Preliminary Environmental Information Report Volume 2

Appendix 12.3 Hydrogeological Impact Assessment

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Contents

1 Introduction

1.1 Project overview

1.1.1 LionLink is a proposed electricity interconnector between Great Britain and the Netherlands that will supply up to 2.0 gigawatts (GW) of electricity and will connect to Dutch offshore wind via an offshore converter platform in Dutch waters (hereafter 'the Project').

1.1.2 The Proposed Scheme (defined as the part of the Project within Great Britain) would involve the construction of a proposed Converter Station and the installation of offshore and onshore proposed Underground High Voltage Direct Current (HVDC) Cables to the onshore proposed Converter Station and proposed Underground High Voltage Alternating Current (HVAC) Cables between the proposed Converter Station and Kiln Lane Substation.

1.2 Purpose of this report

1.2.1 This report presents a Hydrogeological Impact Assessment (HIA) of the proposed construction and operation of the Proposed Onshore Scheme.

1.2.2 This assessment of hydrogeological impacts, based on desk study information and site-specific data, aims to:

a. Identify groundwater or groundwater dependent receptors (including surface water interactions) within the study area for the Proposed Onshore Scheme.
b. Assess qualitatively whether identified receptors are susceptible to changes in groundwater conditions and, where required, quantitatively assesses the potential impacts from the Proposed Onshore Scheme.

1.2.3 The findings of this HIA have been used to inform the preliminary assessment of likely significant effects with respect to Hydrology, Hydrogeology and Drainage, which are detailed in the Preliminary Environmental Information Report (PEIR) within **Chapter 12 Hydrology, Hydrogeology and Drainage**, along with necessary mitigation measures.

1.2.4 The HIA considers the Full Build out of Kiln Lane Substation Scenario on a worst-case basis (see **Chapter 5 EIA Approach and Methodology** of the PEIR for the assessment scenarios). At this stage of the Proposed Scheme, the assessment assumes that trenching or ground disturbance may occur anywhere within the Draft Order Limits presented in **Figure 2.2 Proposed Onshore Scheme** of the PEIR.

1.2.5 Both options (Northern Route Option and Southern Route Option) with regards to the proposed Underground High Voltage Alternating Current (HVAC) Cable Corridor as described in **Chapter 5 EIA Approach and Methodology** have been assessed. For the HVAC Cable Southern Route Option, the HVAC Cable Route

LionLink Infrastructure and ducting for Sea Link Scenario has been assessed as the worst case.

1.2.6 Both options with regards to the proposed Underground High Voltage Direct Current (HVDC) Cable Corridor as described in Chapter 5 EIA Approach and Methodology have been assessed.

1.3 Description of the Proposed Onshore Scheme of relevance to the Hydrogeological Impact Assessment

1.3.1 The Project connects the British and Dutch National Electricity Transmission Systems (NETS), and Dutch offshore wind generation. This HIA focuses on the onshore elements of the Proposed Scheme located in England within the administrative boundary of Suffolk County Council and East Suffolk Council Local Planning Authority areas (the 'Proposed Onshore Scheme').

1.3.2 The Draft Order Limits for the Proposed Onshore Scheme are shown in within the PEIR at **Figure 2.2 Proposed Onshore Scheme**.

1.3.3 A breakdown of the Draft Order Limits in Sections is shown at **Figure 2.1 Zoning Plan** of the PEIR, which should be viewed alongside this HIA to orient the reader.

1.3.4 The Proposed Onshore Scheme comprises the following components, which are discussed in further detail in **Chapter 2 Description of the Proposed Scheme**:

a. Kiln Lane Substation;
b. Proposed Underground HVAC Cables;
c. Proposed Converter Station;
d. Proposed Underground HVDC Cables; and
e. Proposed Landfall.

1.3.5 The key parameters of the Proposed Onshore Scheme that inform the HIA are summarised below.

Kiln Lane Substation (Full Build Out)

1.3.6 It is assumed (as per Sea Link (Ref 1)) that construction could include a piled foundation solution that extends into the underlying Crag Formation bedrock.

1.3.7 Construction works at Kiln Lane Substation will include:

a. Cut and fill operations at the north-east and west of the site to level the ground;
b. New cable trenches and ducts to facilitate construction of Kiln Lane Substation;
c. Shallow excavations for drainage. Passive drainage will be installed along permanent access roads, discharging to an attenuation pond at the downstream end of the drainage system. SUDs will be used in all scenarios and will not increase downstream flooding risk;
d. A number of impermeable structures and surfaces; and

e. Deeper below ground works (i.e. foundation excavations or piling) Foundations, slab extensions and piling for Gas Insulated Switchgear (GIS) Hall and bays may be required.

1.3.8 No details of the depths of below ground works have been confirmed at this stage in the design of the Proposed Onshore Scheme; however, this detail will be presented as part of the subsequent ES.

Proposed Underground HVAC and HDVC Cables

1.3.9 The key parameters in relation to the proposed Underground Cable Corridor are outlined in **Table 1.1.**

Table 1.1: Proposed Underground HVAC and HDVC Cable Corridor construction depths

Proposed Underground Cable Corridor construction	
Trench width/depth	2.45m wide, 1.5m deep
Minimum depth of cover to top of cable*	Roads and Footpaths – 750mm Agricultural land – 900mm Substation Boundaries – 600mm Watercourses – 2000mm Railways – 5000mm

* Depth in agricultural land, roads and footpaths are shown as minimum here but assumed to be at 1200mm to keep depth profile the same across entire proposed Underground Cable Corridor.

1.3.1 It is assumed that the launch and reception pits for the trenchless methods crossings will be no greater in depth than the 1200mm general depth to cover summarised above.

Proposed Converter Station

1.3.2 The proposed Converter Station includes a permanent access track which comprises a 24.0m clear span crossing of the River Fromus.

1.3.3 For the main buildings, no depths of foundations have been confirmed at this stage of the design of the Proposed Onshore Scheme. It is assumed (as per Sea Link (Ref 1)) that piled foundations may extend down into the Crag Formation bedrock.

1.3.4 Construction works at the proposed Converter Station will include:

a. new cable trenches and ducts;
b. shallow excavations for drainage;
c. a number of impermeable structures and surfaces; and
d. deeper below ground works (i.e. foundation excavations or piling).

Proposed Landfall

1.3.5 Proposed Offshore HVDC Cable will come into the proposed Landfall Site from offshore trenchless methods which will extend up to 30m below ground level.

2 Approach to assessment

2.1 Introduction

2.1.1 The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 2) requires infrastructure projects to undertake an assessment of their impacts on water quality, resources and physical characteristics.

2.1.2 There is no specific guidance in relation to assessing the impact of water infrastructure on the hydrogeological regime, therefore the HIA of the Proposed Onshore Scheme is carried out in accordance with Appendix A of the Design Manual for Roads and Bridges (DMRB) LA 113 and the Environment Agency technical guidance on 'Hydrogeological impact assessment for dewatering abstraction' (Ref 4), together with regards to relevant legislation and policy in **Chapter 12 Hydrology, Hydrogeology and Drainage**.

2.1.3 The methodology for determining whether the impacts will result in likely significant effects is outlined and reported in **Chapter 12 Hydrology, Hydrogeology and Drainage**. Consultation and engagement with stakeholders to date is also reported in **Chapter 12 Hydrology, Hydrogeology and Drainage**.

2.1.4 This section outlines the approach to the HIA, including the study area, scoped in impacts to be considered (both construction and operation), HIA methodology, data utilised to inform the assessment and assumptions, gaps and limitations of the assessment.

2.2 Study area

2.2.1 The Draft Order Limits represent the extent of the area within which a project authorised by development consent may be carried out, including the required permanent and temporary land needed for construction, operation, maintenance and decommissioning activities. The Draft Order Limits for this PEIR have been drawn to provide sufficient flexibility to allow for further scheme design and development, based on the 'Rochdale Envelope' approach

2.2.2 For this assessment a 500m buffer has been used around the Draft Order Limits as the study area (see **Figure 12.2 Groundwater Features** of the PEIR). The study area is informed by the 'source-pathway-receptor' pollutant linkage principle and was selected based on professional judgement of the potential impacts and pathways related to the Proposed Onshore Scheme. The study area will be reviewed and, as appropriate, refined as the assessment progresses, taking into account any activities which have the potential to impact water resources at greater distance (such as dewatering and discharge activities). The study area will ensure that all receptors that are potentially in hydraulic continuity with the Proposed Onshore Scheme that could be reasonably impacted are included (such as downstream receptors). Based on the assessment to date, it is considered that the 500m study area captures all receptors at risk of significant effects.

2.2.3 The study area is predominantly in a rural setting and largely farmed agricultural land.

2.3 Hydrogeological Impact Assessment methodology

2.3.1 DMRB LA 113 Appendix A (Ref 3) outlines a three-stage process for assessing hydrogeological impacts:

a. Step 1: Establish regional groundwater body status;
b. Step 2: Develop a conceptual model for the surrounding area; and
c. Step 3: Based on the conceptual model, identify all potential features which are susceptible to groundwater level and flow impacts.

2.3.2 The Environment Agency guidance 'Hydrogeological Impact Appraisal for dewatering abstractions' (Ref 4) outlines a similar, but more detailed 14 step process as follows:

a. establish the regional water resource;
b. develop a conceptual model for the dewatering operation and the surrounding area;
c. identify all potential water features which are susceptible to flow impacts;
d. apportion the likely flow impacts to the water features;
e. mitigate the flow impacts;
f. assess the significance of the net flow impacts;
g. define the search area for drawdown impacts;
h. identify all potential water features which could be impacted by drawdown;
i. predict the likely drawdown impacts;
j. mitigate the drawdown impacts;
k. assess the significance of net drawdown impacts;
l. assess the water quality impacts;
m. redesign the mitigation measures to minimise flow and drawdown impacts; and
n. develop a monitoring strategy.

2.3.3 The source-pathway-receptor model is applied to water features sensitive to groundwater level, flow and quality changes. In this context, sources include activities such as dewatering or spillages. The pathway is the hydraulic connection between the source and receptor, such as the aquifer that connects the two. The receptors are the groundwater bodies themselves, and/or groundwater dependent features such as public water supplies, springs, abstractions and Groundwater Dependent Terrestrial Ecosystem (GWDTE).

2.4 Data sources

2.4.1 The following data sources have been interrogated as part of this HIA:

a. British Geological Survey (BGS) Published Geology (1:50,000 scale digital geology map) (Ref 5);
b. BGS Historical Borehole Records (Ref 5);
c. BGS Lexicon of Named Rock Units (Ref 6);
d. BGS England and Wales map coverage 1:50,000 and 1:63,360 (map sheet 191) (Ref 7);
e. BGS Geological maps of the UK and continental shelf areas, East Anglia Sheet 52N, Solid Geology (Ref 8);
f. BGS Great Britain National Series 1:10,000 (Ref 9);
g. Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref 10);
h. Natural England Open Data Geoportal (Ref 11);
i. Department for Environment, Food and Rural Affairs (DEFRA) Hydrology Data Explorer (Ref 12);
j. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report (Ref 13);
k. The physical properties of minor aquifers in England and Wales. British Geological Survey Technical Report (Ref 14);
l. Baseline Report Series: 21. The Chalk and crag of north Norfolk and the Waveney Catchment (Ref 15);
m. Request for Information Environment Agency; and
n. Request for Information East Suffolk Council.

2.5 Assumptions and limitations

2.5.1 It is assumed that dewatering is likely to be limited for the construction of the Proposed Onshore Scheme, based on the monitored groundwater levels and shallow construction depths (see **Section 4**).

2.5.2 It is assumed that all abstractions and discharges, as required, will be subject to and comply with relevant licences or permits, unless exempt. Where exempt, general pollution prevention measures will be implemented. This includes an assumption that treatment to settle sediments will be undertaken, as required, prior to discharge.

2.5.3 The Proposed Onshore Scheme has committed to undertaking trenchless crossings at roads, railways and main rivers. It is assumed that the launch and reception pits for the trenchless methods crossings will be no greater in depth than the 1200mm general depth to cover, summarised in **Table 1.1**. This HIA assumes that the water used to facilitate the drilling technique will be brought to site via tankers to facilitate drilling.

3 Regional Water Resource Status

3.1.1 The study area is located within the East Suffolk Catchment Abstraction Management Strategy (CAMS) area (Ref 16).

3.2 Groundwater availability

3.2.1 The Draft Order Limits and study area are underlain by a principal bedrock aquifer; the Crag Formation (Ref 16).

3.2.2 Groundwater is mapped as available at the proposed Landfall Site and in the north of the study area. In the centre of the study area (in the area of the Minsmere catchment), restricted water is available. In the south of the study area, including the proposed Converter Station and Kiln Lane Substation, groundwater is mapped as not available.

