into the water column. The scale of this impact would be relatively localised for coarser sediments (due to immediate settling out) and larger-scale for finer sediments. Suspended sediments in the water column are predicted to return to baseline conditions within days after completion of installation due to dispersion and dilution.<br><br>The trenchless crossing exit point would also require excavation of the exit pits to install the trenchless crossing ducts on the seaward side of the landfall. Upon completion of duct installation the exit pits would be filled in to reinstate the intertidal zone close to its original morphology. This activity would result in some localised and short-term disturbance to the beach and nearshore zone, but there would be no long-term effect on sediment transport processes.<br><br>As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)**, for Changes in Suspended Sediment Concentration and Transport due to Cable Installation, magnitude of impact and significance of effect would be **negligible** for all scenarios. | |
| | | **Operation** | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)** for Changes to Bedload Sediment Transport and Seabed Morphology Due to the Presence of Cable Protection Measures, there is the potential that burial of the export cables would not practicably be achievable within the nearshore part of the offshore cable corridor in water depths less than 10m due to the presence of chalk bedrock in the shallow subsurface. As a worst-case scenario, cable protection measures would need to be installed to protect any shallow or surface-laid cables.<br><br>If the protection does present an obstruction to this bedload transport the sediment would first accumulate on one side or both sides of the obstacle (depending on the gross and net transport at that location) to the height of the protrusion (up to 1.4m). With continued build-up, it would then form a 'ramp' over which sediment transport would eventually occur by bedload processes, thereby bypassing the protection. The gross patterns of bedload transport across the export cables would therefore not be affected significantly. However, the beach and nearshore zone are covered by a relatively thin cover of potentially mobile sediment and Pleistocene till is typically exposed at seabed. This means bedload sediment transport rates are low. Significance of effect for all scenarios for impacts from cable protection and cable repairs have been assessed as **negligible**. | |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
| --- | --- | --- | --- |
| | Could significantly impact the hydromorphology of any water body? | **Construction**<br>As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)**, although there may be some localised increased in suspected sediment associated with the trenchless crossing exit pits, the exit pits would be backfilled to reinstate the intertidal zone close to its original morphology. This activity would result in some localised and short-term disturbance to the beach and nearshore zone, but there would be no long-term effect on sediment transport processes. As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)**, for Impact C1c: Changes in Suspended Sediment Concentration and Transport due to Cable Installation, magnitude of impact and significance of effect would be **negligible** for all scenarios. | Out |
| | | **Operation**<br>For operational activities, the area of unburied cable protection equates to 0.01% of the water body's area; no significant impacts on hydromorphology are anticipated. As assessed in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)** modelling does show potential effects on hydrodynamics from the cable protection. However, effects would be localised, and because | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | the seabed is gravel and till (more resistant than sand), significant morphological changes are not anticipated. | |
| | Is in a water body that is heavily modified for the same use as your activity? | **Construction and operation**<br>No – the water body is designated as heavily modified for coastal protection, flood protection and navigation purposes. | Out |
| Physico-chemistry and Chemistry | Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)? | **Construction and operation**<br>There would be an increase in suspended sediment concentrations because of export cable installation and excavations associated with the intertidal/subtidal exit pits. These activities could increase turbidity and alter oxygen and nutrient levels. Although these processes would cause localised and short-term increases in suspended sediment, the scale of this impact would be relatively localised for coarser sediments (due to immediate settling out) and larger-scale for finer sediments. Suspended sediments in the water column are predicted to return to baseline conditions within days after completion of installation due to dispersion and dilution. Trenchless installation activity would result in some localised and short-term disturbance to the beach and nearshore zone, but there | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | | would be no long-term effects on water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days). | |
| | | **Operation**<br>The presence of unburied cable protection would not impact water quality. | Out |
| | Is in a water body with a phytoplankton status of moderate, poor or bad? | **Construction and operation**<br>No – status is high. | Out |

| Parameter | Scoping Question | Scoping Assessment | Scoping Decision |
|---|---|---|---|
| | Is in a water body with a history of harmful algae? | **Construction and operation**<br>Not monitored. | Out |
| | The chemicals are on the Environmental Quality Standards Directive list? | **Construction and operation**<br>No chemicals would be directly released from potential works associated with the Projects. Best practice measures would be used to reduce the likelihood of spillages during construction and operation/maintenance. | Out |
| | It disturbs sediment with contaminants above Cefas Action Level 1? | **Construction and operation**<br>Sediment sampling along the offshore export cable corridor shows there are no sediment-associated contaminants above Cefas Action Level 1 out to one nautical mile (Fugro, 2022). | Out |

### 20.3.3.2.3 Groundwater Bodies

*Table 20-3-6 Scoping Assessment for Groundwater Bodies*

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| Water bodies assessed: Hull and East Riding Chalk GB40401G700700 | | | |
| Project components assessed: landfall, Onshore Export Cables, onshore substations | | | |
| Groundwater quantity | Will the activity change groundwater levels affecting Groundwater Dependent Terrestrial Ecosystems (GWDTEs) or dependent surface water features? | **Construction**<br>During construction activities could cause localised changes to groundwater flows. There may be local changes to infiltration rates into the groundwater body due to installation of buried infrastructure causing alterations to subsurface flow routes. Any dewatering associated with trenching would be temporary and highly localised. Trenching would also be shallow (<2 m) and any dewatering would be unlikely to significantly alter the movement or level of groundwater in the wider groundwater body (which measures 1967 $km^2$), or affect gross patterns of groundwater flow. These small scale changes are not expected to have permanent impacts on GWDTEs or dependent surface water features. | Out |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | | **Operation**<br>There may be localised changes to flow paths and directions of groundwater in the vicinity of buried/near surface infrastructure. However, these small scale changes are unlikely to impact GWDTEs or dependent surface water features. Any localised dewatering needed for unplanned emergency repairs is unlikely to significantly alter the movement or level of groundwater in the wider groundwater body (which measures 1967 km$^2$) or affect gross patterns of groundwater flow. The area of the groundwater body that could be affected is very small in comparison to the wider body of groundwater (0.04% for Sequential or Concurrent operation). As a result, impacts on groundwater levels and associated GWDTEs are not expected. | Out |
| | Will the level of proposed groundwater abstraction exceed recharge at a water body scale? | **Construction**<br>No consumptive abstraction is planned, and there would be no mechanism for impact on groundwater recharge. Any groundwater abstraction would be limited to localised dewatering of near-surface groundwaters during subsurface excavations in the construction phase. | Out |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | | **Operation**<br>Operation of the Projects would not involve any groundwater abstraction. Any localised dewatering needed for unplanned emergency repairs to the underground cables would not affect water body scale recharge (the water body measures1967.3 $km^2$). | Out |
| | Could the activity lead to an additional surface water body that will become noncompliant and lead to failure of the dependent surface water test? | **Construction**<br>No consumptive abstraction is planned. Any groundwater abstraction would be limited to localised dewatering of near-surface groundwaters during subsurface excavations in the construction phase. | Out |
| | | **Operation**<br>Operation activities would not abstract any water from the groundwater body. This means there is no mechanism for impact on any dependant surface waters. | Out |
| | Could the activity result in additional abstraction that will exceed any | **Construction**<br>No consumptive abstraction is planned, and there would be no mechanism for impact on groundwater recharge. There may be some localised dewatering, but this would not affect total recharge. | Out |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | groundwater body scale headroom between the fully licensed quantity and the limit imposed by the total recharge? | **Operation**<br>No consumptive abstraction is planned, and there would be no mechanism for impact on groundwater recharge. There may be some localised dewatering, but this would not affect total recharge. | Out |
| Groundwater quality | Will the activities have the potential to result in or exacerbate widespread diffuse pollution at a water body scale? | **Construction**<br>Should pollution during construction accidently occur, this would be limited to a very small proportion of both groundwater bodies identified (highly localised) and would not have an impact on diffuse pollution at the water body scale. Best practice mitigation measures, secured in an **Outline Code of Construction Practise (OCoCP) (Volume 8, application ref: 8.9)** would minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event that could have an impact on groundwater resources. | Out |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | | **Operation**<br>No mechanism for impact has been identified whereby widespread diffuse pollution could be created or exacerbated once the Projects are operational. The Onshore Development Area crosses a Drinking Water Safeguard Zone (DWSZ) (groundwater). DWSZs are a recognised mechanism to prevent rising trends in nitrate at drinking water sources. Nitrates would be produced from the septic tank at the Converter Stations, although these will be minimally staffed and very unlikely to result in or exacerbate widespread diffuse pollution at a water body scale. | Out |
| | Will the activities have the potential to result in pollution of GWDTEs or cause deterioration in the quality of a drinking water abstraction? | **Construction**<br>Activities such as open cut trench excavations to construct the Onshore Export Cable Corridor could potentially introduce contaminants into the groundwater bodies identified. This could lead to an increase in pollutant concentrations affecting the quality of licensed and unlicensed abstractions. | In |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | | **Operation**<br>No mechanism for impact has been identified whereby GWDTEs could be polluted, or the quality of drinking water compromised once the Projects are operational. The small scale of potential operational nitrates released from the septic tank at the converter stations means impacts on GWDTEs are considered unlikely. | Out |
| | Could the activities have the potential to result in increasing trends in pollutant concentrations or reduce the ability of the water body being able to reverse significant trends in groundwater pollutants? | **Construction**<br>Construction of the Onshore Export Cables from open cut trench excavations and HDD could potentially introduce contaminants into groundwater. This could lead to an increase in pollutant concentrations within the groundwater bodies identified. | In |
| | | **Operation**<br>No mechanism for impact has been identified whereby pollutant trends could increase once the Projects are operational. The small scale of potential operational nitrates released from the septic tank at the converter stations means impacts on GWDTEs are considered unlikely. | Out |

| Parameter | Scoping question | Scoping assessment | Scoping decision |
|---|---|---|---|
| | Will the activity lead to saline intrusion? | **Construction**<br>Although there may be some very localised increases in salinity in the vicinity of the landfall trenchless crossing technique bore, there would not be any consumptive abstraction of groundwater during construction or operation, which would cause a drawdown in the underlying aquifer. As the Landfall is above mean sea level, the head difference would also limit any minor changes in salinity. | Out |
| | | **Operation**<br>Once the is the Projects are operational there would be no mechanism whereby saline intrusion could occur into the underlying groundwater body/aquifer. | Out |

#### 20.3.3.2.4 Impacts on River Basin Management Plan Improvement and Mitigation Measures

41. The Environment Agency has not published any details of improvement measures that are required to improve the status of any of the water bodies that have been scoped into the assessment. However, the Environment Agency has identified the mitigation measures that are required to achieve GEP in the artificial or heavily modified river water bodies identified in **Table 20-3-3**. These measures are listed in **Table 20-3-7**.

42. These measures are classed as either in place (IP) (i.e., they have already been implemented) or not in place (NIP) (i.e., they have not yet been implemented).

43. The measures identified are relevant to those water bodies designated as either heavily modified or artificial. Measures identified for the river water bodies are intended to address physical modification pressures associated with land drainage, flood protection, navigation (including ports) and urbanisation (i.e., the uses for which the water bodies are designated as heavily modified).