3.2.3 Any new abstraction licenses will be considered on a case-by-case basis and are likely to have conditions.

3.3 Surface water availability

3.3.1 Under Q95 conditions the proposed Landfall Site, and the majority of the study area have restricted water available and sections of the southern study area including the proposed Converter Station and Kiln Lane Substation have no available water (Ref 16).

3.3.2 New abstraction licenses are considered based on local flows in the watercourse and impact of these abstractions on designated sites and other abstractors.

3.3.3 The northern sections of study area have consumptive water available 30% of the time and the southern sections of study area have consumptive water available 50% of the time. Due to limited resource availability, the majority of new abstractions are limited to between November and March (inclusive).

3.3.4 Hands off Flow (HoF) conditions are also applied to licences to protect the environment and rights of other abstractors; therefore, even if a licence is granted there is no guaranteed supply of water.

4 Baseline

4.1 Site location and topography

4.1.1 The Draft Order Limits of the Proposed Onshore Scheme are located in the county of Suffolk, between the towns of Friston to the south and Walberswick to the north.

4.1.2 The Draft Order Limits fall within and cross a number of key hydrological and hydrogeological features including River Mismere and Hundred River (designated rivers); Crag Principal Aquifer and the Minsmere Walberswick Heaths and Marshes Groundwater Dependent Terrestrial Ecosystem.

4.1.3 The Draft Order Limits are low lying between 5 and 36mAOD gradually lowering towards the coast and along surface water features. The proposed Landfall Site is at approximately 8mAOD, the proposed Converter Station is at approximately 18mAOD and Kiln Lane Substation at approximately 20mAOD.

4.2 Environmentally designated sites

4.2.1 Environmental designations within 500m of the Draft Order Limits are outlined in further detail in **Appendix 8.1 Baseline Report – Designated Sites** and **Table 4.1.**

Table 4.1: Environmental Designations within 500m of the Draft Order Limits[1]

Environmentally designated site type	Name	Location
National Landscapes	Suffolk Coasts and Heaths	Intersects the proposed Landfall Site, proposed Underground HVDC Cable Corridor – (Section D) and northern section of the proposed Underground HVDC Cable Corridor (Section C)
National Nature Reserves (NNR)	Suffolk Coast	Within 500m of Draft Order Limits: proposed Landfall Site, proposed Underground HVDC Cable Corridor (Section D) and northern section of the proposed Underground HVDC Cable Corridor (Section C)
RAMSAR	Minsmere-Walberswick	Intersects the proposed Landfall Site, proposed Underground HVDC Cable Corridor (Section D) and northern section of proposed Underground HVDC Cable Corridor (Section C)
Special Areas of Conservation (SAC)	Minsmere to Walberswick Heaths and Marshes	Intersects the proposed Landfall Site, proposed Underground HVDC Cable Corridor (Section D) and northern section of proposed Underground HVDC Cable Corridor (Section C)

[1] Please read in conjunction with **Figure 2.1 Zoning Plan** of the PEIR for orientation.

Environmentally designated site type	Name	Location
Special Protection Area (SPA)	Minsmere-Walberswick	Intersects the proposed Landfall Site, proposed Underground HVDC Cable Corridor (Section D) and northern section of proposed Underground HVDC Cable Corridor (Section C)
Sites of Specific Scientific Interest (SSSI)	Minsmere to Walberswick Heaths and Marshes	Intersects the proposed Landfall Site, proposed Underground HVDC Cable Corridor (Section D) and Northern section of proposed Underground HVDC Cable Corridor (Section C)

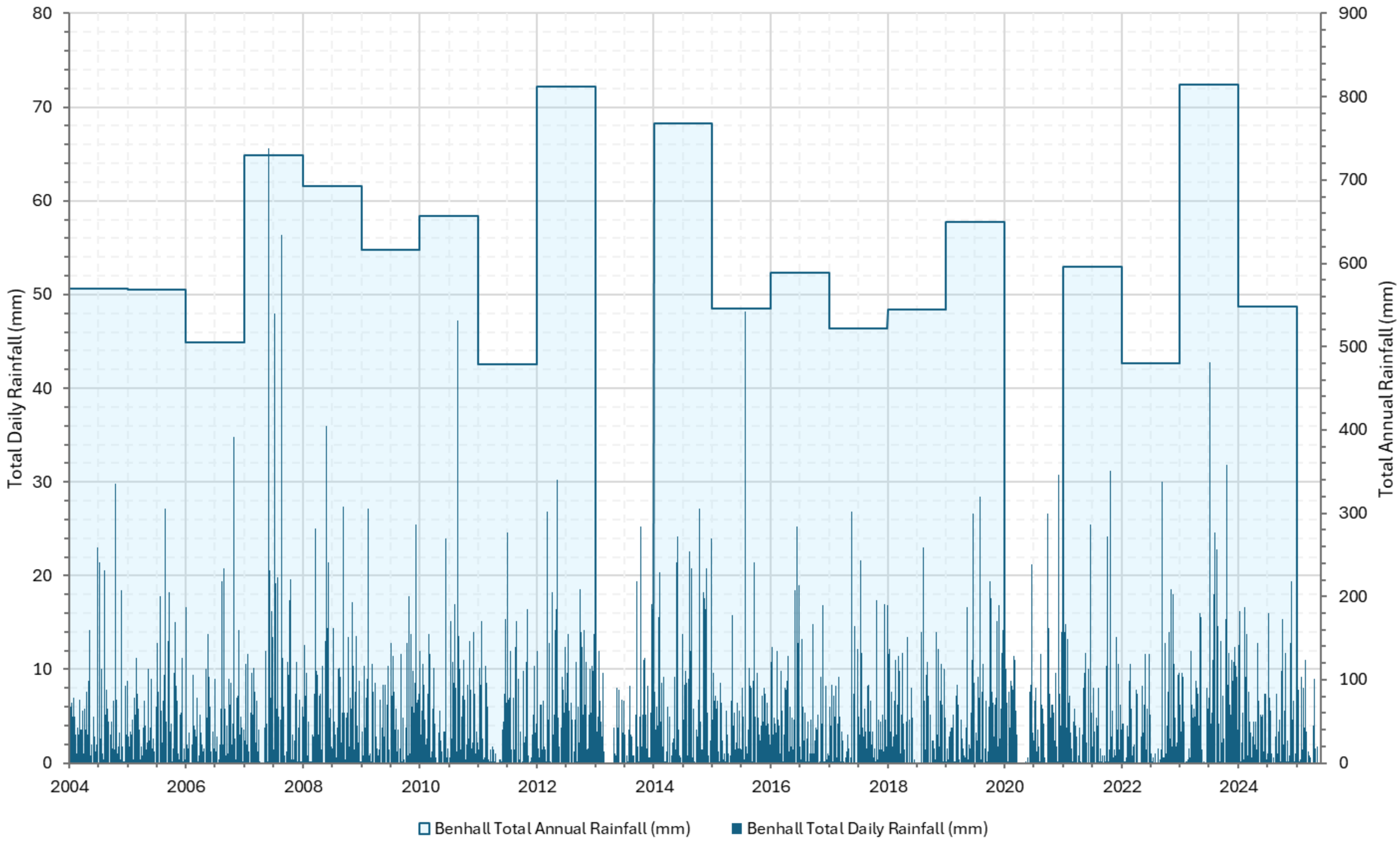
4.3 Rainfall and recharge

4.3.1 Rainfall data is presented in **Inset 4.1** for Benhall rainfall station and **Inset 4.2** for Linstead Prava rainfall station which are located 1.5km to the south, and 10.5km to the north-west respectively of the Draft Order Limits. Data is shown for the period of 2004 to 2025 (Ref 17).

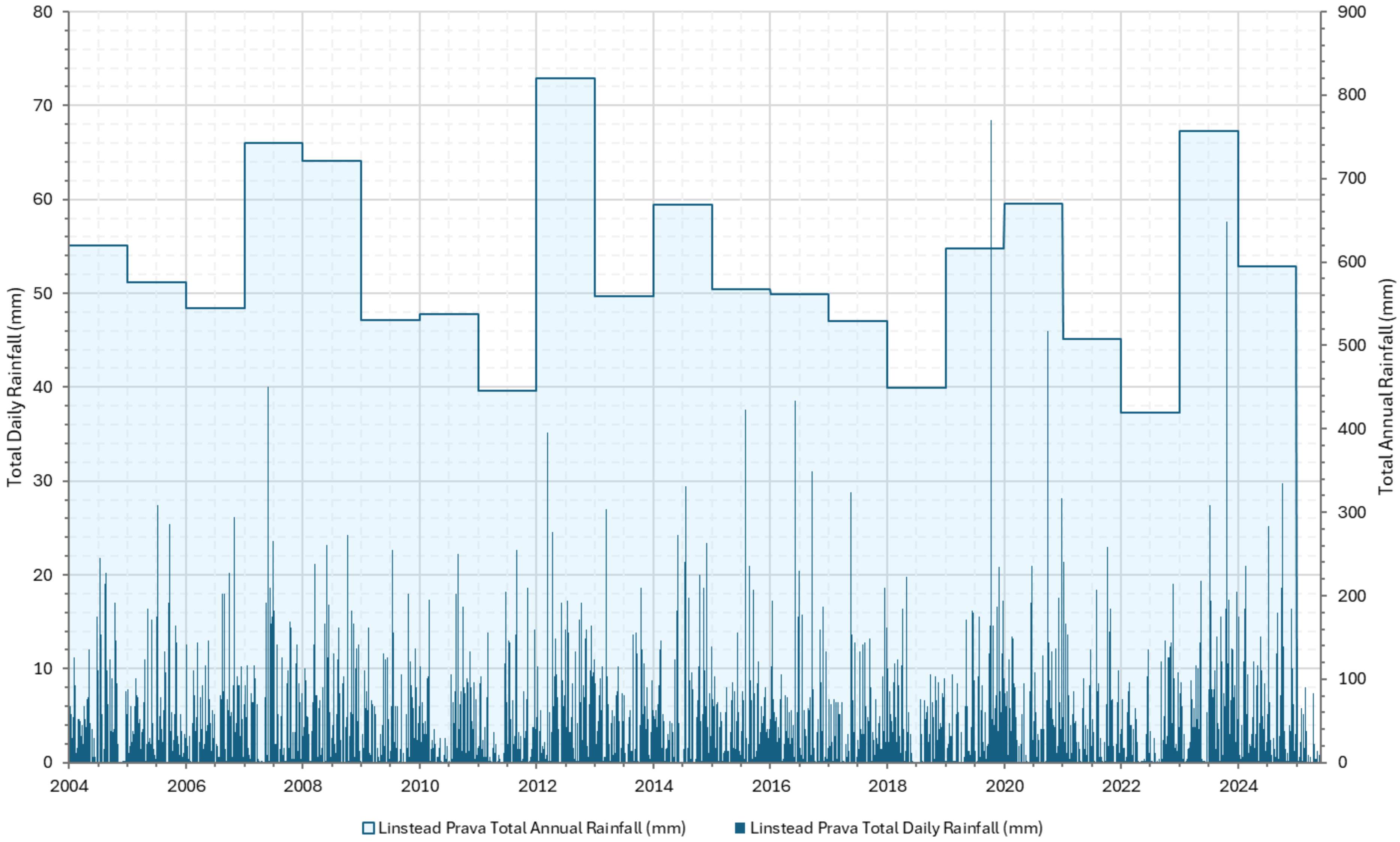
4.3.2 Some annual totals have been excluded from the data presented due to gaps in daily data.

4.3.3 **Inset 4.3** shows the annual rainfall totals for both stations as well as the HadUK 1km Gridded Data (Ref 18) for the study area. Data is shown for the period of 2004 to 2024. The driest years on record for all stations is 2011 and 2022. The wettest years on record for all stations are 2012 and 2023.

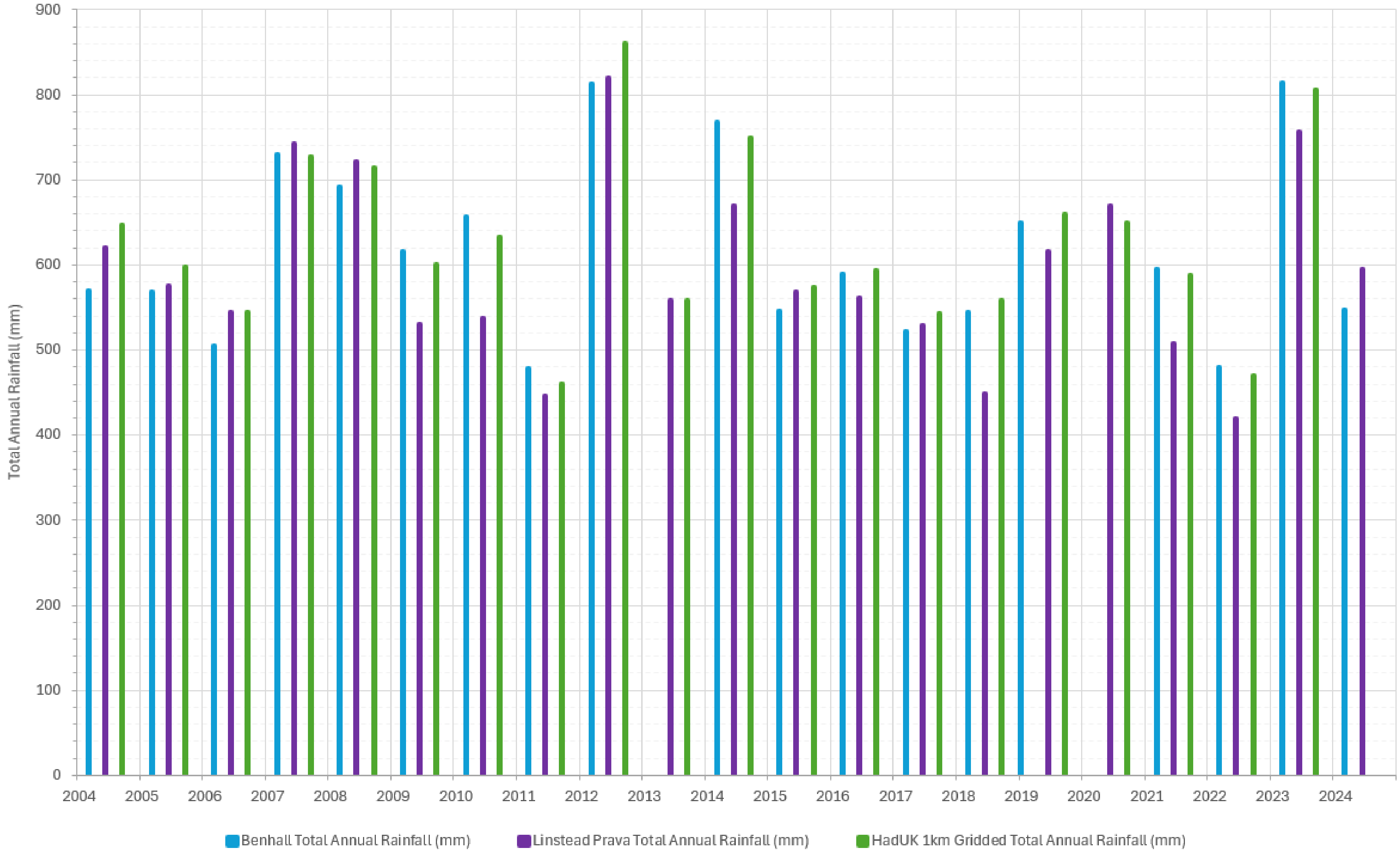
Inset 4.1: Benhall annual and daily rainfall totals (mm)



Inset 4.2: Linstead Parva annual and daily rainfall totals (mm)



Inset 4.3: Benhall, Linstead Prava and HadUK 1km gridded data annual rainfall totals (mm)



4.4 Surface water

4.4.1 There are 13 watercourses located within the Draft Order Limits as well as various smaller drains. These include:

a. Hundred River and two unnamed tributaries of Hundred River to the East of section B of the proposed Underground HVDC Cable Corridor;
b. Minsmere Old River and five unnamed tributaries of Minsmere Old River which runs across the proposed Underground HVDC Cable Corridor;
c. River Fromus and unnamed tributary of Fromus River to the west of Section A of the proposed Underground HVDC Cable Corridor; and
d. Dunwich River and Dunwich River (tidal) which runs across the proposed Landfall Site.

4.4.2 There are six Water Environment Regulations (WER) surface water bodies and three transitional (TraC) water bodies within 500m of the Draft Order Limits. Given the nature and location of the proposed works, the Proposed Onshore Scheme is not anticipated to affect the Wenhanston, Blyth and Leiston Beck surface water bodies and TraC water bodies and therefore these have been screened out as outlined in **Appendix 12.2 Water Environment Regulations Compliance Assessment** of this PEIR. These surface water bodies are outlined in **Annex A**.

4.4.3 All WER Surface Water Bodies within the study area eventually flow into Suffolk Coastal Water Body.

4.5 Geology

Published superficial geology

4.5.1 The published BGS 1:50,000 scale mapping (Ref 5) indicates that the proposed Landfall Site is underlain by Lowestoft Formation (both sand and gravel and diamicton). The proposed Underground Cable Corridor is mapped as being underlain by Lowestoft Formation (diamicton), except areas crossing Minsmere Old River which is underlain by Lowestoft (sand and gravel), Peat, Head (clay, silt, sand and gravel) and Alluvium (clay, silt sand and gravel).

4.5.2 Where specific sections of the Draft Order Limits are discussed below, please see **Figure 2.1 Zoning Plan** of the PEIR for orientation.

Kiln Lane Substation

4.5.3 The Kiln Lane Substation Site overlies superficial deposits comprising the Lowestoft Formation. Over most of the area this is made up of diamicton, while sand and gravel deposits are more likely to be present in the southwest of Kiln Lane Substation.

4.5.4 In this area, the superficial deposits are designated a Secondary (undifferentiated) Aquifer.

Proposed Underground HVAC Cable Corridor (Section A)

4.5.5 The proposed Underground HVAC Cable Corridor overlies superficial deposits comprising predominantly the Lowestoft Formation. It is mostly made up of diamicton. Sand and gravel deposits are mapped along the valley associated with the tributary of the River Fromus and to the southwest of Kiln Lane Substation. At the periphery of the sand and gravel deposits, clays and silts are sometimes mapped.

4.5.6 Further downstream on the tributary of the River Fromus (towards Sternfield), the superficial deposits are mapped as Alluvium or Head deposits, or not present.

4.5.7 Made ground is anticipated to be present within the proposed Underground HVAC Underground Cable Corridor, associated with previous development.

4.5.8 In this area, the Lowestoft Formation is designated as:

a. Secondary A aquifer were mapped as sand and gravel deposits;
b. Secondary B aquifer were mapped as clay and silt deposits; and
c. Secondary (undifferentiated) aquifer were mapped as diamicton.

4.5.9 The Alluvium deposits are designated as Secondary A, whilst the Head is mapped as Secondary (undifferentiated)

Proposed Converter Station

4.5.10 The proposed Converter Station Site overlies superficial deposits comprising the Lowestoft Formation. Over the entire proposed Converter Station Site, this is mapped as diamicton.

4.5.11 The superficial deposits are designated a Secondary (undifferentiated) Aquifer.

Proposed Underground HVDC Cable Corridor (Section B and C)

4.5.12 The proposed Underground HVDC Cable Corridor (i.e., options presented in **Chapter 2 Description of the Proposed Scheme** of the PEIR) overlies a range of superficial deposits, with occasional areas where no superficial deposits are mapped.

4.5.13 Between the main rivers, the superficial deposits comprise predominantly the Lowestoft Formation. This ranges from predominantly diamicton, to discrete areas of sand and gravel deposits and clay and silt deposits (generally in valleys associated with water courses).

4.5.14 Alluvium, Peat and Head deposits are mapped along the proposed Underground HVDC Cable Corridor, in association with water courses. The peat is predominantly mapped in association with the Minsmere.

4.5.15 Made ground is also anticipated to be present within the proposed Underground HVDC Cable Corridor, associated with previous development.

4.5.16 The superficial deposits are designated as:

a. Secondary A – Sand and gravel deposits of the Lowestoft Formation, and Alluvium;
b. Secondary B – Clay and silt deposits of the Lowestoft Formation;
c. Secondary (undifferentiated) – Diamicton of the Lowestoft Formation, and Head deposits;
d. Unproductive – Peat; and
e. Proposed Underground HVDC Cable Corridor (Section D)

4.5.17 The proposed Underground HVDC Cable Corridor overlies superficial deposits comprising predominantly the Lowestoft Formation. Over most of the proposed Underground HVDC Cable Corridor these are mapped as either diamicton or sand and gravels deposits. In the east of the proposed Underground HVDC Cable Corridor, Tidal Flat deposits are mapped. Head deposits are mapped in a small area in the vicinity of Sallow Walk Covert.

4.5.18 The superficial deposits are designated as follows:

a. Secondary (undifferentiated) Aquifer – Diamicton of the Lowestoft Formation, and Head deposits;
b. Secondary (A) – Sands and gravels of the Lowestoft Formation; and
c. Unproductive (not designated) – Tidal Flat Deposits (clays and silts).

Landfall – Walberswick (Section D)

4.5.19 The majority of the proposed Landfall Site has no superficial deposits mapped, with sand and gravel deposits of the Lowestoft Formation mapped in the north-west corner. Tidal Flat Deposits (clays and silts) are mapped to the south of the proposed Landfall Site.

4.5.20 The sand and gravel deposits of the Lowestoft Formation are designated as a Secondary (A) aquifer.

Published bedrock geology

4.5.21 The published BGS 1:50,000 scale mapping (Ref 5) indicates the superficials across the Draft Order Limits are underlain by Crag Group (sands, gravels, silts and clays) overlaying the Chalk. The Crag Group is considered a Principal Aquifer and is locally important up to approximately 80m thick. The Crag generally consists of unconsolidated marine sands, which can be locally hard and consolidated. The yield of the aquifer is typically moderate to low. Seasonal water table fluctuations are generally limited in the Crag due to its high storage coefficient. Water quality can be poor, iron-rich and hard, particularly in areas overlain by glacial clay deposits, whilst saline intrusion may occur towards the coast (Ref 15).

4.5.22 These Quaternary Crags consist of unconsolidated, intercalated clays, silts, sands and gravels unconformably overlying Cretaceous Chalk and Palaeogene Clays.

4.5.23 The Crag can be subdivided into the Coraline Crag, Red Crag, Norwich Crag and Wroxham Crag (Ref 14).

4.5.24 The Coralline Crag is restricted to an area around Aldeburgh and is therefore not within 500m of the Draft Order Limits (Ref 14).

4.5.25 The Red Crag is present from Southwold to Aldeburgh. The Red Crag comprises poorly sorted, cross-bedded, medium- to coarse-grained shelly sands, coarsening upwards (Ref 14).

4.5.26 The Norwich Crag forms a uniform sheet of strata around 30m thick and occurs across the Saxmundham and Lowestoft sheets. Norwich Crag rests unconformably on Red Crag where that is present; elsewhere it lies unconformably on Palaeogene or Upper Chalk strata. The Norwich Crag dominantly comprises fine- to medium-grained, micaceous sub-angular quartz sands, interbedded with clays (Ref 14).

4.5.27 The Wroxham Crag extends as far south as Southwold and is therefore not within 500m of the Draft Order Limits (Ref 14).

4.5.28 No geologically designated SSSI or County GeoSites have been identified in the study area.

Kiln Lane Substation

4.5.29 The bedrock geology at Kiln Lane Substation Site is of the Crag Group which comprises sands, gravels, silts and clays. The sands are characteristically dark green from glauconite but weather bright orange with haematite ‘iron pans’. The gravels in the lower part of the group have abundant flint and chalk nodules.

Proposed Underground HVAC Cable Corridor (Section A)

4.5.30 The bedrock geology at the proposed Underground HVAC Cable Corridor is the same as Kiln Lane Substation.

Proposed Converter Station

4.5.31 The bedrock geology at the proposed Converter Station is the same as Kiln Lane Substation.

Proposed Underground HVDC Cable (Sections B, C and D)

4.5.32 The bedrock geology along the proposed Underground HVDC Cable Corridor is the same as Kiln Lane Substation.

Proposed Landfall – Walberswick (Section D)

4.5.33 The bedrock geology at the proposed Landfall is the same as Kiln Lane Substation.

Ground investigation

Scope of works

4.5.34 Ground investigations have been carried out across the Draft Order Limits. Further ground investigations are currently being conducted, but data has not yet been received. This will be presented as part of the subsequent ES.

4.5.35 Aquifer protection measures were employed when drilling the boreholes in order to preclude the creation of a pathway for contamination to migrate down towards the underlying aquifer. These protection measures comprised using 200mm diameter casing and tools to drill to the top of the bedrock, then by installing a 1.00m thick bentonite plug, prior to reducing to 150mm diameter casing and tools and re-commencing drilling

Scope of works – proposed Converter Station

4.5.36 Ground investigations were carried out between 21 November to 01 December 2024, with longer term groundwater monitoring undertaken (see section 4.6.14) to capture seasonal variation.