44. Although the Projects involve localised construction works within these water bodies, the very limited impacts on hydromorphology identified in section 20.3.3.2.1 means that there is no mechanism to affect the proposed measures listed in **Table 20-3-7**. The future implementation or effectiveness of mitigation measures would not be affected.

*Table 20-3-7 Measures Identified in the RMBP for the River Water Bodies Identified in* ***Table 20-3-3***

| **Mitigation measure** | **Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770** | **Old Howe/ Frodingham Beck to River Hull GB104026067021** | **Mickley Dike GB104026066990** | **Catchwater Drain GB104026066970** | **Foredyke Stream Upper GB104026066890** | **Foredyke Stream Lower to Holderness Drain GB104026066910** | **Holderness Drain Source to Foredyke Stream GB104026066950** | **Hull from Arram Beck to Humber GB104026067212** | **Beverley and Barmston Drain GB104026067211** | **High Hunsley to Arram Area GB104026066841** | **High Hunsley to Woodmansey Area GB104026066820** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flood bunds | -[2] | NIP[3] | - | - | - | - | - | NIP | NIP | NIP | - |
| Set-back embankments | - | NIP | - | - | NIP | NIP | - | NIP | NIP | NIP | - |
| Floodplain connectivity | - | NIP | - | - | NIP | NIP | - | NIP | NIP | NIP | - |
| Fish passes | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |

[2] '– ' *indicates the measure is not relevant to a water body.*
[3] *Mitigation measures are listed as either not in place (NIP) or in place (IP). Not in place refers to measures that have not yet been implemented but form part of the water body's objectives to achieve good ecological potential. In places measures have been implemented.*

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduce fish entrainment | - | NIP | - | - | - | - | IP | NIP | NIP | NIP | - |
| Enhance ecology | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |
| Remove obsolete structures | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Changes to locks etc | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Selective vegetation control | IP | NIP | IP | IP | IP | IP | IP | NIP | NIP | NIP | IP |
| Vegetation control | IP | NIP | IP | IP | IP | IP | IP | NIP | NIP | NIP | IP |

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vegetation control timing | IP | NIP | IP | - | IP | IP | IP | NIP | NIP | NIP | IP |
| Invasive species techniques | - | NIP | - | - | - | NIP | - | NIP | NIP | NIP | IP |
| Retain habitats | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |
| Maintenance – minimise habitat impact | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |
| Remove or soften hard bank | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Maintenance – prevent sediment transfer | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Water level management | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Align and attenuate flow | IP | NIP | IP | - | IP | IP | IP | NIP | NIP | NIP | - |
| Preserve or restore habitats | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |
| Educate landowners | - | NIP | - | - | - | - | - | NIP | NIP | NIP | IP |
| In-channel morph diversity | - | NIP | - | NIP | - | - | - | NIP | NIP | NIP | - |

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Re-opening culverts | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Alter culvert channel bed | - | NIP | - | - | - | - | - | NIP | NIP | NIP | - |
| Sediment management strategy | - | NIP | NIP | - | NIP | NIP | NIP | NIP | NIP | NIP | - |
| Avoid the need to dredge | - | - | - | - | - | - | - | NIP | - | - | - |
| Dredging disposal strategy | - | - | - | - | - | - | - | NIP | - | - | - |
| Reduce impact of dredging | - | - | - | - | - | - | - | NIP | - | - | - |

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduce sediment re-suspension | - | - | - | - | - | - | - | NIP | - | - | - |
| Retime dredging or disposal | - | - | - | - | - | - | - | NIP | - | - | - |
| Sediment management | - | - | - | - | - | - | - | NIP | - | - | - |
| Dredge disposal site selection | - | - | - | - | - | - | - | NIP | - | - | - |
| Manage disturbance | - | - | - | - | - | - | - | NIP | - | - | - |
| Phased de-watering | - | - | - | - | - | - | - | NIP | - | - | - |
| Modify vessel design | - | - | - | - | - | - | - | NIP | - | - | - |

| Mitigation measure | Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770 | Old Howe/ Frodingham Beck to River Hull GB104026067021 | Mickley Dike GB104026066990 | Catchwater Drain GB104026066970 | Foredyke Stream Upper GB104026066890 | Foredyke Stream Lower to Holderness Drain GB104026066910 | Holderness Drain Source to Foredyke Stream GB104026066950 | Hull from Arram Beck to Humber GB104026067212 | Beverley and Barmston Drain GB104026067211 | High Hunsley to Arram Area GB104026066841 | High Hunsley to Woodmansey Area GB104026066820 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vessel management | - | - | - | - | - | - | - | NIP | - | - | - |
| Boats in central track | - | - | - | - | - | - | - | NIP | - | - | - |
| Invasive species awareness | - | - | - | - | - | - | - | NIP | - | - | - |
| Boat wash awareness | - | - | - | - | - | - | - | NIP | - | - | - |
| Bank rehabilitation | - | - | - | - | - | - | - | NIP | - | - | - |

##### 20.3.3.2.5 Impacts on Protected Areas

45. The Environment Agency's '*Clearing the Waters For All*' guidance (Environment Agency, 2017) recommends further assessment of potential impacts on any water-dependent protected areas that are within 2km of a proposed new project activity. This 2km zone of influence has therefore been adopted across all water bodies for each project activity and the results of the process are summarised in **Table 20-3-8** and **Table 20-3-9** and evaluated below.

###### *20.3.3.2.5.1 Nitrate Vulnerable Zones*

46. The Onshore Development Area passes through the following Nitrate Vulnerable Zones (NVZs), as indicated in **Table 20-3-8**; **Figure 20-3-3**:

- River Hull from Arram Beck to Humber NVZ (S254);
- Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259);
- Holderness Drain from Foredyke Stream to Humber NVZ (S251); and
- Yorkshire Chalk (G106).

47. Foul drainage from construction welfare facilities would be tankered off-site for treatment, preventing impacts to NVZs. As described in the **Outline Drainage Strategy (Volume 8, application ref: 8.12)**, the exact details of any operational welfare areas associated with the Onshore Converter Station(s) are still to be determined. However, given the nature of the development, foul flows are likely to be minimal. It is anticipated that any foul water flows from the site will drain to a septic tank or package treatment plant prior to discharge to a nearby watercourse. Design sizing and requirements will be determined at the detailed design stage.

48. The construction site drainage systems would also prevent increasing nitrate volumes from entering the surface drainage network following soil excavations. Control measures for manage sediment supply would also limit potential nutrient inputs from disturbed agricultural soils.

49. The construction and operation activities are therefore unlikely to significantly alter NVZ nitrate and nutrient concentrations. Impacts on NVZs are scoped out of the assessment.

###### *20.3.3.2.5.2 Drinking Water Safeguard Zones*

50. The Onshore Development Area passes through the following DWSZs (**Table 20-3-9**; **Figure 20-3-1**; New Figure reference):

- Tophill Low (surface water); and
- Cottingham, Dunswell, Keldgate, Springhead (groundwater).

51. DWSZs are a recognised mechanism to prevent rising trends in nitrate at drinking water sources. The DWSZ above covers the same area as Source Protection Zone (SPZ) 3. Nitrates would be produced from the septic tank at the converter stations, although these will be minimally staffed and unlikely to increase loadings significantly. DWSZs are scoped out of the assessment.

##### *20.3.3.2.5.3 Bathing Waters*

52. Skipsea Bathing waters are located 1.8km to the south of the Offshore Development Area (**Table 20-3-10; Figure 20-3-1**) and accidental spillage of dangerous chemicals from construction materials and machinery could adversely affect bathing water quality.

53. The risk of accidental spills or leaks occurring during construction would be adequately mitigated through the production and adherence to an OCoCP. Impacts from sediment or contaminant plumes are considered to be short-term and temporary, lasting for the duration of the works only. The bathing waters are also relatively distant from the Offshore Development Area. As such, bathing waters are scoped out of the assessment.

54. Suspended sediment is unlikely to affect bathing water quality 1.8fkm away. In the nearshore, where coarse-grained sands and gravels dominate the seabed, these grain-size fractions would remain close to the bed and settle back to the bed rapidly. Considering background suspended sediment concentrations are higher in the nearshore due to coastal erosion, any changes due to cable installation activities are likely to be within the range of changes caused during large storm events.

##### *20.3.3.2.5.4 Habitats Network Sites*

55. WER compliance assessments require the consideration of the potential effects on quality elements (hydromorphological, physico-chemical, chemical and biological), many of which support ecological interest features for which Habitats Network Sites are designated (e.g. Special Areas of Conservation (SAC) and Special Protection Areas (SPA)).

56. The Greater Wash SPA is crossed by the Offshore Development Area (**Table 20-3-10; Figure 20-3-1**) and is screened into the **Report to Inform Appropriate Assessment (RIAA) (Volume 6, application ref: 6.1)** for potential impacts on red-throated diver. The impact screened in relates to the disturbance of red-throated diver from construction activities and from vessel movements throughout the Project lifetime. No effects relevant to water quality or the WER compliance assessment were screened in for consideration in the assessment.

57. The RIAA concluded that any potential effects on red-throated diver due to construction of the export cable through the Greater Wash SPA for either DBS East or DBS West In Isolation or for both together would not adversely affect the integrity of the Greater Wash SPA.

58. It is concluded that any potential effects on red-throated diver due to disturbance from operational and maintenance vessels for either DBS East or DBS West In Isolation or for both together, and on the assumption that these vessels would need to cross the SPA (noting that the Operations and Maintenance Port has not yet been finalised) would not adversely affect the integrity of the Greater Wash SPA. The Greater Wash SPA is therefore scoped out of the assessment.