Table 4.2: Section A ground investigations

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
Cable Percussion (CP) Boreholes	6	15		150mm diameter
Inspection Pits	6	1.2		
Trial Pits (JCB tracked excavator)	29	0.4	3	
Soakaway	3	2.5		Carried out at TP06, TP17 and TP26

Scope of works – proposed Underground HVDC Cable (Section B and C)

4.5.37 Ground investigations were carried out between 28 August to 08 October 2024, with longer term groundwater monitoring undertaken (see section 4.6.15) to capture seasonal variation.

Table 4.3: Proposed Underground HVDC Cable Section B and C ground investigations

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
Cable Percussion (CP) Boreholes	29	0.8	15.45	Up to 200m diameter. At borehole BHB03 a plastic duct was found at 0.80m depth. The hole was backfilled and the location moved to BHB03A. At Borehole BHB06 the split spoon from the Standard Penetration Test (SPT) sheared off the base of the rods and became wedged sideways down the hole at 5.00m depth resulting in the hole being backfilled and redrilled as BHB06A.
Inspection Pits	29	1.2		Inspection pit for boreholes BHB19 and BHC02 – BHC04 were expanded around the boreholes to clear a 1.00mx1.00m area of any archaeological finds.
Trial Pits (wheeled excavator)	17	2.2	3	A 3.00x3.00m pit was opened at surface at the locations of TPB21-TPB27, TPB30-TPB33, and TPC01-TPC17 and TPC19-TPC20. Once below the level of the topsoil, the pit was continued at a width of between 0.59m to 0.60m to allow full depth of trial pit to be achieved.

Scope of works – proposed Underground HVDC Cable (Section D)

4.5.38 Ground investigations were carried out between 21 October to 31 October 2024, with longer term groundwater monitoring undertaken (see section 4.6.16) to capture seasonal variation.

Table 4.4: Proposed Underground HVDC Cable Section D ground investigations

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
Cable Percussion (CP) Boreholes	3	15.4	20.45	
Inspection Pits	3	1.5		Inspection pit for boreholes BHD03 and BHD04 were expanded around the boreholes to clear a 1.00mx1.00m area of any archaeological finds.
Trial Pits (wheeled excavator	17	3		Switched from wheeled excavator to tracked excavator

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
and tracked excavator)				between 28 and 31 October 2024. A 3.00x3.00m pit was opened at surface at the locations of TPD02-07 and TPD09-TPD13. Once below the level of the topsoil, the pit was continued at a width of between 0.59m to 0.60m to allow full depth of trial pit to be achieved

Scope of works – proposed Landfall Site (Section D)

4.5.39 Ground investigations were carried out between 21 October to 31 October 2024, with longer term groundwater monitoring undertaken (see section 4.6.17) to capture seasonal variation.

Table 4.5: Proposed Landfall Site Section D ground investigations

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
Cable Percussion (CP) Boreholes	5	19.95	35	200mm diameter Within boreholes BH03 and BH04 blowing sands were encountered at depth and it became necessary to install a 1.00m thick bentonite plug at 19.50mbgl in BH03 and 20.00mbgl in BH04 to prevent the sands getting between the casing, prior to reducing to 150mm diameter casing and tools and re-commencing drilling.
Inspection Pits	5	1.5		Inspection pits were expanded around the boreholes to clear a 1.00mx1.00m area of any archaeological finds.
Trial Pits (tracked excavator)	13	0.5	3.5	A 3.00x3.00m pit was opened at surface, once below the level of the topsoil, the pit was continued at a width of between 0.30m to 0.45m to the allow full depth of trial pit to be achieved. Due to the location of an irrigation system which runs under the site, Trial Pit TP04 was moved with agreement from the Engineer, to avoid this underground service. Finds of archaeological interest were located in Trial Pits TP04 and TP05.

Activity	No.	Shallowest (mbgl)	Deepest (mbgl)	Notes
				These pits were terminated at a depth of 0.50m on the advice of the archaeologist and agreement with the Engineer and move to TP04A and TO05A respectively.

4.5.40 In situ testing was conducted across the site including:

a. laboratory testing has also been conducted of soil and groundwater samples; and
b. soakaway testing was also undertaken at the proposed Landfall Site at a depth of 2.5m bgl.

4.5.41 Long term monitoring of gas and groundwater levels is also being undertaken and multiparameter flow cell and GFM435 Gas Analyser is being used to measure the following parameters:

a. Temperature (in Degrees Celsius [°C]);
b. Electrical Conductivity (μS/cm);
c. Dissolved Oxygen Concentration (%);
d. pH;
e. Redox Potential (mV);
f. Concentrations (% Vol) of CH_4, O_2, CO_2, and (ppm) H_2S, CO;
g. Flow Rate;
h. Differential Pressure;
i. Barometric Pressure; and
j. Air Temperature.

Summary of ground conditions from ground investigations

4.5.42 The ground conditions from the site investigations can be summarised for each section of the Draft Order Limits as follows.

4.5.43 Section A of the Draft Order Limits:

a. Topsoil: thickness 0.3 to 0.5m and anticipated across this region;
b. Peat, alluvium and head deposits: no ground investigation undertaken where these are mapped in this region. Deposits align with tributaries of River Fromus;
c. Lowestoft Formation (diamicton): thickness 6.6 to 14 m and present across majority of the region; and
d. Crag formation: forms bedrock across the entire Draft Order Limits.

4.5.44 Section B of the Draft Order Limits:

a. Topsoil: thickness 0.3 to 0.8 m and anticipated across this region
b. Peat, alluvium and head deposits: no peat was encountered within boreholes. Very limited boreholes and trial pits were completed within mapped area of

alluvium and head deposits. Deposits align with tributaries of Leiston Beck and Minsmere Old River.

c. Lowestoft Formation (diamicton): thickness of 0.5 to 15m therefore is expected to be variable across the region. Present across majority of the region.
d. Crag Formation: up to 15m thick base of Crag Group not encountered. A distinct layer of very stiff/dense brown sandy silt was encountered within three boreholes only (BHB02, BHB08 and BHB12). In these locations the silt has a variable proven thickness range of between 1m and 7m.

4.5.45 Section C of the Draft Order Limits:

a. Topsoil: thickness of 0.2 to 0.5m and anticipated across this region.
b. Peat and Head deposits: not encountered during ground investigations. Deposits align with Leiston Beck and Minsmere Old River.
c. Lowestoft Formation: thickness of 0.3 to 7.5m. Lowestoft Formation (diamicton) anticipated across majority of regions and Lowestoft (sand and gravels) anticipated to be largely constrained to the north of the Draft Order Limits.
d. Crag Formation: up to 14.3m thick base of Crag Group not encountered. Forms bedrock across the entire Draft Order Limits.

4.5.46 Section D of the Draft Order Limits:

a. Topsoil: thickness of 0.3 to 1.0m and anticipated across this region but typically 0.4 m thick.
b. Lowestoft Formation (diamicton): thickness of 0.9 to 2.7m and largely constrained to west of Draft Order Limits excluding a small outcrop in the centre of the study area (near BHD05).
c. Crag Formation: forms bedrock across the entire Draft Order Limits.

4.5.47 For further details on the descriptions of strata from ground investigations refer to **Chapter 9 Geology and Contamination**.

4.6 Hydrogeology

Water Environment Regulations groundwater classification

4.6.1 WER status, objectives and programme of measures are derived by the Environment Agency for groundwater bodies.

4.6.2 The study area is fully within a single WER groundwater body; the Waveney and East Suffolk Chalk and Crag.

Table 4.6: Water Environment Regulations groundwater body status

	Waveney and East Suffolk Chalk and Crag Groundwater Body
Water body ID	GB40501G400600
Operational Catchment	Waveney and Suffolk East Chalk and Crag

	Waveney and East Suffolk Chalk and Crag Groundwater Body
Management Catchment	Anglian GW (Groundwater)
River Basin District	Anglian
Current overall status (2019)	Poor
Current quantitative status (2019)	Poor
Current chemical status (2019)	Poor
Quantitative objective	Good
Chemical objective	Poor
Protected area	Nitrates Directive, Special Protection Area, Ramsar Site, Drinking Water Protected Area, Special Area of Conservation

Aquifer properties

4.6.3 The classification of aquifers within the study area are outlined in **Table 4.7,** with the geology illustrated in **Figures 9.2** and **9.3** of the PEIR.

Table 4.7: Aquifer classifications

Geology	Formation/Member	Aquifer Classification
Superficial	Peat	Secondary (undifferentiated)
	Alluvium	Secondary A
	Tidal Flat Deposits	Unproductive
	Head	Secondary (undifferentiated)
	Lowestoft Formation (diamicton)	Secondary (undifferentiated)
	Lowestoft Formation (clay and silts)	Secondary B
	Lowestoft Formation (sand and gravels)	Secondary A
Bedrock	Crag Group	Principal

Aquifer classifications

Principal aquifers: provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.

Secondary A aquifers: comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.

Secondary B aquifers: mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

Secondary (undifferentiated): aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

Unproductive strata: largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

4.6.4 The Crag is a locally important aquifer, up to approximately 80m thick. It generally consists of unconsolidated marine sands, which can be locally hard and consolidated (Ref 19).

4.6.5 The Crag can be subdivided into the Coraline Crag, Red Crag, Norwich Crag and Wroxham Crag, however it is not possible to differentiate the hydrogeological characteristics of the different formations (Ref 14).

4.6.6 Groundwater flow in the Crag is intergranular and matrix dominated, with yield depending on the coarseness of the sand and gravel fraction and on the degree of sorting. The flow system is controlled by the alternating layers of clays, silts and sands and their contrasting permeabilities (Ref 14).

4.6.7 The Crag is separated from the Chalk by the Palaeogene clay formations and potentiometric surface elevations are higher than those in the Chalk (Ref 14).

4.6.8 Mean transmissivity of $605m^2/d$ and interquartile range between 238 and $772m^2/d$ (Ref 14).

4.6.9 Storage coefficients vary from $7x10^{-5}$ to 0.61, with an interquartile range of 0.004 to 0.11; these values indicate unconfined to semi-confined conditions (Ref 14).

4.6.10 Mean porosity of approximately 15 to 40% and specific capacities with a mean of more than $275m^3/d/m$, and interquartile range of 41 to $249m^3/d/m$ (Ref 14).

4.6.11 Recharge to groundwater is anticipated to be predominantly in areas of more permeable deposits where infiltration rates would be greater.

4.6.12 The lower permeability deposits and urbanisation that underlie sections of the proposed Underground HVDC Cable Corridor are anticipated to reduce groundwater infiltration rates in these areas.

4.6.13 The Crag is a complex aquifer with numerous clay and silt layers, and hence the vertical permeability is likely to be strongly influenced by the existence and lateral continuity of these layers (Ref 14).

Groundwater levels

4.6.14 Monitoring around proposed Converter Station included two 50mm diameter standpipes, two 53mm diameter standpipes and two 54mm diameter standpipes to be installed in boreholes BH01 to BH06 inclusive. Groundwater monitoring was undertaken between 19 December 2023 and 02 October 2024.

4.6.15 Monitoring around proposed Underground HVDC Cable Corridor (Section B and C) included 27 50mm diameter standpipes to be installed in boreholes BHB01 to BHB13, BHB15, BHB18 to BHB24 and BHC01 to CHC08 inclusive. Groundwater monitoring was undertaken between 04 November 2024 and 04 March 2025.

4.6.16 Monitoring around proposed Underground HVDC Cable Corridor (Section D) included three 50mm diameter standpipes to be installed in boreholes BHD02, BHD05 and BHD06. Groundwater monitoring was undertaken between 21 November 2024 and 13 February 2025.

4.6.17 Monitoring around the proposed Landfall Site included five 50mm diameter standpipes to be installed in boreholes BH01 to BH05 inclusive. Groundwater monitoring was undertaken between 21 November 2024 and 06 March 2025.

4.6.18 Local Environment Agency groundwater level monitoring in the area shows groundwater levels in northern reaches of Draft Order Limits between 1.1 and 2.5 mAOD. Groundwater levels around Section B of the Draft Order Limits near Westleton between 3.9 and 5.3 mAOD. There is limited other groundwater level monitoring data across the rest of the study area.

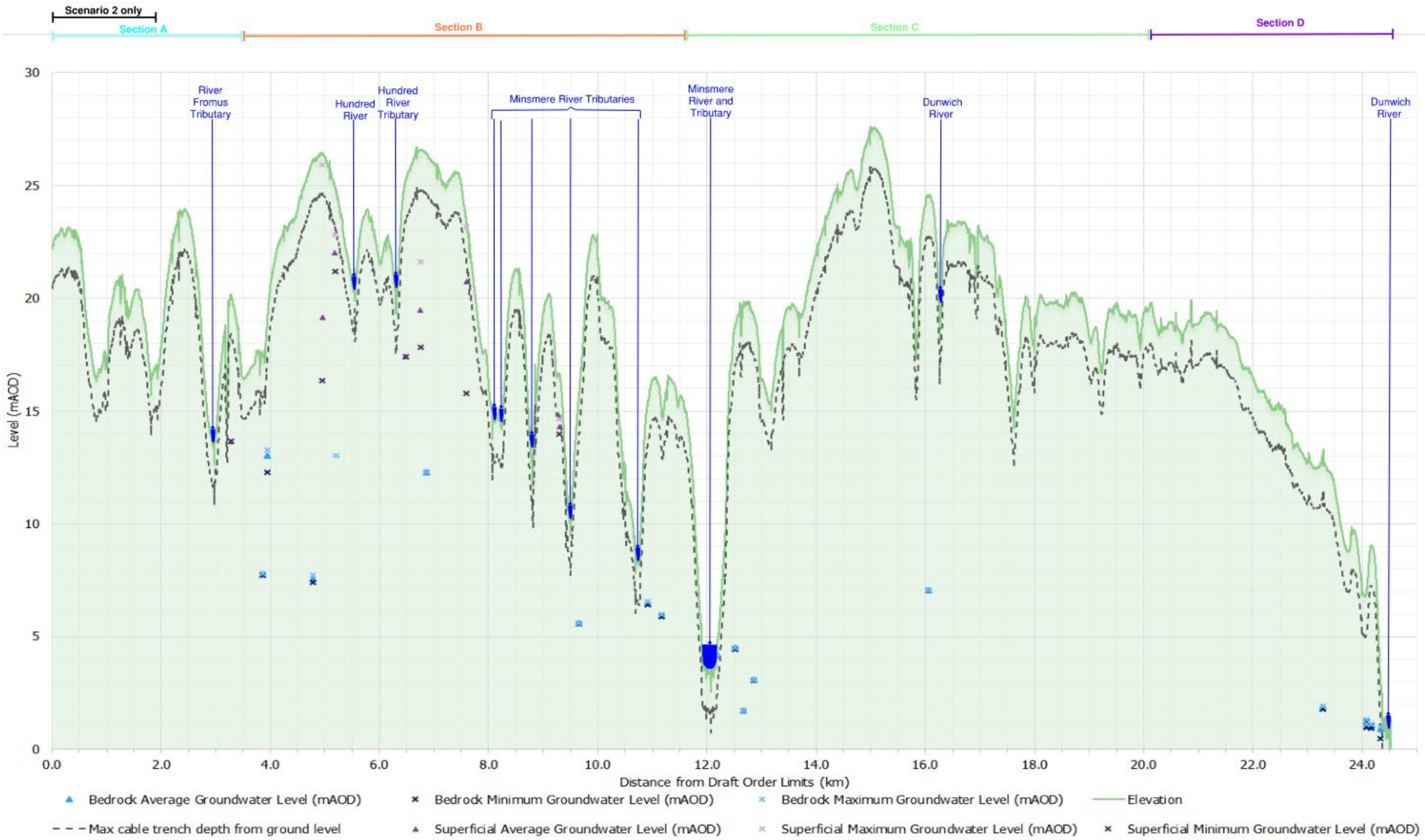
4.6.19 Maximum and minimum groundwater levels encountered during groundwater monitoring at each component is outlined in **Table 4.8**.

Table 4.8: Maximum and minimum groundwater levels encountered during groundwater monitoring

Component	Minimum groundwater levels (mAOD)	Maximum groundwater levels (mAOD)
Section A	No groundwater level monitoring data available	
Section B	5.56 (11.03 mbgl)	25.92 (9.33 mbgl)
Section C	1.7 (11.12 mbgl)	7.06 (13.88 mbgl)
Section D	0.47 (3.83 mbgl)	1.91 (12.27 mbgl)

4.6.20 **Inset 4.4** shows groundwater levels along the proposed Underground Cable Corridor alongside ground level (mAOD).

Inset 4.4: Elevation along the proposed Underground Cable Corridor alongside groundwater levels in the superficials and bedrock[2]



[2] The cross section illustrates the anticipated open-cut cable trench depth from ground level. Cable depths will be deeper at trenchless crossings.

Groundwater Dependent Receptors

4.6.21 Minsmere-Walberswick Heaths and Marshes Specific Scientific Interest (SSSI) and designated GWDTE is within 500m of the Draft Order Limits and crossed by a trenchless crossing west of the proposed Landfall.

4.6.22 There are no mapped springs within 500m of the Draft Order Limits.

Groundwater vulnerability

4.6.23 Groundwater vulnerability mapping is shown in **Figure 12.9.** Groundwater vulnerability maps have been created using data from the BGS, the UK Centre for Ecology and Hydrology and the National Soil Resources Institute, at a 1 km^2 grid spacing.

Table 4.9: Groundwater vulnerability

Geology	Formation/Member	Groundwater Vulnerability
Superficial	Peat	Low
	Alluvium	Medium - High
	Tidal Flat Deposits	Low
	Head	Medium - High
	Lowestoft Formation (diamicton)	Medium
	Lowestoft Formation (clay and silts)	Medium - High
	Lowestoft Formation (sand and gravels)	Medium - High
Bedrock	Crag Group	Medium – Low

Classifications of groundwater vulnerability:

High: areas that can easily transmit pollution to groundwater. They are characterised by high-leaching soils and the absence of low-permeability superficial deposits. These are high priority groundwater resources that have very limited natural protection. This results in a high overall pollution risk to groundwater from surface activities. Operations or activities in these areas are likely to require additional measures over and above good practice pollution prevention requirements to ensure that groundwater isn't impacted.

Medium - High: These are high priority groundwater resources that have limited natural protection. This results in a medium-high overall pollution risk to groundwater from surface activities. Activities in these areas may require additional measures over and above good practice to ensure they do not cause groundwater pollution.

Medium: areas that offer some groundwater protection. Intermediate between high and low vulnerability. These are medium priority groundwater resources that have some natural Medium - Low: These are lower priority groundwater resources that have some natural protection resulting in a moderate to low overall groundwater pollution risk. Activities in these areas should follow good practice to ensure they do not cause groundwater pollution.

Low: areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low-leaching soils and/or the presence of low-permeability superficial deposits. These are low priority groundwater resources that have a high degree of natural protection. This reduces their overall risk of pollution from surface activities. However, activities in these areas may be a risk to surface water due to increased run-off from lower permeability soils and near-surface deposits. Activities in these areas should be adequately managed to ensure they do not cause either surface or groundwater pollution.

Unproductive: areas comprised of rocks that have negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.

Groundwater quality

4.6.24 The water quality samples were sent to an accredited laboratory for testing against a range of water quality parameters and contaminant suites. The water quality data was compared against Environmental Quality Standards (EQS) standards for Freshwater. The water quality analysis showed some detections of metals, inorganics and PAHs above the respective EQS standards which are shown in **Table 4.10**, **Table 4.11** and **Table 4.12**.

4.6.25 The groundwater quality results from samples taken around the proposed Landfall Site are yet to be received, these will be reviewed to inform the ES assessment.

Table 4.10: Groundwater quality proposed Underground HVDC Cable (Section B and C) (BHB01, BHB02, BHB303A, BHB04, BHB11, BHB13, BHB19, BHB20, BHB23, BHB24, BHC01, BHC02 and BHC03)

Determinand	Hazardous/Non-Hazardous	EQS freshwater annual average	Average value	Minimum value	Maximum value
Cadmium, Dissolved (ug/l)	Non-hazardous pollutant	0.08	0.06	<0.03	0.10
Copper, Dissolved (ug/l)	Non-hazardous pollutant	1	3.21	<0.4	9.80
Lead, Dissolved (ug/l)	Hazardous pollutant	1	0.66	<0.09	1.70
Nickel, Dissolved (ug/l)	Non-hazardous pollutant	4	6.90	1.80	22.00
Zinc, Dissolved (ug/l)	Non-hazardous pollutant	10.9	71.19	3.50	180.00
Phenol - Monohydric Low Level (ug/l)	Non-hazardous pollutant	7.7	21.95	<1.5	34.00
Sulphate as SO4 (mg/l)	Non-hazardous pollutant	400	241.45	5.90	1000.00

Determinand	Hazardous/Non-Hazardous	EQS freshwater annual average	Average value	Minimum value	Maximum value
Fluoranthene (ug/l)	Hazardous pollutant	0.0063	0.12	<0.01	0.25
Benzo(b)fluoranthene (ug/l)	Hazardous pollutant	0.00017	0.11	<0.01	0.31
Benzo(k)fluoranthene (ug/l)	Hazardous pollutant	0.00017	0.08	<0.01	0.12
Benzo(a)pyrene (ug/l)	Hazardous pollutant	0.00017	0.08	<0.01	0.24
Indeno(1,2,3-c,d)pyrene (ug/l)	Hazardous pollutant	0.00017	0.17	<0.01	0.17
Benzo(g,h,i)perylene (ug/l)	Hazardous pollutant	0.00017	0.04	<0.01	0.06

Table 4.11: Groundwater quality proposed Underground HVDC Cable (Section D) (BHD05)

Determinand	Hazardous/Non-Hazardous	EQS freshwater annual average	Value
Copper, Dissolved (ug/l)	Non-hazardous pollutant	1	1.8
Zinc, Dissolved (ug/l)	Non-hazardous pollutant	10.9	120

Table 4.12: Groundwater quality proposed Saxmundham Converter Station (BH05)

Determinand	Hazardous/Non-Hazardous	EQS freshwater annual average	Value
Copper, Dissolved (ug/l)	Non-hazardous pollutant	1	2.0
Zinc, Dissolved (ug/l)	Non-hazardous pollutant	10.9	53
Fluoranthene (ug/l)	Hazardous pollutant	0.0063	0.02

4.7 Water resources

Water stress

4.7.1 Suffolk water resources zones show a supply deficit in AMP8, and the supply region is currently classified as a serious water stressed area by the Environment Agency. This designation was updated in 2021, using the latest evidence from the National Framework for Water Resources and WRMP19 forecasts, and accepted by the Secretary of State following public consultation.

4.7.2 According to the Environment Agency, "*Water stress applies both to the natural environment and to public water supplies. Both will be affected by climate change. Public water supplies are under pressure from reductions in abstraction to make them more environmentally sustainable. There is also a need to make public water supplies more resilient to droughts and meet additional demands associated with development and population growth*".

4.7.3 Further details on the classification of water stress in the region can be found in **Appendix 12.4 Water Cycle Study**.

Water Resource Designations

4.7.4 Source Protection Zone 3 (SPZ 3) covers the southern region of the Draft Order Limits including southern section of the proposed Underground HVDC Cable Corridor, proposed Underground HVAC Cable Corridor and the proposed Converter Station and Kiln Lane Substation. These are shown in **Figure 12.2**.

4.7.5 There are no drinking water safeguard zones either surface water or groundwater within 500m of the Draft Order Limits.

Abstractions

4.7.6 There are five licenced groundwater abstractions and one licensed surface water abstractions within 500m of the Draft Order Limits. All licensed abstractions are for general agricultural use, for spray irrigation.

4.7.7 There are six private groundwater abstractions and eight deregulated abstraction licence points within 500m of the Draft Order Limits. All of the private groundwater abstractions within 500m of Draft Order Limits are for domestic residential use.

4.7.8 These abstractions are outlined in **Annex A** and **Figure 12.1 and 12.2**.

Discharges

4.7.9 There are nine active discharge consents to controlled waters within 500m of the Draft Order Limits. Four of which are associated with domestic property, one with wastewater treatment works (WwTW), two water company pumping stations and various other discharge types. These are outlined in **Annex A:**.

5 Assessment of Impacts

5.1 Introduction

5.1.1 This section identifies flow, drawdown and quality impacts that could occur across the Proposed Onshore Scheme as a result of proposed construction, operational activities (including maintenance), and decommissioning. The section subsequently identifies which groundwater receptors are susceptible to those impacts, and control measures to minimise those impacts (which are summarised in **Section 6**).

5.1.2 At this stage, the assessment of impacts has been undertaken qualitatively, on the basis that embedded design mitigation and control measures (as outlined in **Section 6**) are sufficient to mitigate potential impacts without a detailed quantitative assessment required.

5.1.3 When considering the hydrogeological magnitude of impact on a receptor, the same methodology is used as outlined in **Table 12.9** of **Chapter 12 Hydrology, Hydrogeology and Drainage**.

5.2 Kiln Lane Substation

Construction impacts

5.2.1 The construction of Kiln Lane Substation may locally alter the groundwater levels and flows.

5.2.2 Groundwater levels can be temporarily reduced by excavation below the water table. Conversely the installation of below ground infrastructure can locally increase the water table due to mounding effects. Based on Sea Link ES (Ref 1) it has been assumed that piling is required at Kiln Lane Substation (as a reasonable worst-case scenario).