*Table 20-3-8 Protected Areas Associated with Surface Water Bodies in the Onshore Development Area as Designated by the Nitrates Directive*

| **Water body and reference number** | **Nitrate Vulnerable Zone** | | | |
|---|---|---|---|---|
| | **River Hull from Arram Beck to Humber NVZ (S254)** | **Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)** | **Yorkshire Chalk (G106)** | **Holderness Drain from Foredyke Stream to Humber NVZ (S251)** |
| Barmston Sea Drain/Skipsea Drain to Conf Water GB104026077770 | ✓ | ✓ | × | × |
| Old Howe/Frodingham Beck to River Hull GB104026067021 | ✓ | × | ✓ | × |
| Mickley Dike GB104026066990 | ✓ | × | × | × |
| Catchwater Drain GB104026066970 | × | × | × | ✓ |
| Foredyke Stream Upper GB104026066890 | × | × | × | ✓ |

| Water body and reference number | Nitrate Vulnerable Zone | | | |
|---|---|---|---|---|
| | River Hull from Arram Beck to Humber NVZ (S254) | Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259) | Yorkshire Chalk (G106) | Holderness Drain from Foredyke Stream to Humber NVZ (S251) |
| Foredyke Stream Lower to Holderness Drain GB104026066910 | × | × | × | ✓ |
| Holderness Drain Source to Foredyke Stream GB104026066950 | ✓ | × | × | ✓ |
| Hull from Arram Beck to Humber GB104026067212 | ✓ | × | ✓ | × |
| Beverley and Barmston Drain GB104026067211 | ✓ | × | ✓ | × |
| High Hunsley to Arram Area GB104026066841 | ✓ | × | ✓ | × |

| Water body and reference number | Nitrate Vulnerable Zone | | | |
|---|---|---|---|---|
| | River Hull from Arram Beck to Humber NVZ (S254) | Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259) | Yorkshire Chalk (G106) | Holderness Drain from Foredyke Stream to Humber NVZ (S251) |
| High Hunsley to Woodmansey Area GB104026066820 | ✓ | × | ✓ | × |

*Table 20-3-9 Protected Areas Associated with the Hull and East Riding Chalk Groundwater Water Body within 2km of the Onshore Development Area*

| Protected Area | ID number | Directive/ Designation |
|---|---|---|
| Cottingham | GWSGZ0240 | Drinking Water Safeguard Zones (Groundwater) |
| Dunswell | GWSGZ0241 | Drinking Water Safeguard Zones (Groundwater) |
| Keldgate | GWSGZ0246 | Drinking Water Safeguard Zones (Groundwater) |
| Springhead | GWSGZ0248 | Drinking Water Safeguard Zones (Groundwater) |

| Protected Area | ID number | Directive/ Designation |
|---|---|---|
| Barmston Sea Drain from Skipsea Drain to N Sea NVZ | S259 | Nitrates Directive |
| River Hull from Arram Beck to Humber NVZ | S254 | Nitrates Directive |
| Holderness Drain from Foredyke Stream to Humber NVZ | S251 | Nitrates Directive |
| Yorkshire Chalk | G106 | Nitrates Directive |
| Greater Wash | UK9020329 | Special Protection Area |

*Table 20-3-10 Protected Areas Associated with the Coastal Water Body within 2km of Offshore Development Area*

| Protected Area | ID number | Directive/ Designation |
|---|---|---|
| Greater Wash | UK9020329 | Special Protection Area |
| Skipsea | UK08600 | Bathing Water Directive |

#### 20.3.3.2.6 Stage 2 Summary

59. Stage 2 scoping has established that activities associated with the Projects in the following water bodies should be taken forward to Stage 3 Detailed Compliance Assessment:

- Construction
    - River water body (all quality elements):
        - Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770;
        - Old Howe/ Frodingham Beck to River Hull GB104026067021;
        - Mickley Dike GB104026066990;
        - Catchwater Drain GB104026066970;
        - Foredyke Stream Upper GB104026066890;
        - Foredyke Stream Lower to Holderness Drain GB104026066910;
        - Holderness Drain Source to Foredyke Stream GB104026066950;
        - Hull from Arram Beck to Humber GB104026067212;
        - Beverley and Barmston Drain GB104026067211;
        - High Hunsley to Arram Area GB104026066841; and
        - High Hunsley to Woodmansey Area GB104026066820.
    - Groundwater body (groundwater quality)
        - Hull and East Riding Chalk GB40401G700700.

60. All operational activities for all water bodies have been scoped out.

#### 20.3.3.3 Stage 3: Detailed Compliance Assessment

61. This section presents the results of the impact assessment undertaken on the water bodies identified in section 20.3.3.1.1 of this report, using the method outlined in **Table 20-3-11**. This assessment determines whether elements of the Projects brought forward from Stage 2 would cause deterioration of water bodies, and whether such deterioration would have a significant non-temporary effect on the status of one or more quality elements at a water body level. The assessment is based on the worst case parameters outlined in section 20.3.1based on which the Sequential Scenario has been identified as the worst-case scenario. Control measures would be secured in an **OCoCP (Volume 8, application ref: 8.9)**.

##### 20.3.3.3.1 River Water Bodies

###### *20.3.3.3.1.1 Hydromorphology (Hydrological Regime and Morphological Conditions)*

###### 20.3.3.3.1.1.1 Construction Activities (Sequential)

62. There is the potential for construction activities to alter surface water flows entering river water bodies. An increase in areas of hard-standing land use associated with the Haul Road and construction compounds could change flow conveyance pathways. This could result in localised changes to the volume, energy or distribution of flows of the identified water bodies. Such an increase in surface runoff could potentially increase local bed and bank scour.

63. Greater levels of fine sediment could be released directly into watercourses, predominantly from ground disturbance and vegetation cover removal associated with construction. This could result in increased sediment deposition and smothering of existing substrates. However, all water bodies surveyed during the geomorphological baseline survey (**Volume 7, Appendix 20-2 (application ref: 7.20.20.2)**) are low energy (depositional) environments and bed substrates are typically fine (silts and clays) – none of the surveyed watercourses have clean gravel substrates that could be smothered. Baseline fine sediment supply is likely to be high in most catchments, associated with evidence of channel maintenance (vegetation clearance and desilting) and the dominance of arable land uses and fine sediment supply associated with agricultural activities.

64. The potential for soil disturbance and temporary changes in land use that could affect surface and groundwater flows has been estimated from the area of the Onshore Development Area in each catchment (**Table 20-3-11**). Areas and proportions of each catchment that could be affected are low (typically less than 2%). The highest proportions are in the coastal catchment (3.1%), High Hunsley to Woodmansey Area (2.8%) and Catchwater Drain (2.2%). As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**, magnitude of impact for increased sediment supply and changes to surface and groundwater flows would be negligible or low in all catchments. Significance of effect is **negligible** or minor adverse depending on receptor sensitivity.

65. The Onshore Export Cable Corridor would use trenchless methods to cross Main Rivers. This means that Main Rivers would not be directly disturbed. The majority of Ordinary Watercourses would be crossed using open-cut trenching (**Table 20-3-12**).

66. There is potential for indirect impacts upon the hydrological regime and morphological condition of water bodies from the use of multiple trenched crossings and culverts on Ordinary Watercourses which drain into the main water body. A large number of trenched crossings in water body catchments could alter flow regimes, disrupt coarse sediment transport patterns and increase the input of fine sediment into water bodies, impacting upon its morphological condition.

67. As shown in **Table 20-3-12** there are generally a low number of trenched crossings required within each water body catchment. The exceptions being the catchments of Catchwater Drain (seven trenched crossings) and Beverley and Barmston Drain (19 trenched crossings), both of which are relatively large catchments. The relatively high number of crossings in Beverley and Barmston Drain reflects the fact that the catchment is crossed by the Onshore Development Area in three different locations. The catchment also contains the onward connection to the proposed Birkhill Wood National Grid Substation, which requires some extra crossings.

68. Haul Road crossings would also be required at watercourse crossings and for access only (i.e. not associated with cable installation).

69. Control measures would be in place to reduce impacts in all catchments (section 20.3.3.3.1.1.2).

*Table 20-3-11 Worst Case Estimated Maximum Area of Disturbed Ground in each Catchment Receptor*

| Water body catchment | Estimated total area of disturbed ground during construction | |
|---|---|---|
| | km² | % of catchment area |
| Foredyke Stream Upper | 0.30 | 1.5 |
| Foredyke Stream Lower to Holderness Dr | 0.25 | 1.1 |
| Old Howe/ Frodingham Beck to R Hull | 0.33 | 1.3 |
| Beverley and Barmston Drain | 1.21 | 1.1 |
| Hull from Arram Beck to Humber | 0.01 | 0.03 |
| Barmston Sea Drain / Skipsea Drain to Conf | 0.54 | 1.9 |
| Barmston Sea Drain from Skipsea Drain to N Sea | 0.0004 | 0.006 |
| High Hunsley to Woodmansey Area | 0.42 | 2.8 |
| High Hunsley to Arram Area | 0.32 | 0.8 |
| Holderness Drain Source to Foredyke Stream | 0.47 | 1.1 |
| Catchwater Drain | 0.49 | 2.2 |
| Mickley Dike Catchment | 0.04 | 0.2 |
| Coastal catchment | 0.04 | 3.1 |

*Table 20-3-12 Watercourse Crossings in River Water Body Catchments*

| Catchment | Trenchless crossings | | Trenched crossings |
|---|---|---|---|
| | Main River | Ordinary Watercourse | Ordinary Watercourse |
| Barmston Sea Drain/Skipsea Drain to Confluence | 0 | 2 | 4 |
| Barmston Sea Drain from Skipsea Drain to North Sea | 0 | 0 | 0 |
| Onshore coastal catchment | 0 | 0 | 0 |
| Mickley Dike catchment | 0 | 0 | 1 |
| Old Howe/Frodingham Beck to River Hull | 0 | 0 | 3 |
| Catchwater Drain | 0 | 4 | 7 |
| Foredyke Stream Upper | 1 | 0 | 3 |
| Foredyke Stream Lower to Holderness Drain | 2 | 0 | 1 |
| Holderness Drain Source to Foredyke Stream | 1 | 2 | 5 |
| Beverley and Barmston Drain | 1 | 3 | 19 |
| Hull from Arram Beck to Humber | 1 | 0 | 0 |

| Catchment | Trenchless crossings | | Trenched crossings |
|---|---|---|---|
| | Main River | Ordinary Watercourse | Ordinary Watercourse |
| High Hunsley to Arram Area | 1 | 0 | 1 |
| High Hunsley to Woodmansey Area | 0 | 0 | 2 |

#### 20.3.3.3.1.1.2 Control Measures

70. Given the construction works would be confined to a small area of each water body, impacts on the hydrological regime and morphological conditions of water bodies is expected to be localised and temporary in nature. To mitigate for any localised impacts, the following construction control measures would be implemented and secured within the **OCoCP (Volume 8, application ref: 8.9):**

- Sediment supply:
  - Guidance documents:
    - Construction activities would adhere to industry good practice measures as detailed in the Environment Agency's Pollution Prevention Guidance (PPG) notes (PPG1, PPG5, PPG8 and PPG21). Although the PPG notes are no longer statutory guidance in England, they have been updated as Guidance for Pollution Prevention (GPP notes) for use in Scotland and Northern Ireland (NetRegs, 2022) and remain a good source of best practice; and
    - Construction Industry Research and Information Association (CIRIA) best practice (Control of water pollution from construction sites: Guidance for consultants and contractors (C532) (2001)) would also be adhered to.
  - The following Measures are included in the Outline Pollution Prevention Plan, Appendix X of the **OCoCP (Volume 8, application ref: 8.9)**:
    - Minimising the amount of time stripped ground and soil stockpiles are exposed. Topsoil would be stripped from the entire width of the onshore cable corridor for the length of

the work front, then stored and capped to minimise erosion from wind and rain;