5.2.3 Altered recharge to ground from temporary works can also locally impact groundwater levels; where stripping of low permeability materials could increase local recharge whilst installation of low permeability material could reduce local recharge and increase runoff.

5.2.4 Groundwater flows can be locally altered during construction associated with piling and installation of below ground structures. Piling has the potential to create new temporary or permanent groundwater flow pathways.

5.2.5 Groundwater quality impacts could occur from general construction activities including piling, mobilising existing contaminants or potential uncontrolled release of contamination during construction (such as accidental release of fuel or other construction chemicals). Groundwater quality impacts in relation to existing contamination are assessed in further detail in **Chapter 9 Geology and Contamination** (which concluded no significant effects).

5.2.6 Potential receptors scoped in within 500m and assumed to be in hydraulic continuity:

a. Aquifer – Principal – Bedrock – Crag Group.
b. Aquifer – Secondary A – Superficials – Alluvium.
c. Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels).
d. Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts).
e. Aquifer – Secondary (undifferentiated) – Superficials – Peat.
f. Aquifer – Secondary (undifferentiated) – Superficials – Head.
g. Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton).
h. One licensed groundwater abstractions (outlined in **Annex A:**):
    i. 7/35/03/*G/0001.
i. Three private groundwater abstractions (outlined in **Annex A:**):
    i. 00/00010/PWWELL.
j. Two deregulated licence points:
    i. Waveney and East Suffolk Chalk and Crag Groundwater Body.
    ii. SPZ3 across the Kiln Lane Substation Ssite options.

5.2.7 The temporary alteration of groundwater flows or levels from water management has the potential for impacts if altering baseflow to groundwater dependent receptors (abstractions and ecological sites) or altering the potential for groundwater flooding. With embedded design measures in place, the regulatory regime (for abstractions and discharges) and control measures as set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** the magnitude of impact is considered to be negligible.

5.2.8 Impacts from altered infiltration into the ground from hardstanding will be managed through the drainage design to be implemented in line with SuDS principles, taking into account climate change. On this basis, magnitude of impact is considered to be negligible.

5.2.9 Works that could result in new preferential pathways and alteration to groundwater flows are unlikely to result in impacts greater than negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice**, including development of a foundation works risk assessment, pipe bedding design and appropriate decommissioning of site investigation boreholes, are followed.

5.2.10 For uncontrolled release of contaminants, the magnitude of impact is considered to be negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** are followed.

Operational impacts

5.2.11 Groundwater levels and flows could be impacted by the operational drainage regime, altering the location and magnitude of infiltration.

5.2.12 Localised maintenance work could require groundwater management which would potentially impact groundwater levels and flows, as during construction.

5.2.13 Groundwater quality could also be impacted by localised maintenance work, or accidental release of fuel or other chemicals. The magnitude of any leakage or spill would be dependent on the location, quality, frequency of occurrence, flow and duration.

5.2.14 Potential receptors would be the same as within construction phase (see **Paragraph 5.2.6**).

5.2.15 The drainage is to be designed in line with SuDS principles and taking into consideration climate change. As such, negligible impacts to the groundwater regime are anticipated.

5.2.16 Risks from maintenance works would be similar to construction, but on a smaller scale with the same control measures implemented.

5.2.17 Accidental release of fuel or other construction chemicals is unlikely to result in a impacts greater than negligible during operation as storage and use of chemicals/fuel will be undertaken in accordance with best practice pollution prevention measures and drainage design (such as bunded tanks).

Decommissioning impacts

5.2.18 If it was determined that elements of Kiln Lane Substation were no longer required, they would be disconnected from the system before being dismantled and recycled or reused if possible. It is likely the decommissioning methods would be similar to those required to install this component of the Proposed Onshore Scheme, and decommissioning would be separately assessed at the time.

5.2.19 Potential receptors would be the same as within construction phase (see **Paragraph 5.2.6**).

5.2.20 It is not anticipated that impacts from decommissioning would present a greater environmental risk than any assessed impacts from the construction phase.

5.3 Proposed Underground HVAC Cable Corridor

Construction impacts

5.3.1 The construction of the proposed Underground HVAC Cable Corridor may locally alter the existing groundwater levels and flows.

5.3.2 It is anticipated that the main groundwater table will generally not be encountered during excavation of the proposed Underground HVAC Cable Corridor. However, some perched groundwater may be encountered across the Draft Order Limits.

5.3.3 Trenchless crossings will utilise methodologies that exclude groundwater (negligible groundwater is allowed to enter the tunnel/HDD used for the crossing). This limits the potential for groundwater ingress and subsequently drawdown.

5.3.4 If dewatering were to be required to maintain the water level within the superficial deposits, it is anticipated that any dewatering will be undertaken by pumping out seepages of water rather than active lowering of the groundwater table.

5.3.5 Groundwater quality impacts could occur from general construction activities including potential uncontrolled release of contamination during construction (such as accidental release of fuel or other construction chemicals). This includes breakout from any trenchless crossings.

5.3.6 Based on Sea Link ES (Ref 1) it has been assumed that piling is required at all pylons (as a reasonable worst-case scenario) which can locally impact groundwater levels/flows or act as a pollution source.

5.3.7 Potential receptors scoped in within 500m of the Draft Order Limits and assumed to be in hydraulic continuity:

a. Aquifer – Principal – Bedrock – Crag Group.
b. Aquifer – Secondary A – Superficials – Alluvium.
c. Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels).
d. Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts).
e. Aquifer – Secondary (undifferentiated) – Superficials – Peat.
f. Aquifer – Secondary (undifferentiated) – Superficials – Head.
g. Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton).
h. One licensed groundwater abstraction (outlined in **Annex A:**):
   i. 7/35/03/*G/0001.
i. Three private groundwater abstractions (outlined in **Annex A:**):
   i. 00/00010/PWWELL.
j. Two deregulated licence points.
   i. Waveney and East Suffolk Chalk and Crag Groundwater Body.
   ii. SPZ3 across the Kiln Lane Substation Site options.

5.3.8 Water management, together with pollution prevention and control, would be undertaken in line with the measures outlined in **Appendix 2.1 Outline Onshore Code of Construction Practice** which aim to reduce the likelihood and magnitude of any impact to negligible.

Operational impacts

5.3.9 In the very unlikely event that a fault occurs (i.e., a cable strike) along the proposed Underground Cable Corridor, cable repairs may be required. The activities involved would be similar to installation, typically limited to the location of the repair. Depending on the severity of the fault, repairs could range from use of specialised sheath repair similar in nature to a joint bay unit, to full replacement of the cable section between the joint bay units. Localised maintenance work could require groundwater management which would potentially impact groundwater levels and flows, as during construction.

5.3.10 Groundwater quality could also be impacted by localised maintenance work, or accidental release of fuel or other chemicals. The magnitude of any leakage or spill would be dependent on the location, quality, frequency of occurrence, flow and duration.

5.3.11 Potential receptors would be the same as within construction phase (see **Paragraph 5.3.7**).

5.3.12 Risks from maintenance works would be similar to construction, but on a smaller scale with the same control measures implemented.

Decommissioning impacts

5.3.13 Dependent on specific requirements, the redundant cables could either be left in-situ, or all or parts of the cable could be removed for recycling. Where this is not possible, removed cables would be disposed of in accordance with the relevant waste disposal regulations at the time of decommissioning.

5.3.14 If decommissioning is required, it is expected that it would use similar methods as those required to install the asset with decommissioning separately assessed at the time. All above ground assets along the proposed Underground HVAC Cable Corridor would be removed to foundation level and foundations capped.

5.3.15 It is not anticipated that impacts from decommissioning would present any greater environmental risk than any assessed impacts from the construction phase.

5.4 Proposed Converter Station

5.4.1 The construction of the proposed Converter Station may locally alter the existing groundwater levels and flows.

Construction impacts

5.4.2 Groundwater levels can be temporarily reduced by excavation below the water table. Conversely the installation of below ground infrastructure can locally increase the water table due to mounding effects. Based on Sea Link ES (Ref 5) it has been assumed that piling is required at the proposed Converter Station (as a reasonable worst-case scenario).

5.4.3 Altered recharge to ground from temporary or permanent works can also locally impact groundwater levels; where stripping of low permeability materials could increase local recharge whilst installation of low permeability material could reduce local recharge and increase runoff.

5.4.4 Groundwater flows can be locally altered during construction associated with piling and installation of below ground structures. Piling has the potential to create new temporary or permanent groundwater flow pathways.

5.4.5 Groundwater quality impacts could occur from general construction activities including piling, mobilising existing contaminants or potential uncontrolled release of contamination during construction (such as accidental release of fuel or other construction chemicals. Groundwater quality impacts in relation to existing contamination are assessed in further detail in **Chapter 9 Geology and Contamination.**

5.4.6 Potential receptors scoped in within 500m of the Draft Order Limits and assumed to be in hydraulic continuity:

a. Aquifer – Principal – Bedrock – Crag Group.
b. Aquifer – Secondary A – Superficials – Alluvium.
c. Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels.
d. Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts).
e. Aquifer – Secondary (undifferentiated) – Superficials – Peat.
f. Aquifer – Secondary (undifferentiated) – Superficials – Head.
g. Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton).
h. One licensed groundwater abstractions (outlined in **Annex A:**);
   i. 7/35/03/*G/0001.
i. Three private groundwater abstractions (outlined in **Annex A:**);
   i. 00/00010/PWWEL.
j. Two deregulated licence points;
   i. Waveney and East Suffolk Chalk and Crag Groundwater Body.
   ii. SPZ3 across the Proposed Kiln Lane Substation options.

5.4.7 The temporary alteration of groundwater flows or levels from water management has the potential for impacts if altering baseflow to groundwater dependent receptors (abstractions and ecological sites) or altering the potential for groundwater flooding. With embedded design measures in place, the regulatory regime (for abstractions and discharges) and control measures as set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** the magnitude of impact is considered to be negligible.

5.4.8 Impacts from altered infiltration into the ground from hardstanding will be managed through the drainage design to be implemented in line with SuDS principles, taking into account climate change. On this basis, magnitude of impact is considered to be negligible.

5.4.9 Works that could result in new preferential pathways and alteration to groundwater flows are unlikely to result in impacts greater than negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice**, including development of a foundation works risk assessment, pipe bedding design and appropriate decommissioning of site investigation boreholes, are followed.

5.4.10 For uncontrolled release of contaminants, the magnitude of impact is considered to be negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** are followed.

Operation impacts

5.4.11 Groundwater levels and flows could be impacted by the operational drainage regime, altering the location and magnitude of infiltration.

5.4.12 Localised maintenance work could require groundwater management which would potentially impact groundwater levels and flows, as per construction.

5.4.13 Groundwater quality could also be impacted by localised maintenance work, accidental release of fuel or other chemicals. The magnitude of any leakage or spill would be dependent on the location, quality, frequency of occurrence, flow and duration

5.4.14 Potential receptors would be the same as within construction phase.

5.4.15 The drainage is to be designed in line with SuDS principles and taking into consideration climate change. As such, negligible impacts to the groundwater regime are anticipated.

5.4.16 Risks from maintenance works would be similar to construction, but on a smaller scale with the same control measures implemented.

5.4.17 Accidental release of fuel or other construction chemicals is unlikely to result in impacts greater than negligible during operation as storage and use of chemicals/fuel will be undertaken in accordance with best practice pollution prevention measures and drainage design (such as bunded tanks).

Decommissioning impacts

5.4.18 In the event that the Proposed Onshore Scheme ceases operation, the proposed Converter Station would be decommissioned in accordance with a decommissioning plan that is expected to include but not limited to as follows:

a. dismantling and removal of equipment;
b. removal of cabling from site;
c. removal of any building services equipment;
d. demolition of the buildings and removal of fences; and
e. landscaping and reinstatement of the Proposed Converter Station Site.

5.4.19 The main components would be dismantled and removed for recycling wherever possible. It will also be evaluated whether the buried cables systems could be used for another purpose. Where this is not possible disposal would be undertaken in accordance with the relevant waste disposal regulations at the time of decommissioning. It is anticipated that the permanent access road would be left in-situ whereas the above ground features would be removed to a sufficient depth to allow other practices/construction to occur unhindered.

5.4.20 If decommissioning is required, the scale and nature of activities would use similar methods as those required to install the asset with decommissioning separately assessed at the time.

5.4.21 Potential receptors would be the same as within construction phase.

5.4.22 It is not anticipated that impacts from decommissioning would present no greater environmental risk than any assessed impacts from the construction phase.

5.5 Proposed Underground HVDC Cable Corridor

Construction impacts

5.5.1 The construction of the proposed Underground HVDC Cable Corridor may locally alter the groundwater levels and flows.

5.5.2 It is anticipated that the main groundwater table will generally not be encountered during excavation of the proposed Underground Cable Corridor. However, some perched groundwater may be encountered across the Draft Order Limits or the water table may be encountered in valleys or at watercourse crossings. Where water management is required, this could result in localised impacts to groundwater levels and flows, and any nearby dependent receptors.

5.5.3 Trenchless crossings will utilise methodologies that exclude groundwater (prevent groundwater entering the trenchless crossing); limiting the potential for groundwater ingress and subsequently drawdown.

5.5.4 If dewatering were to be required to maintain the water level within the superficial deposits. It is anticipated that any dewatering will be undertaken by pumping out seepages of water rather than active lowering of the groundwater table.

5.5.5 Potential receptors include:

a. Aquifer – Principal – Bedrock – Crag Group.
b. Aquifer – Secondary A – Superficials – Alluvium.
c. Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels).
d. Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts).
e. Aquifer – Secondary (undifferentiated) – Superficials – Peat.
f. Aquifer – Secondary (undifferentiated) – Superficials – Head.
g. Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton).
h. One licensed groundwater abstractions (outlined in **Annex A:**);
    i. 7/35/03/*G/0009 50m east of the Draft Order Limits, used for direct spray irrigation.
i. Four private groundwater abstractions (outlined in **Annex A:**);
j. Two deregulated licence points.

    i. 00/00190/PWWELL 40m west of the Draft Order Limits, used for domestic supply.
    ii. 03/00006/PWWELL 100m west of the Draft Order Limits, used for domestic supply.
k. Waveney and East Suffolk Chalk and Crag Groundwater Body.
l. SPZ3 in southern section of the proposed Underground HVDC Cable.
m. Minsmere to Walberswick Heaths and Marshes SSSI.

5.5.6 Water management, together with pollution prevention and control, would be undertaken in line with the measures outlined in **Appendix 2.1 Outline Onshore Code of Construction Practice** which aim to reduce the likelihood and magnitude of any impact to negligible.

Operational impacts

5.5.7 In the very unlikely event that a fault occurs (i.e., a cable strike) along the proposed Underground Cable, cable repairs may be required. The activities involved would be similar to installation, typically limited to the location of the repair. Depending on the severity of the fault, repairs could range from use of specialised sheath repair similar in nature to a joint bay unit, to full replacement of the cable section between joint bays. Localised maintenance work could require groundwater management which would potentially impact groundwater levels and flows, as during construction.

5.5.8 Groundwater quality could also be impacted by localised maintenance work, or accidental release of fuel or other chemicals. The magnitude of any leakage or spill would be dependent on the location, quality, frequency of occurrence, flow and duration.

5.5.9 Potential receptors would be the same as within construction phase (see **Paragraph 5.5.5**).

5.5.10 Risks from maintenance works would be similar to construction, but on a smaller scale with the same control measures implemented.

Decommissioning impacts

5.5.11 Dependent on specific requirements the redundant cables could either be left in-situ, or all or parts of the cable could be removed for recycling. Where this is not possible, removed cables would be disposed of in accordance with the relevant waste disposal regulations at the time of decommissioning.

5.5.12 If decommissioning is required, it is expected that it would use similar methods as those required to install the asset with decommissioning separately assessed at the time. All above ground assets along the proposed Underground HVDC Cable Corridor would be removed to foundation level and foundations capped.

5.5.13 It is not anticipated that impacts from decommissioning would present any greater environmental risk than any assessed impacts from the construction phase.

5.6 Proposed Landfall

5.6.1 The construction of the proposed Landfall may locally alter the existing groundwater levels and flows.

Construction impacts

5.6.2 Groundwater levels can be temporarily reduced by excavation below the water table. Conversely the installation of below ground infrastructure can locally increase the water table due to mounding effects.

5.6.3 Altered recharge to ground from temporary or permanent works can also locally impact groundwater levels; where stripping of low permeability materials could increase local recharge whilst installation of low permeability material could reduce local recharge and increase runoff.

5.6.4 Groundwater flows can be locally altered during construction associated with the installation of below ground structures.

5.6.5 Groundwater quality impacts could occur from general construction activities including mobilising existing contaminants or potential uncontrolled release of contamination during construction (such as accidental release of fuel or other construction chemicals. Groundwater quality impacts in relation to existing contamination are assessed in further detail in **Chapter 9 Geology and Contamination.**

5.6.6 Potential receptors scoped in within 500m of the Draft Order Limits and assumed to be in hydraulic continuity:

a. Aquifer – Principal – Bedrock – Crag Group.
b. Aquifer – Secondary A – Superficials – Alluvium.
c. Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels).
d. Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts).
e. Aquifer – Secondary (undifferentiated) – Superficials – Peat.
f. Aquifer – Secondary (undifferentiated) – Superficials – Head.
g. Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton).
h. Waveney and East Suffolk Chalk and Crag Groundwater Body.
i. Minsmere to Walberswick Heaths and Marshes SSSI.

5.6.7 The temporary alteration of groundwater flows or levels from water management has the potential for impacts greater than negligible if altering baseflow to groundwater dependent receptors (abstractions and ecological sites) or altering the potential for groundwater flooding. With embedded design measures in place, the regulatory regime (for abstractions and discharges) and control measures as set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** the magnitude of impact is considered to be negligible.

5.6.8 Impacts from altered infiltration into the ground from hardstanding will be managed through the drainage design to be implemented in line with SuDS principles, taking into account climate change. On this basis, magnitude of impact is considered to be negligible.

5.6.9 Works that could result in new preferential pathways and alteration to groundwater flows are unlikely to result in impacts greater than negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice,** including development of a foundation works risk assessment, pipe bedding design and appropriate decommissioning of site investigation boreholes, are followed.

5.6.10 For uncontrolled release of contaminants, the magnitude of impact is considered to be negligible if control measures set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** are followed.

Operational impacts

5.6.11 In the very unlikely event that a fault occurs (i.e., a cable strike) along the proposed Underground cables, cable repairs may be required. The activities involved would be similar to installation, typically limited to the location of the repair. Depending on the severity of the fault, repairs could range from use of specialised sheath repair similar in nature to a joint bay unit, to full replacement of the cable section between joint bays. Localised maintenance work could require groundwater management which would potentially impact groundwater levels and flows, as during construction.

5.6.12 Groundwater quality could also be impacted by localised maintenance work, or accidental release of fuel or other chemicals. The magnitude of any leakage or spill would be dependent on the location, quality, frequency of occurrence, flow and duration.

5.6.13 Potential receptors would be the same as within construction phase (see **Paragraph 5.6.6**).

5.6.14 Risks from maintenance works would be similar to construction, but on a smaller scale with the same control measures implemented.

Decommissioning

5.6.15 All above ground assets at the proposed Landfall would be removed to foundation level and foundations capped. The below ground transition joint bay providing onshore to offshore cable interface may be left in place. If decommissioning is required, it is expected that there would be similar methods used as those required to install the asset.

5.6.16 It is not anticipated that impacts from decommissioning would present any greater environmental risk than any assessed impacts from the construction phase.

5.7 Summary of scoped in receptors susceptible to impacts without mitigation

5.7.1 Based on hydrogeological conceptualisation of the Proposed Onshore Scheme, **Table 5.1** summarises the groundwater features within the study area identified as being susceptible to changes in groundwater conditions without implementing control measures.

5.7.2 Further details on the abstractions are outlined in **Annex A:**.

Table 5.1: Receptors susceptible to potential impacts

Receptors susceptible to potential impacts
Aquifer – Principal – Bedrock – Crag Group
Aquifer – Secondary A – Superficials – Alluvium
Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels)
Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts)
Aquifer – Secondary (undifferentiated) – Superficials – Peat
Aquifer – Secondary (undifferentiated) – Superficials – Head
Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton)
Minsmere-Walberswick Heaths and Marshes SSSI and GWDTE
Licensed groundwater abstraction - AN/035/0003/005
Licensed groundwater abstraction - 7/35/03/*G/0060
Licensed groundwater abstraction - 7/35/03/*G/0009
Licensed groundwater abstraction - 7/35/03/*G/0001
Licensed surface water abstraction - AN/035/0004/018
Private groundwater abstraction - 00/00190/PWWELL
Private groundwater abstraction - 00/00204/PWWELL
Private groundwater abstraction - 00/00218/PWWELL
Private groundwater abstraction - 00/00010/PWWELL
8 deregulated groundwater abstraction licence points
Waveney and East Suffolk Chalk and Crag WER Classified Groundwater Body
SPZ3

6 Control Measures

6.1 Introduction

6.1.1 Based on the conceptualisation, receptors susceptible to groundwater flow, drawdown or quality impacts have been identified. This section outlines a selection of the key embedded mitigation measures and essential control measures included within the design or management plans to eliminate or reduce the magnitude of impacts for different site activities.

6.1.2 All site activities and working methods will be manged to protect the quality of surface water and groundwater resources from adverse effects as outlined within **Appendix 2.1 Outline Onshore Code of Construction Practice**.

6.2 Construction control measures

6.2.1 Key construction activity embedded and essential control measures to eliminate or reduce hydrogeological impacts are summarised in **Table 6.1**.

Table 6.1: Construction mitigation measures

Activity	Mitigation
Piling and deep structures	• Measures within the Outline Onshore CoCP. • A Soil Management Plan will be developed and implemented. • A Foundation Works Risk Assessment will be conducted as well as Water Management Plan and Fluid Breakout/Frac-Out Management Plan as outlined in Outline Onshore CoCP. • The control of earthworks or materials movement (including any re-use of materials) is to be carried out under appropriate Environmental Permits, exemptions to the Environmental Permitting system or by use of the CL:AIRE 'The definition of Waste: The development industry Code of Practice'. • Pollution Incident Control Plan within Outline Onshore CoCP. • In the event of a substantial spill during construction, all relevant landowners/tenants, will be contacted within 24 hours. If located within SPZ3, the Environment Agency and relevant water supply owner will be contacted immediately. It will be determined if any licenced abstractions or private water supplies might be affected. An assessment of the likelihood of groundwater contamination reaching identified licenced abstractions and private water supplies will be undertaken, and where a PWS is likely to have been affected, an alternative water supply will be provided, as appropriate. As outlined in the Outline Onshore CoCP.
Temporary change in land use (e.g. increased hardstanding)	• Temporary construction drainage plan, as per the Outline Onshore CoCP. Where new or additional surfacing is required

Activity	Mitigation
	within access tracks and compound areas, it will be permeable surfaces where ground conditions allow. • Pollution prevention measures (as per Outline Onshore CoCP). • Soil Management Plan • Sustainable Drainage System (SuDS) techniques will be utilised at permanent and temporary above ground installations to manage rainfall runoff in terms of both quality and quantity, as well as within construction compounds and along the pipeline corridor during construction. Techniques will be selected based on the ground conditions, and with reference to the hierarchy outlined in the national planning policy guidance (NPPG). Surface water management will achieve sufficient attenuation and treatment of surface water runoff to avoid increases in flood risk and pollution of the water environment.
Construction dewatering for below ground activities	• Through design and embedded mitigation routing of the proposed Underground HVDC Cable Corridor will avoid sensitive water environment receptors i.e. SPZ1 and SPZ2. • Through design and embedded mitigation drainage design will be made in line with SuDS principles to prevent impacts to water quality and quantity. • Contractor(s) will adhere to EA's approach to Groundwater Protection 2018 Framework. • Dewatering will generally be undertaken by pumping out of seepages of water, rather than active lowering of the groundwater table. • For active abstraction licences and private water supplies, control measures will be outlined in the water management plan. In the event of a land owner or tenant reporting that installation activities have affected water supplies, an initial response will be provided within 24 hours and an alternative water supply will be provided as appropriate. • Any temporary dewatering activities during construction will be undertaken in accordance with Environment Agency guidance and, if required, relevant abstraction licence and environmental permits obtained. Activities will be limited to the depth and time required to facilitate construction activities. • Any abstraction will be temporary in nature with no permanent abstractions proposed or required.
Trenchless Crossings	• Through design and embedded mitigation trenchless crossings will be used across all main rivers and medium to high value ordinary watercourses. Trenchless methodologies will also exclude groundwater. • All works within or proximity to main rivers or Ordinary Watercourses will be undertaken in accordance with a method approved by the relevant authority, or the protective provisions of the application for development consent as set out in Outline Onshore CoCP.

Activity	Mitigation
General construction activities	• Measures within Outline Onshore CoCP.

6.3 Operation

6.3.1 Key operational activity embedded and essential control measures to eliminate or reduce impacts are outlined in **Table 6.2**.

Table 6.2: Operational mitigation measures

Activity	Mitigation
Operational Drainage	SuDs principles to attenuate and appropriately treat runoff prior to discharge.
Maintenance activities	Measures within the Operational Management Plan, which are assumed to align with the Outline Onshore CoCP measures, as a minimum.
Accidental release of fuel or other chemicals	All use and storage of chemicals to be undertaken in accordance with Environment Agency Guidance for Pollution Prevention (GPP) documents and controlled and monitored under the Outline Onshore CoCP and general construction site good environmental and waste management procedures. A Pollution Incident Control Plan will be developed and implemented.