- Only removing vegetation from the area that needs to be exposed in the near future;
- Seeding or covering stockpiles;
- Using geotextile silt fencing at the toe of the slope, to reduce the movement of silt – this should be installed before soil stripping has begun and vehicles start tracking over the site;
- On-site retention of sediment to be maximised by routing all drainage through the site drainage system;
- Include measures to intercept sediment runoff at source in the drainage system using suitable filters to remove sediment from water discharged to the surface drainage network;
- Plant and wheel washing is carried out in a designated area of hard standing at least 10m from any watercourse or surface water drain;
- Traffic movements would be restricted to minimise surface disturbance;
- Collect run-off in lagoons and allow suspended solids to settle before disposal;
- Divert clean water away from the area of construction work in order to minimise the volume of contaminated water;
- In locations where large areas of exposed ground lie adjacent to watercourses, buffer strips of vegetation would be retained where possible to prevent runoff;
- Limiting the extent of open excavations along the onshore cable corridor to short sections at any one time (work fronts). Topsoil would be stripped from the entire width of the onshore cable corridor for the length of the work front, then stored and capped to minimise erosion from wind and rain;
- Temporary works areas (e.g., construction compounds and trenchless crossing areas) associated with the Onshore Development Area may comprise hardstanding of permeable material, such as gravel aggregate or alternatively matting/timber or similar, underlain by geotextile or another suitable material to a minimum of 50%

of the exposed area. This would minimise the area of open ground;

- Topsoil and sub-soil removed as part of site preparation would be stored separately within the working width and away from the open-cut trench. Both would be managed to minimise soil erosion;
- As described in the **Outline Drainage strategy (Volume 8, application ref: 8.12)**, a construction drainage system would be implemented at the Onshore Converter Stations at the beginning of the construction phase. This would cover the drainage requirements for both the temporary and permanent working areas and ensure any land drainage has suitable pollution prevention measures implemented, including filter trenches and fuel interceptors. On-site retention of sediment to be maximised by routing all drainage through the site drainage system.;
- The strategy for controlling surface water runoff is detailed in the **Outline Drainage Strategy (Volume 8, application ref: 8.12)**. The report gives details of the outline drainage strategy for the Onshore Converter Station(s) and the pre and post construction land drainage, located within the Onshore Development Area. This strategy will form the basis of the detailed drainage scheme would be submitted to the Lead Local Flood Authority (LLFA) at East Riding of Yorkshire Council for approval prior to the commencement of construction of the Projects, in consultation with the Environment Agency, Internal Drainage Boards and the relevant sewerage and drainage authorities; and
- In addition to the pre and post construction land drainage scheme, described above a Surface Water Management Plan, setting out the requirements for temporary surface water drainage during construction would also be prepared by the contractor, should any temporary dewatering be required.

- The **OCoCP (Volume 8, application ref: 8.9)** includes the following measures in 'Watercourse Crossings':
- Trenched crossings

  - The amount of time that temporary dams are in place would be kept to a minimum;
  - Prior to dewatering the area between the temporary dams, a fish rescue would be undertaken;
  - Flumes or pumps would be adequately sized to ensure that flows downstream are maintained whilst minimising upstream impoundment;
  - Scour protection would also be used to protect the river bed downstream of the dam from high energy flow at the outlets of flumes and pumps; and
  - Sympathetic reinstatement of channel and banks.
- Temporary crossings:
  - Temporary culverts would be adequately sized to avoid impounding flows (including allowing for increased winter flows as a result of climate change); inverts of culverts would be set slightly below the existing bed level to allow for the continuity of bedload transport; and
  - Sympathetic reinstatement of channel and banks (if necessary).

71. As assessed in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)** the magnitude of impact from trenched crossings is either negligible or low for all catchments except Beverley and Barmston Drain (medium). Significance of effect is negligible or minor adverse depending on receptor sensitivity. While residual adverse effects are identified, once the control measures have been applied, the activity would not result in deterioration in water body status or prevent status objectives being achieved in the future.

###### *20.3.3.3.1.2 Physico-chemistry (General, Priority substances)*

###### 20.3.3.3.1.2.1 Construction Activities

72. Construction activities could result in accidental release of lubricants, oils and runoff into nearby water bodies, impacting upon surface water quality. This could occur accidentally from construction machinery (e.g. fuels and lubricants) and construction materials (e.g. concrete) located near water bodies. Vehicle and construction material storage areas could be an additional source of leaks and spills.

73. An increase in sediment supply from any disturbed soils along the Onshore Export Cable Corridor and at the converter stations during construction, could increase surface runoff into the river water bodies. Greater fine sediment in the water body could reduce light penetration and affect local oxygenation and temperature conditions.

74. Construction activities which disturb the ground, including excavations for cable trenching, could result in the remobilisation of contaminants that are already present in the soil. This could include in situ contaminated land and nutrients such as nitrogen and phosphorus from nutrient-rich arable soils. The supply of nutrients to surface waters could result in adverse effects on water quality (including, in extreme cases, eutrophication) and aquatic plant, invertebrate and fish communities supported by surface waters.

75. During construction the presence of temporary culverts and use of open cut trenching methods across Ordinary Watercourses could increase conveyance of pollutants and fine sediment to the downstream water body, impacting on overall dissolved oxygen, pH and temperature.

###### 20.3.3.3.1.2.2 Control Measures

76. The following Measures are included in the **Outline Pollution Prevention Plan, Appendix D** of the **OCoCP (Volume 8, application ref: 8.9)**:

- To prevent construction activities from impacting upon both 'General' and 'Priority' substances parameters, the Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors CIRIA (C650); and CIRIA - SuDS Manual (CIRIA, 2015) would be applied. In addition to the control measures already outlined for increased sediment supply and trenched crossings, this would include the following measures:
  - No discharge to surface watercourses would occur without permission from the Environment Agency;
  - Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants;
  - Regular cleaning of roads of any construction waste and dirt to be carried out;
  - Measures would be employed to intercept and treat run-off from the working corridor, for example by using sandbags, settlement tanks and lagoons. After treatment, discharge of any waters would be carried out so as to minimise physical impacts on channel morphology;
  - An **Outline Soil Management Plan (SMP)**, which will form **Appendix A** of the **OCoCP (Volume 8, application ref: 8.9)**, outlining the

mitigation measures and best practice techniques, which contractors would be obliged to comply with would also be produced;

- A Pollution Prevention Plan (PPP) would be developed and would include details of an emergency spill procedures;
- Oil, chemicals and other potentially harmful liquids would be handled in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001, refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition; and any tanks and associated pipe work containing oils and fuels would be double skinned and be provided with intermediate leak detection equipment;
- Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) would be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses.
- All plant machinery and vehicles would be maintained in a good condition to reduce the risk of fuel leaks;
- Post-construction, the working area would be reinstated to pre-existing condition as far as reasonably practical in line with Defra 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites PB13298;
- Foul drainage would be collected through a mains connection to existing local authority sewer system if available or septic tank located within the project boundary. The specific approach would be determined during detailed design with consideration for the availability of mains connection and the number of visiting hours for site attendees; and
- Previously described measures to control soil disturbance would limit the potential for remobilisation of nutrients from agricultural land.

77. As shown in **Table 20-3-12**, there are generally a low number of trenched crossings required within each water body catchment. The maximum areas of disturbed ground in each catchment, which could lead to soil erosion and potential for accidental spills and leaks, are also low (**Table 20-3-11**). Impacts and residual effects from increased sediment supply, trenched crossings and changes to surface and groundwater flows from construction of the Projects Sequentially have been assessed as negligible or minor adverse.

78. While residual adverse effects are identified, once the control measures have been applied, the activity would not result in deterioration in water body status or prevent status objectives being achieved in the future.

##### *20.3.3.3.1.3 Biology (Aquatic Flora, Benthic Invertebrates, Fish)*

###### 20.3.3.3.1.3.1 Construction Activities

79. Construction activities could impact on aquatic flora, benthic invertebrates and fish fauna based on potential impacts to the hydromorphology and physico-chemistry quality elements. Increased fine sediment in the water body could smother bed habitats, reducing light penetration and dissolved oxygen. Additionally, changes to physico-chemistry could lead to loss or modification of in-channel and riparian habitats. This disturbance would limit the communities of all three biological parameters.

80. During construction the presence of temporary culverts and use of open cut trenching methods across Ordinary Watercourses could increase conveyance of pollutants and fine sediment to the downstream water body, impacting on species and habitat populations.

81. However, as described in section 20.3.3.3.1.1, effects associated with the direct disturbance of surface water bodies (i.e. trenched crossings) has been assessed as either negligible or minor adverse across the Onshore Development Area. It is therefore likely that impacts at Ordinary Watercourses would not have a significant or permanent cumulative biological impact on any water body.

###### 20.3.3.3.1.3.2 Control Measures

82. As described in section 20.2.3.3.1.1, effects associated with the direct disturbance of surface water bodies (i.e. trenched crossings) has been assessed as either negligible or minor adverse across the Onshore Development Area. It is therefore likely that impacts at Ordinary Watercourses would not have a significant or permanent cumulative biological impact on any water body.

83. Given the proposed control measures that would be implemented to prevent construction impacts to hydromorphology and physico-chemistry (section 20.3.3.3.1.1.2; section 20.3.3.3.1.2.2) these measures would indirectly reduce impacts to biological quality elements, preventing contaminants and fine sediment production from reaching the water bodies and causing risk of deterioration. While residual adverse effects are identified, once the control measures have been applied, the activity would not result in deterioration in water body status or prevent status objectives being achieved in the future.

#### 20.3.3.3.2 Groundwater Bodies (Water Quality)

##### *20.3.3.3.2.1 Construction Activities*

84. The use of trenchless crossing techniques would help to avoid any direct impact on river water bodies. However, there is a risk that excavations to facilitate trenchless crossings could potentially introduce contaminants to the Hull and East Riding Chalk groundwater body and associated bedrock aquifer, superficial aquifers and SPZs. Trenchless crossings, including those required at the landfall, have the potential to create preferential pathways and for drilling mud and other contaminants to leak along the drill path, which could cause contamination of groundwater. The volume of drilling fluid that could be released during HDD works is dependent on a number of factors, including the size of the fracture, the permeability of the geological material, the viscosity of the drilling fluid and the pressure of the hydraulic drilling system.

85. Accidental release of lubricants, fuels and oils from construction or operational maintenance machinery could occur as a result of spillages, leakage from vehicle storage areas and direct release from machinery working directly in or adjacent to water bodies. If not prevented, these contaminants could enter connected groundwaters through run-off. An increase in groundwater contaminant concentrations could subsequently lead to an overall deterioration in groundwater quality. These contaminants could then be transferred to GWDTEs via subsurface flow routes.

##### *20.3.3.3.2.2 Control Measures*

86. To mitigate against these potential impacts on groundwater resources and to prevent deterioration in water body status, the following groundwater control measures would be implemented during construction phase:

- Use of best practice techniques and due diligence regarding the potential for pollution throughout all construction activities. An Outline Pollution Prevention Management Plan (OPPP) which forms **Appendix D** of the **OCoCP (Volume 8, application ref: 8.9)** would be refined as part of the detailed CoCP(s) approved under DCO Requirement 19, upon appointment of a Principal Contractor(s).
- An Emergency Response, Evacuation and Pollution Control Plan will be developed post-consent as part of the detailed CoCP(s) approved under DCO Requirement 19, upon appointment of a Principal Contractor(s).
- This would include specific measures relevant to the storage of fuels, oils, lubricants, waste water and other chemicals during the works. This provides a robust approach to managing pollution incidents on site to reduce the probability and impact of leaks and spills.

- The **OCoCP (Volume 8, application ref: 8.9)** also includes the following measures in 'Watercourse Crossings':
  - In addition, mitigation measures relating specifically to impacts to groundwater may include the development of a hydrogeological risk assessment where earthworks / excavations are within 50m (or 250m dependent upon volume abstracted) of private potable groundwater abstractions if they are unavoidable through micro-siting. The risk assessment would be desk-based and follow a tiered approach with more detailed assessments carried out in areas considered to be a potentially greater risk to groundwater. Hydrogeological risk assessments would also be developed in areas where trenchless crossing techniques are utilised to assess the potential impacts to groundwater from bentonite breakout during drilling. The risk assessment would meet the requirements of Environment Agency's Approach to Groundwater Protection 2018 Framework (Environment Agency, 2018).
  - A piling risk assessment would be undertaken if piles are to be used (e.g. at the onshore converter stations (located in SPZ 2) and installation of an anchor for the HDD rigs) in areas of potential contamination, in line with the Environment Agency's Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention (Environment Agency, 2001). The mitigation measures and monitoring requirements recommended by these assessments, would be implemented during construction works; and
  - A written scheme dealing with contamination of any land and groundwater would be submitted and approved by the Local Planning Authority before construction activities commence.

87. As assessed in **Volume 7, Chapter 19 Geology and Land Quality (application ref: 7.19)**, the potential impacts to the Secondary Aquifers, Principal Aquifers and SPZs are predicted to be of local spatial extent within each aquifer unit. Impacts are predicted to be of short-term duration (related to the working areas only) of intermittent occurrence and high reversibility. For all scenarios, aquifer units and SPZs, control measures will reduce the magnitude of impact from low to negligible therefore the residual effect is **minor** adverse, which is deemed to be not significant (**Volume 7, Chapter 19 Geology and Land Quality (application ref: 7.19)**).

88. Given the small scale of construction work in the groundwater body catchment (0.23%) (magnitude of impact is negligible and significance of effect is minor adverse), and with control measures in place, the activity would not result in deterioration in water body status or prevent status objectives being achieved in the future.

#### 20.3.3.4 Assessment Summary

89. Results of the WER compliance assessment process are summarised in **Table 20-3-13**.

*Table 20-3-13 WER Assessment Summary*

| Water body | Stage 2 | Stage 3 | Deterioration in Status | Prevent of Objectives being Achieved |
|---|---|---|---|---|
| Barmston Sea Drain/ Skipsea Drain to Conf | ✓ | ✓ | × | × |
| Mickley Dike catchment | ✓ | ✓ | × | × |
| Old Howe/ Frodingham Beck to R Hull | ✓ | ✓ | × | × |
| Catchwater Drain | ✓ | ✓ | × | × |
| Foredyke Stream Upper | ✓ | ✓ | × | × |
| Foredyke Stream Lower to Holderness Dr | ✓ | ✓ | × | × |
| Holderness Drain Source to Foredyke Stream | ✓ | ✓ | × | × |
| Beverley and Barmston Drain | ✓ | ✓ | × | × |
| Hull from Arram Beck to Humber | ✓ | ✓ | × | × |

| Water body | Stage 2 | Stage 3 | Deterioration in Status | Prevent of Objectives being Achieved |
|---|---|---|---|---|
| High Hunsley to Arram Area | ✓ | ✓ | × | × |
| High Hunsley to Woodmansey Area | ✓ | ✓ | × | × |
| Humber Middle | × | × | × | × |
| Yorkshire South | ✓ | × | × | × |
| Hull and East Riding Chalk | ✓ | ✓ | × | × |

90. The implementation of outlined control measures secured in the **OCoCP (Volume 8, application ref: 8.9)** during construction means there would be no activities that have the potential to cause non-temporary effects (i.e., effects that are not permanent, but could last for the duration or beyond the current River Basin Planning Cycle) to the status of any of the river and groundwater bodies assessed. Construction and operation of the Projects would not prevent water body status objectives being achieved in the future. Impacts on protected areas within 2km are not anticipated. The Projects are therefore considered to be compliant with WER requirements.

91. For decommissioning, it is anticipated that for the purposes of a worst case scenario, the impacts would be no greater than those identified for the construction phase. Detailed compliance assessment results (section 20.3.3.3) and overall conclusions would be the same for decommissioning as for construction and operation – the Projects would be compliant with WER requirements.

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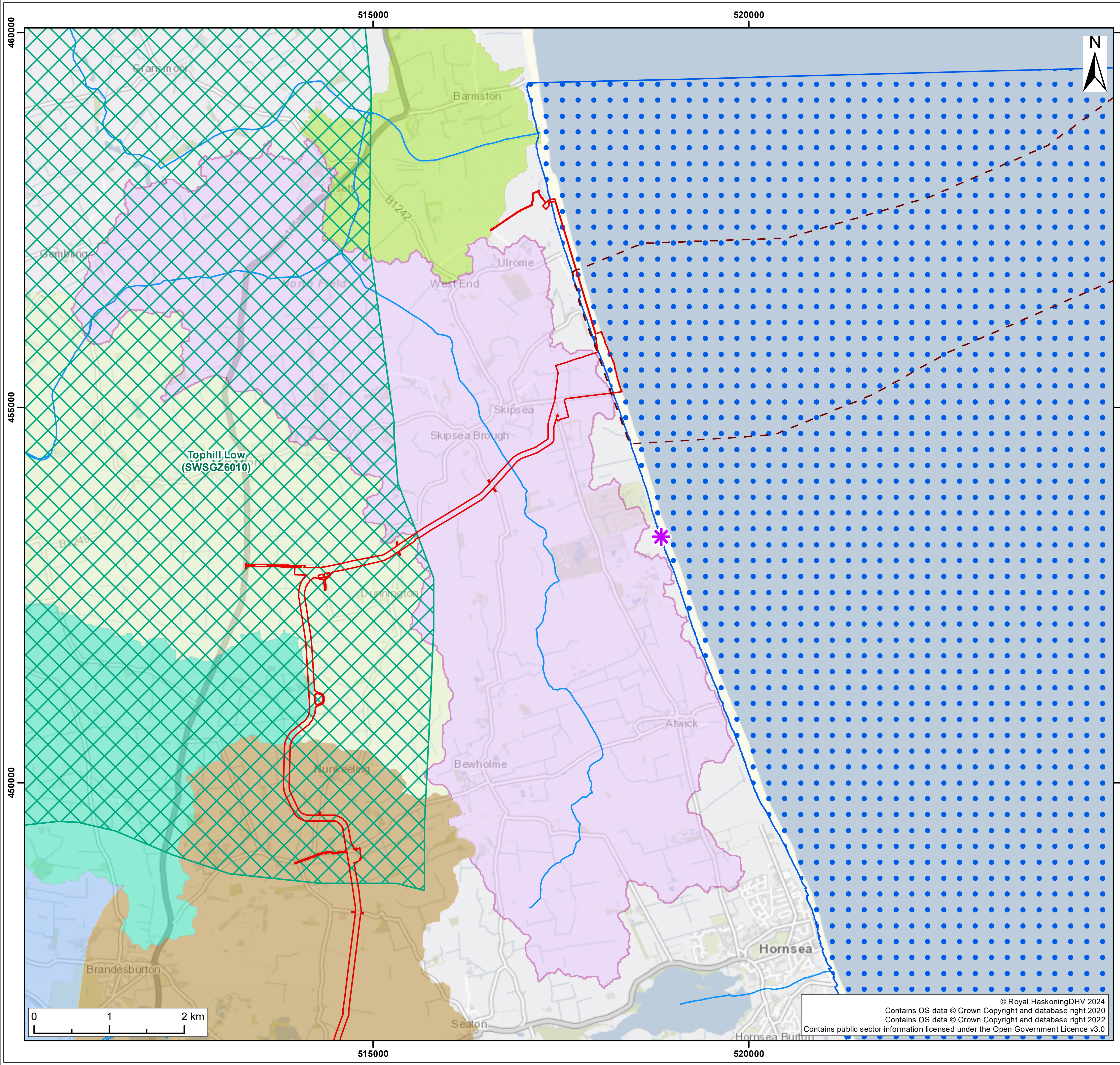
# Figure 20-3-1 to 20-3-3





Legend:

- Onshore Development Area
- Offshore Development Area
- Surface Water Safeguard Zone
- Greater Wash Special Protection Area (SPA)
- Skipsea Bathing Water Site
- River Water Bodies

**Water Body Catchments**

- Barmston Sea Drain / Skipsea Drain to Conf
- Barmston Sea Drain from Skipsea Drain to N Sea
- Catchwater Drain
- Foredyke Stream Lower to Holderness Dr
- Mickley Dike Catchment
- Old Howe/Frodingham Beck to R Hull

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S3 | P02 | 14/02/2024 | Suitable for Information | SB | SF | ND |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |

Title:

Surface water bodies

Figure: 20-3-1a Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0610

Co-ordinate system: British National Grid
Page Size: A3
Scale: 1:50,000

Project: Dogger Bank South Offshore Wind Farms

Report: Environmental Statement

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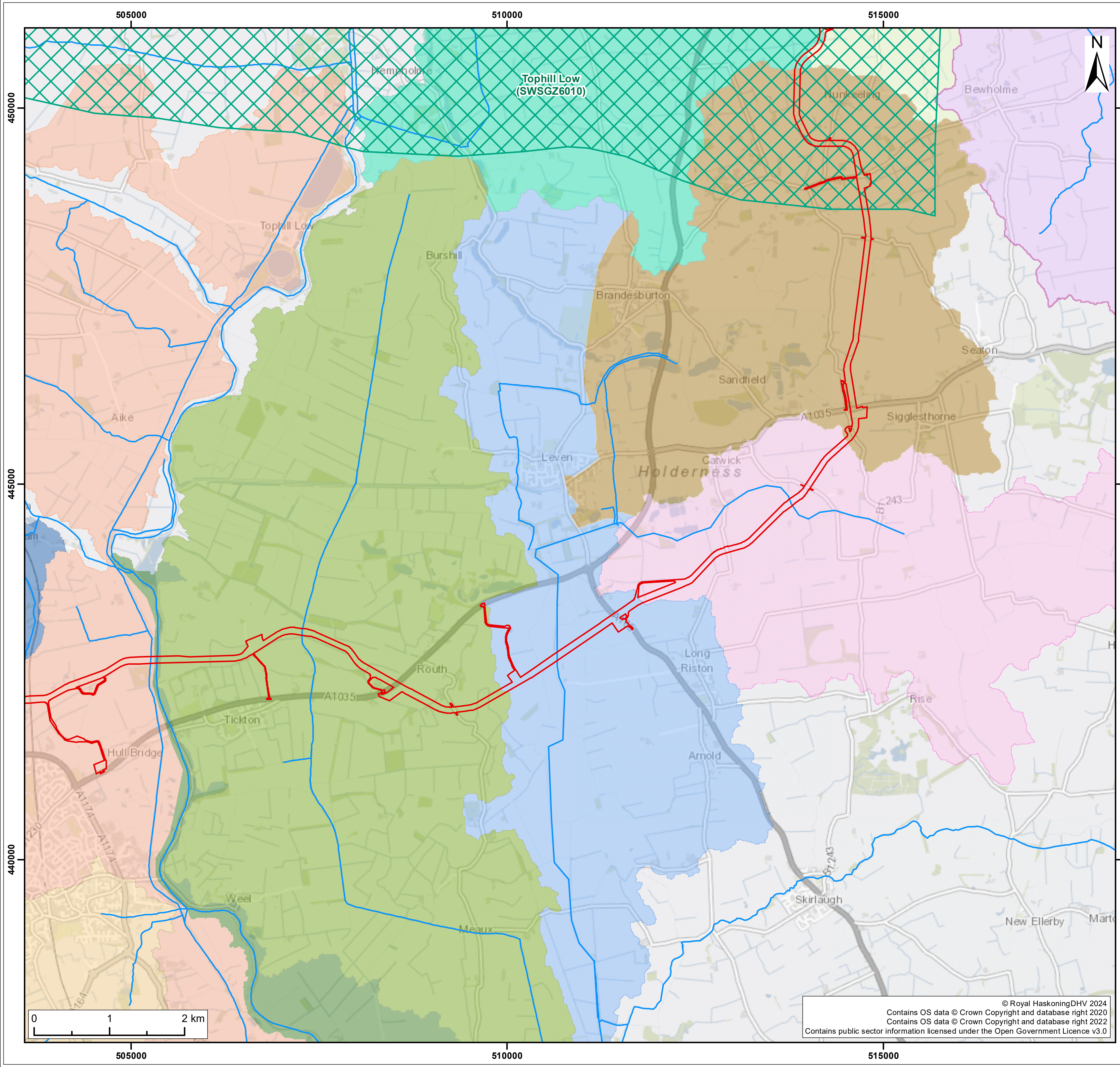


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Legend:

- Onshore Development Area
- Surface Water Safeguard Zone
- River Water Bodies

**Water Body Catchments**

- Barmston Sea Drain / Skipsea Drain to Conf
- Beverley and Barmston Drain
- Catchwater Drain
- Foredyke Stream Lower to Holderness Dr
- Foredyke Stream Upper
- High Hunsley to Arram Area
- High Hunsley to Woodmansey Area
- Holderness Drain Source to Foredyke Stream
- Hull from Arram Beck to Humber
- Mickley Dike Catchment
- Old Howe/Frodingham Beck to R Hull

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S3 | P02 | 14/02/2024 | Suitable for Information | SB | SF | ND |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |

Title:

Surface water bodies

Figure: 20-3-1b Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0610

Co-ordinate system: British National Grid | Page Size: A3 | Scale: 1:50,000

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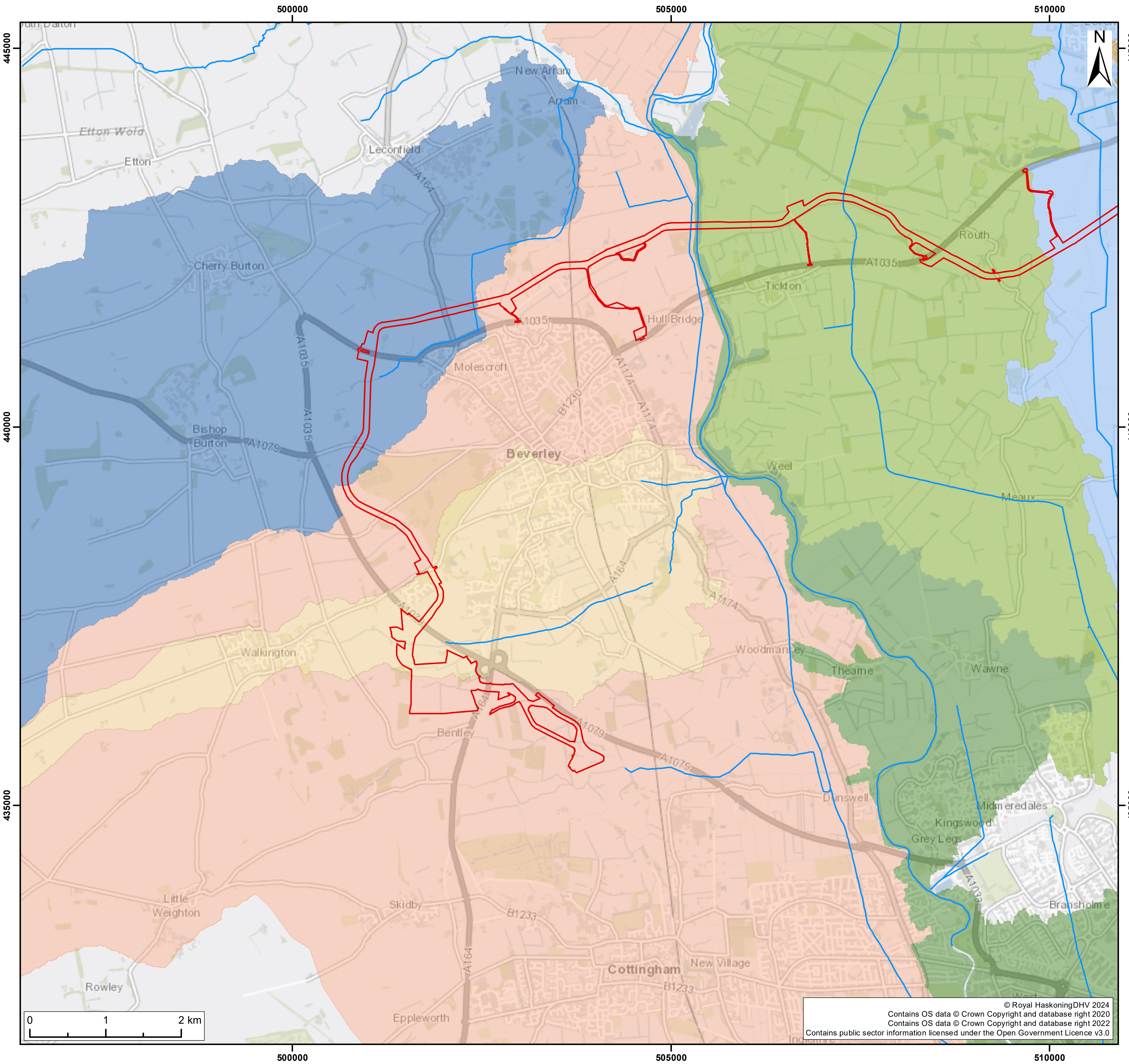



Legend:

- Onshore Development Area
- River Water Bodies

**Water Body Catchments**

- Beverley and Barmston Drain
- Catchwater Drain
- Foredyke Stream Lower to Holderness Dr
- High Hunsley to Arram Area
- High Hunsley to Woodmansey Area
- Holderness Drain Source to Foredyke Stream
- Hull from Arram Beck to Humber

| | | | | | | |
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| S3 | P02 | 14/02/2024 | Suitable for Information | SB | SF | ND |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |
| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |

Title:

Surface water bodies

Figure: 20-3-1c Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0610

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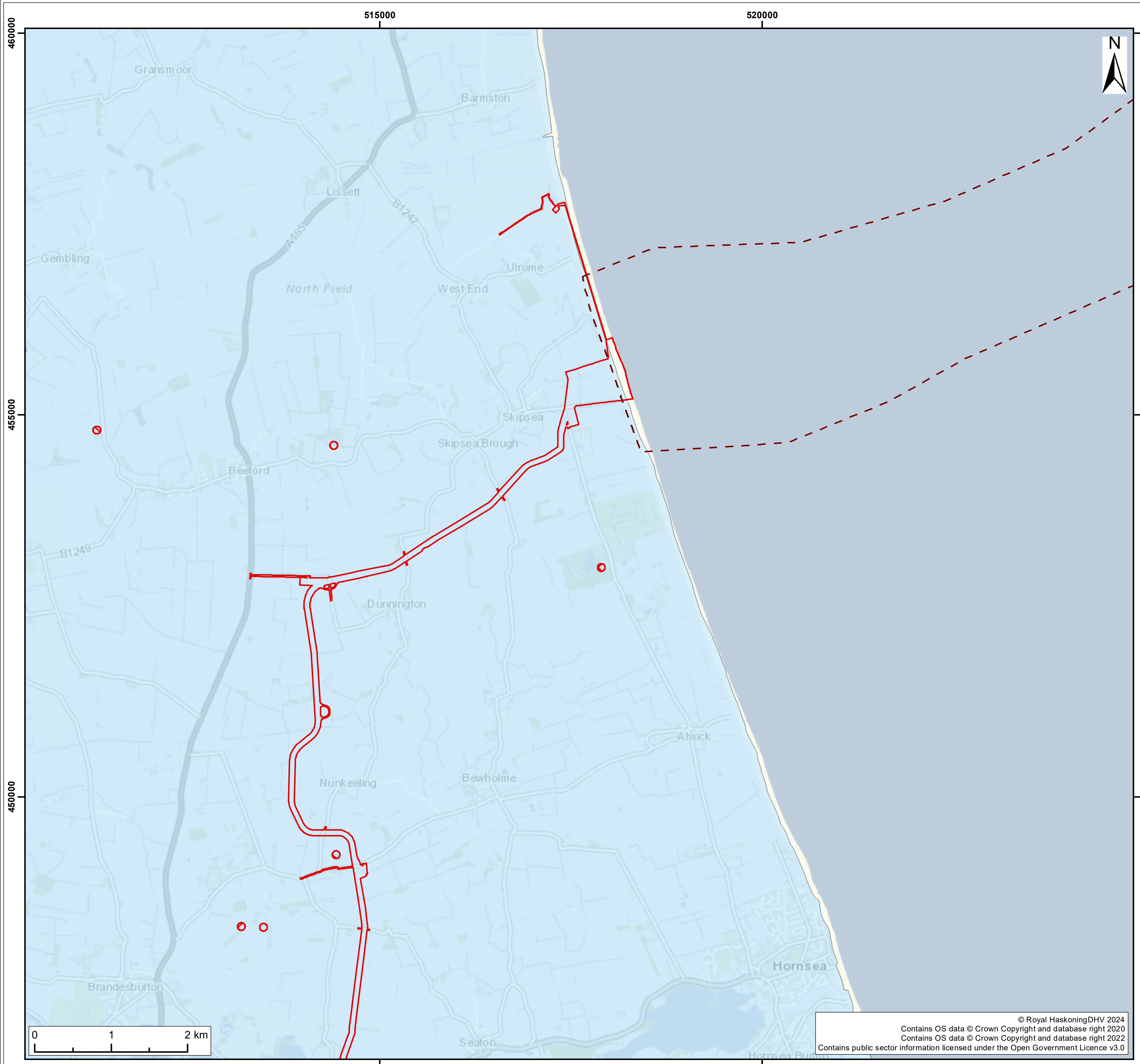



Legend:

- Onshore Development Area
- Offshore Development Area
- WFD Ground Water Body (Hull and East Riding Chalk)

**Source Protection Zone**

- SPZ1

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S3 | P02 | 14/02/2024 | Suitable for Information | JH | SB | SF |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |

Title:

Groundwater bodies

| | |
|---|---|
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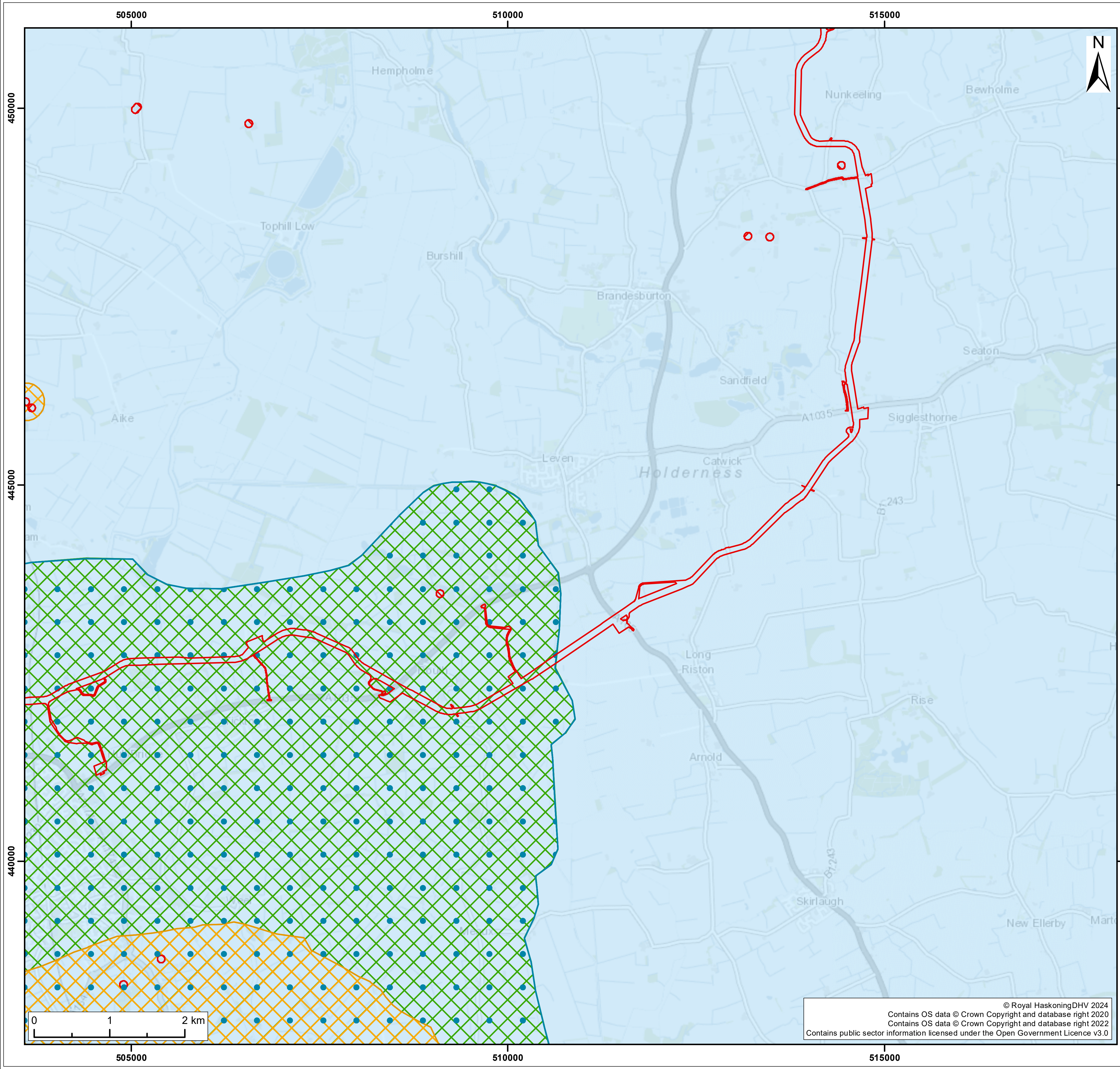





Legend:

- Onshore Development Area
- Groundwater Safeguard Zone
- WFD Ground Water Body (Hull and East Riding Chalk)

**Source Protection Zone**

- SPZ1
- SPZ2
- SPZ3

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S3 | P02 | 14/02/2024 | Suitable for Information | JH | SB | SF |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |

Title:

Groundwater bodies

Figure:20-3-2b Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0609

| Co-ordinate system: | Page Size: | Scale: |
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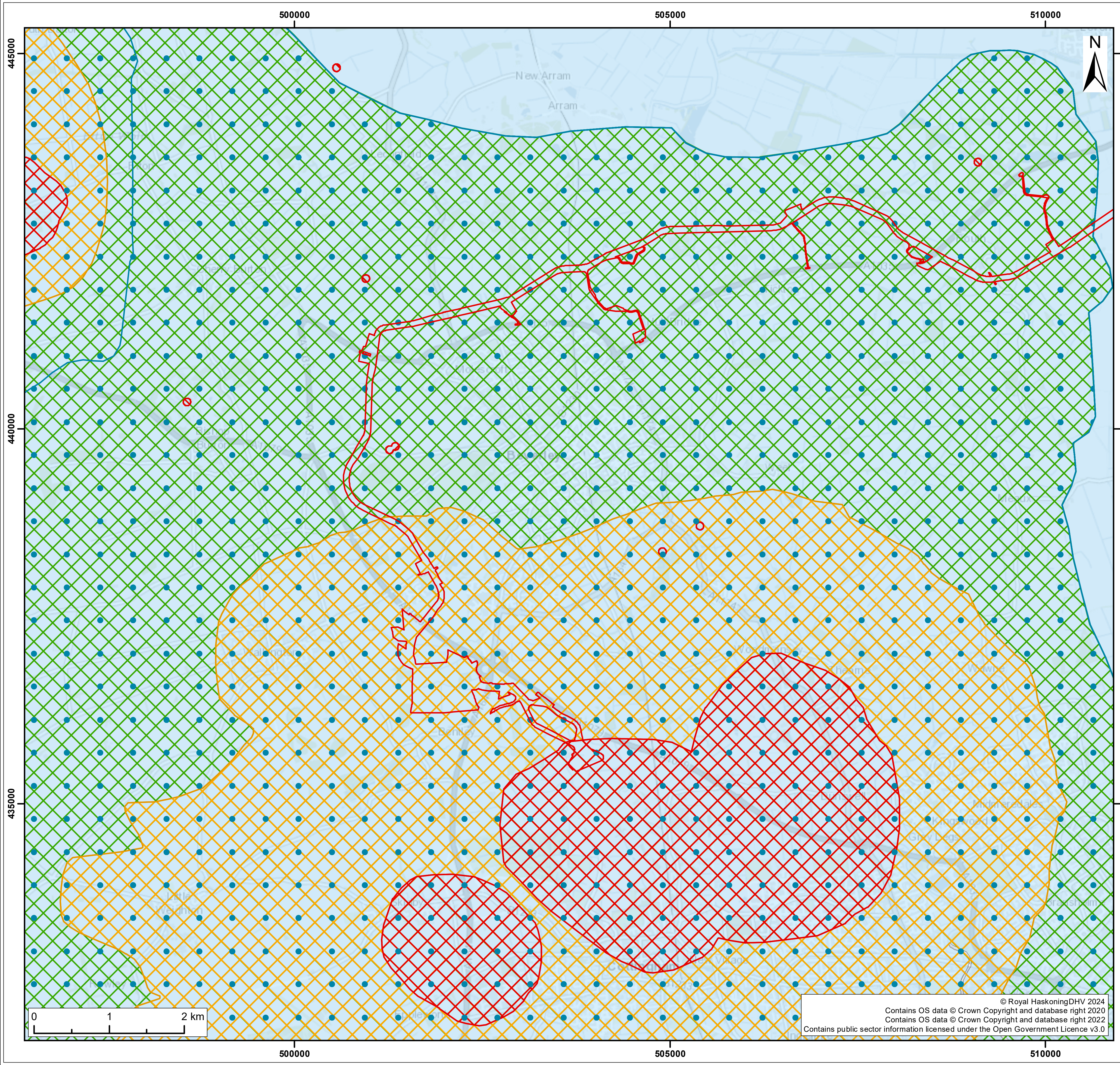



Legend:

- Onshore Development Area
- Groundwater Safeguard Zone
- WFD Ground Water Body (Hull and East Riding Chalk)

**Source Protection Zone**

- SPZ1
- SPZ2
- SPZ3

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S3 | P02 | 14/02/2024 | Suitable for Information | JH | SB | SF |
| S2 | P01 | 13/11/2023 | Suitable for Information | SB | SF | ND |

Title:

Groundwater bodies

Figure: 20-3-2c | Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0609

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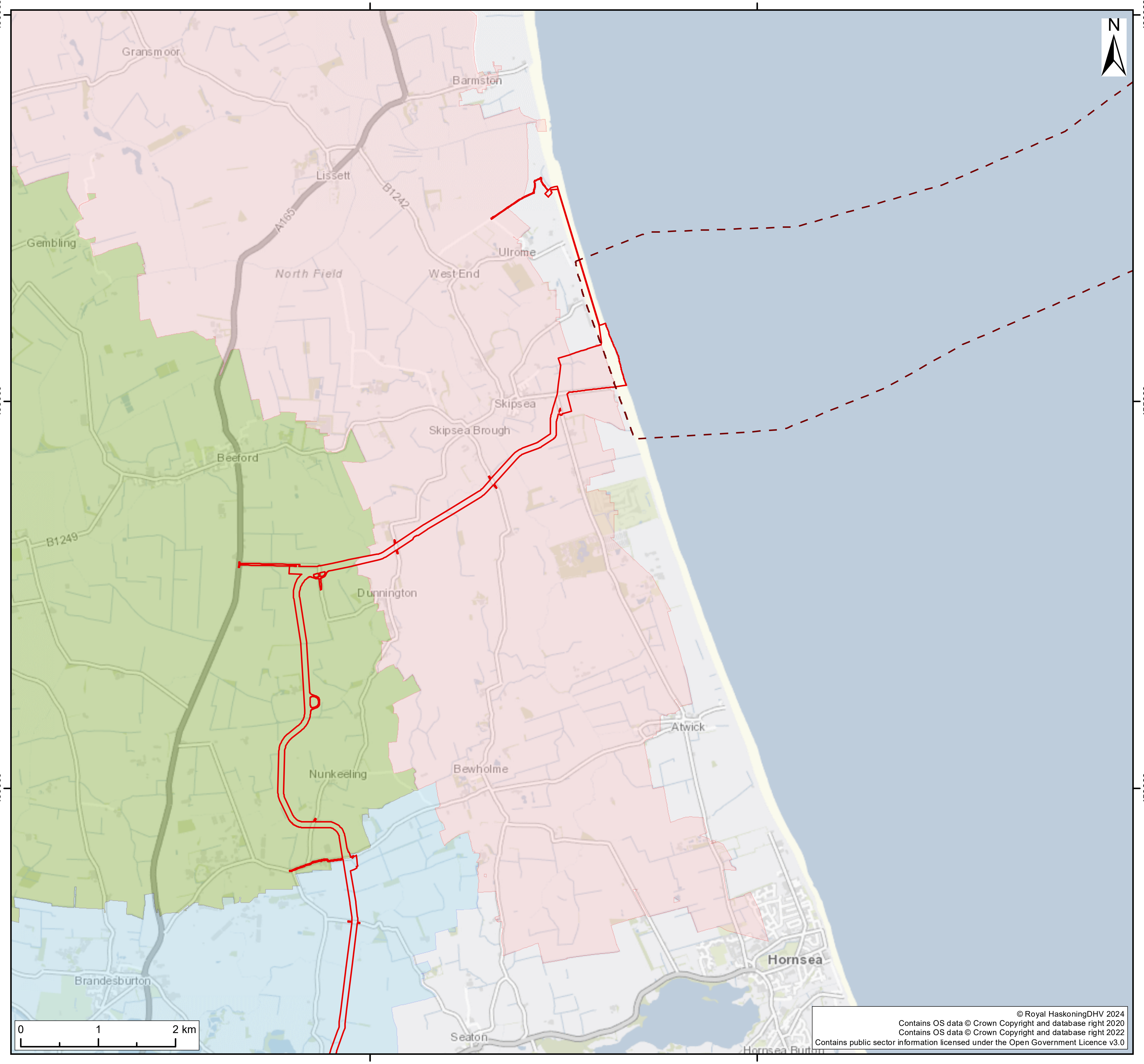



Legend:

| | |
|---|---|
| Onshore Development Area | |
| Offshore Development Area | |
| Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259) | |
| Holderness Drain from Foredyke Stream to Humber NVZ (S251) | |
| River Hull from Arram Beck to Humber NVZ (S254) | |
| Yorkshire Chalk (G106) | |

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S2 | P01 | 13/02/2024 | Suitable for Information | JH | SB | SF |

Title:

Nitrate Vulnerability Zones

Figure: 20-3-3a | Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0678

Co-ordinate system: British National Grid | Page Size: A3 | Scale: 1:50,000

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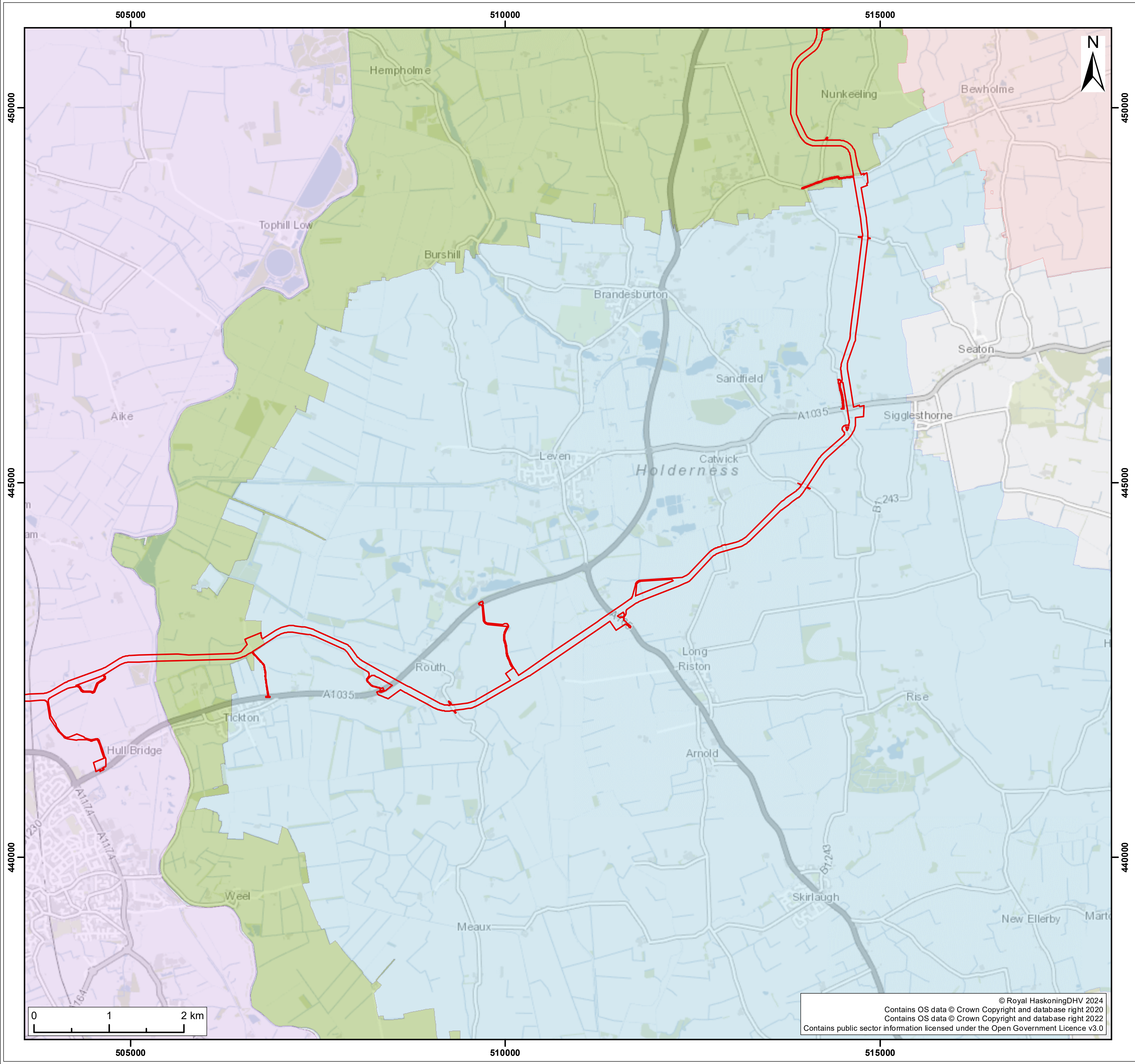



Legend:

- Onshore Development Area
- Offshore Development Area
- Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)
- Holderness Drain from Foredyke Stream to Humber NVZ (S251)
- River Hull from Arram Beck to Humber NVZ (S254)
- Yorkshire Chalk (G106)

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S2 | P01 | 13/02/2024 | Suitable for Information | JH | SB | SF |

Title:

Nitrate Vulnerability Zones

Figure: 20-3-3b Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0678

Co-ordinate system: British National Grid | Page Size: A3 | Scale: 1:50,000

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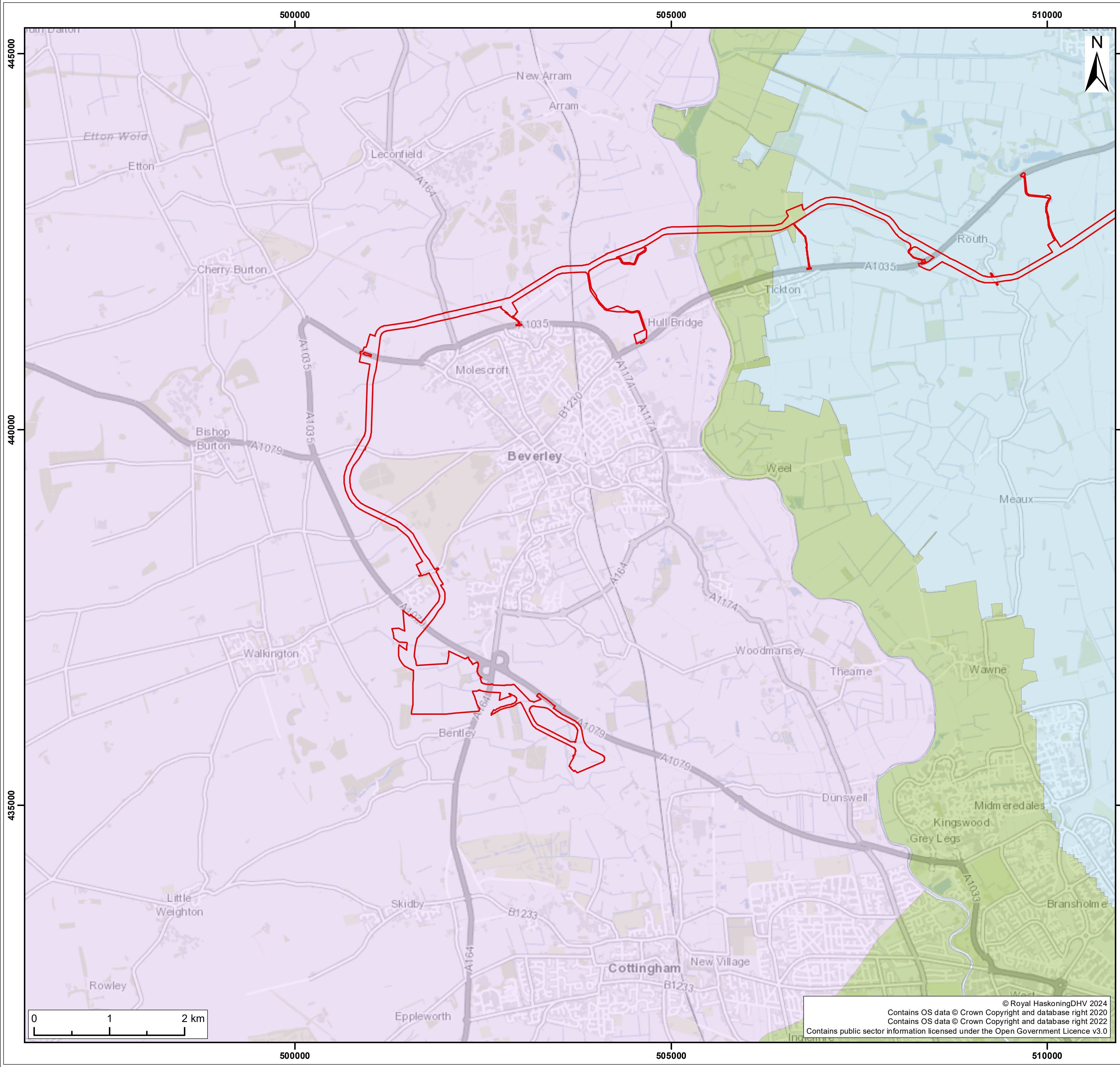





Legend:

- Onshore Development Area
- Offshore Development Area
- Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)
- Holderness Drain from Foredyke Stream to Humber NVZ (S251)
- River Hull from Arram Beck to Humber NVZ (S254)
- Yorkshire Chalk (G106)

| SUI | REV | DATE | DESCRIPTION | DRW | CHK | APR |
|---|---|---|---|---|---|---|
| S2 | P01 | 13/02/2024 | Suitable for Information | JH | SB | SF |

Title:

Nitrate Vulnerability Zones

Figure: 20-3-3c Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0678

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