7 Monitoring Plan

7.1.1 As set out in **Appendix 2.1 Outline Onshore Code of Construction Practice**, monitoring systems will be employed during the construction phase to verify impacts and ensure compliance with any licences or permits obtained.

7.1.2 The lead contractor will consult the Environment Agency regarding water quality, flow and level monitoring to be undertaken for watercourses and groundwater that will be affected by construction works or discharge of surface water runoff, which will include the following, as appropriate:

a. pre-construction monitoring to establish baseline water quality conditions for watercourses and groundwater;
b. monitoring during construction works to enable the effectiveness of mitigation measures to limit pollution risk to be monitored and any pollution incidents to be identified; and
c. monitoring of watercourses or groundwater receiving surface water runoff during construction to enable effective treatment and other sustainable drainage systems measures to be determined and to ensure that an unacceptable rise in groundwater levels does not occur.

7.1.3 Any monitoring and groundwater control installations will be appropriately capped and secured during monitoring and decommissioned in line with best practice guidance on completion.

8 Hydrogeological Impact Magnitude

8.1 Hydrogeological Impact Magnitude

8.1.1 To inform the **Chapter 12 Hydrology, Hydrogeology and Drainage** of the PEIR, based on the impact assessment and identified control measures outlined above, the anticipated magnitude of hydrogeological impact is summarised in **Table 8.1** below.

8.1.2 These impacts will be reviewed and further reported within the subsequent ES as further survey and site investigation data is obtained and the design of the Proposed Onshore Scheme develops.

Table 8.1: Hydrogeological Impact Magnitude

Scoped in receptor	Impact magnitude
Aquifer – Principal – Bedrock – Crag Group	Negligible
Aquifer – Secondary A – Superficials – Alluvium	Negligible
Aquifer – Secondary A – Superficials – Lowestoft Formation (sands and gravels)	Negligible
Aquifer – Secondary B – Superficials – Lowestoft Formation (clay and silts)	Negligible
Aquifer – Secondary (undifferentiated) – Superficials – Peat	Negligible
Aquifer – Secondary (undifferentiated) – Superficials – Head	Negligible
Aquifer – Secondary (undifferentiated) – Superficials – Lowestoft Formation (diamicton)	Negligible
Minsmere-Walberswick Heaths and Marshes SSSI and GWDTE	Negligible
Licensed groundwater abstraction - AN/035/0003/005	Negligible
Licensed groundwater abstraction - 7/35/03/*G/0060	Negligible
Licensed groundwater abstraction - 7/35/03/*G/0009	Negligible
Licensed groundwater abstraction - 7/35/03/*G/0001	Negligible
Licensed surface water abstraction - AN/035/0004/018	Negligible
Private groundwater abstraction - 00/00190/PWWELL	Negligible
Private groundwater abstraction - 00/00204/PWWELL	Negligible
Private groundwater abstraction - 00/00218/PWWELL	Negligible
Private groundwater abstraction - 00/00010/PWWELL	Negligible
Eight deregulated groundwater abstraction licence points	Negligible
Waveney and East Suffolk Chalk and Crag WER Classified Groundwater Body	Negligible

Scoped in receptor	Impact magnitude
SPZ3	Negligible

9 Conclusions

9.1.1 The hydrogeological baseline has been collated based on publicly available data, requested information from regulators/stakeholders and site-specific Ground Investigation data.

9.1.2 Based on the baseline collated to date, a primarily qualitative HIA has been undertaken of the construction and operational impacts to hydrogeological receptors within the study area. This assessment, utilising the source-pathway-receptor conceptualisation, has identified receptors potentially susceptible to impacts and receptors that can be descoped from further assessment due to limited hydraulic continuity.

9.1.3 The assessment has concluded that the magnitude of impacts are negligible after taking into consideration the embedded design measures and control measures as set out in **Appendix 2.1 Outline Onshore Code of Construction Practice**.

9.1.4 As the design and assessment progress, the mitigation measures will continue to be reviewed to seek to reduce the likelihood and magnitude of hydrogeological impacts.

Topic Glossary

Acronym/Phrase/Abbreviation	Definition
Principal aquifer	Provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands
Secondary A aquifer	Permeable layers that can support local water supplies, and may form an important source of base flow to rivers
Secondary B aquifer	Mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers
Secondary undifferentiated	Where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value
Unproductive	Largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them
Source Protection Zone	Source Protection Zones are defined around large and public potable groundwater abstraction sites. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water
AONB	Area of Outstanding Natural Beauty
BGS	British Geological Survey
°C	Degrees Celsius
CAMS	Catchment Abstraction Management Strategy
CH_4,	Methane
CO	Carbon monoxide
CoCP	Code of Construction Plan
CO_2	Carbon dioxide
CP	Cable Percussion
DCP	Dynamic Cone Penetration
DEFRA	Department for Environment, Food and Rural Affairs
Draft Order Limits	Draft Order Limits
EA	Environment Agency
EQS	Environmental Quality Standards
GI	Ground Investigation
GWDTE	Groundwater Dependent Terrestrial Ecosystems

Acronym/Phrase/Abbreviation	Definition
HDD	Horizontal Directional Drilling
HIA	Hydrogeological Impact Assessment
HoF	Hands off Flow
H_2S	Hydrogen sulfide
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LNR	Local Nature Reserves
MAGIC	Multi-Agency Geographic Information for the Countryside
mbgl	Metres Below Ground Level
mV	millivolts
NNR	National Nature Reserve
NVZ	Nitrate Vulnerable Zone
OS	Ordnance Survey
O_2,	Dioxygen
PAHs	Polycyclic Aromatic Hydrocarbon
PEIR	Preliminary Environmental Information Report
pH	Potential of hydrogen
PID	Photo-Ionisation Detection
PRA	Preliminary Contamination Risk Assessment
SAC	Special Areas of Conservation
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
TP	Trial Pit
TraC	Transitional and Coastal
WER	Water Environment Regulations
WFD	Water Directive Framework
WRMP	Water Resources Management Plan
WwTW	Wastewater Treatment Works
µS/cm	Microsiemens per centimeter

References

Ref 1 National Grid (2025). Sea Link Volume 6: Environmental Statement – Part 2, Suffolk, Chapter 5, Geology and Hydrogeology.

Ref 2 Department for Energy Security and Net Zero (2025) . Overarching National Policy Statement for Energy (EN-1).

Ref 3 Highways England (2020). Design Manual for Roads and Bridges. LA 113 Road drainage and the water environment.

Ref 4 Environment Agency (2007). Hydrogeological impact appraisal for dewatering abstractions., Science Report - SC040020/SR1.

Ref 5 BGS Geoindex webmap. [Online] http://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 9 July 2025)

Ref 6 British Geological Survey. The BGS Lexicon of Named Rock Units . [Online] https://webapps.bgs.ac.uk/lexicon/home.cfm?_ga=2.33214718.1751896827.1747399269-849132202.1747399269 (Accessed 9 July 2025)

Ref 7 British Geological Survey. BGS England and Wales map coverage 1:50,000 and 1:63,360 (map sheet 191). [Online] https://webapps.bgs.ac.uk/data/MapsPortal/https://largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001686 (Accessed 9 July 2025)

Ref 8 BGS Geological maps of the UK and continental shelf areas, East Anglia Sheet 52N, Solid Geology . [Online] https://largeimages.bgs.ac.uk/iip/mapsportal.html?id=1003767 (Accessed 9 July 2025)

Ref 9 BGS Great Britain National Series 1:10,000. [Online] https://webapps.bgs.ac.uk/data/MapsPortal/series.html?collection=NGMAP&series=10k (Accessed 9 July 2025)

Ref 10 DEFRA. Multi-Agency Geographic Information for the Countryside (MAGIC). [Online] https://magic.defra.gov.uk/ (Accessed 9 July 2025)

Ref 11 Natural England. Natural England Open Data Geoportal . [Online] https://naturalengland-defra.opendata.arcgis.com/ (Accessed 9 July 2025)

Ref 12 DEFRA. Department for Environment Food and Rural Affairs (DEFRA) Hydrology Data Explorer . [Online] https://environment.data.gov.uk/hydrology/landing (Accessed 9 July 2025)

Ref 13 Allen, D J, Brewerton, L J, Coleby, L M, Gibbs, B R, Lewis, M A, MacDonald, A M, Wagstaff, S J, and Williams, A T (1997). *The physical properties of major aquifers in*

England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. s.l. : Environment Agency R and D Publication 8.

Ref 14 H K Jones, B L Morris, C S Cheney, L J Brewerton, P D Merrin, M A Lewis, A M MacDonald, L M Coleby, J C Talbot, A A McKenzie, M J Bird, J Cunningham and V K Robinson (2000). *The physical properties of minor aquifers in England and Wales .* Keyworth, Nottingham : British Geological Survey Technical Report, WD/00/4. 234pp. Environment Agency R and D Publication 68.

Ref 15 Ander EL, Shand P and Wood S (2006). *Baseline Report Series: 21.The Chalk and Crag of north Norfolk and the Waveney Catchment. British Geological Survey Commissioned Report No. CR/06/043N.*

Ref 16 Environment Agency (2020). *East Suffolk Abstraction Licensing Strategy (ALS).*

Ref 17 DEFRA, Hydrology Data Explorer (2025). [Online] https://environment.data.gov.uk/hydrology/explore (Accessed 9 July 2025)

Ref 18 Met Office; Hollis, D.; Carlisle, E.; Kendon, M.; Packman, S.; Doherty, A. (2024). HadUK-Grid Gridded Climate Observations on a 1km grid over the UK, v1.3.0.ceda (1836-2023). [Online] NERC EDS Centre for Environmental Data Analysis. https://catalogue.ceda.ac.uk/uuid/b963ead70580451aa7455782224479d5/ (Accessed 9 July 2025)

Ref 19 British Geological Survey. Principal Aquifers in England and Wales. [Online] https://www2.bgs.ac.uk/groundwater/shaleGas/aquifersAndShales/maps/aquifers/Crag.html (Accessed 9 July 2025)

Annex A: Water Receptors (within 1km of Proposed Onshore Scheme)

A.1 Water Environment Regulations Surface Water Bodies and TraC Water Bodies

Water body ID	Operational Catchment	Management Catchment	Water Body	Water Body Type	Overall Status	Protected area	Scoped in/Out
Surface Water Bodies							
GB105035046290	Suffolk Coastal	Suffolk East	Blyth (d/s Halesworth)	River	Moderate	Blyth NVZ and Byfrord under Nitrates Directive	Out
GB105035046010	Suffolk Coastal	Suffolk East	Wenhaston Watercourse	River	Moderate	Blyth NVZ under Nitrates directive and Dews Pond as Special Area of Conservation.	Out
GB105035046270	Suffolk Coastal	Suffolk East	Minsmere Old River	River	Moderate	Sandings and Chelmsford, Blyth NVZ, Yoxford, Leiston Beck NVZ and Leiston Beck and Minsmere Old River under Nitrates Directive. Outer Thames Estuary and Minsmere-Walberswick as Special Protection Areas. Minsmere-Walberswick as Ramsar Site. Minsmere to Walberswick Heaths and Marshes as Special Area of Conservation.	In
GB105035046271	Suffolk Coastal	Suffolk East	Leiston Beck	River	Moderate	Sandings and Chelmsford, Yoxford, Leiston Beck NVZ and Leiston Beck and Minsmere Old River under Nitrates Directive. Minsmere-Walberswick as Special Protection Areas. Minsmere-Walberswick as Ramsar Site. Minsmere to Walberswick Heaths	Out

Water body ID	Operational Catchment	Management Catchment	Water Body	Water Body Type	Overall Status	Protected area	Scoped in/Out
						and Marshes as Special Area of Conservation.	
GB105035046260	Suffolk Coastal	Suffolk East	Hundred River	River	Bad	Sandings and Chelmsford under Nitrates Directive.	In
GB105035045980	Suffolk Coastal	Suffolk East	Fromus	River	Poor	Sandings and Chelmsford under Nitrates Directive. Fromus NVZ under Nitrates Directive.	In
TraC Water Bodies							
GB510503503700	Anglian TraC	Suffolk TraC	Blyth (S)	Transitional Water	Moderate	Outer Thames Estuary and Minsmere-Walberswick Special Protection Areas. Minsmere-Walberswick Ramsar Site.	Out
GB650503520002	Anglian TraC	Suffolk TraC	Suffolk	Coastal Water	Moderate	Outer Thames Estuary, Minsmere-Walberswick, Benacre to Easton Bavents and Alde-Ore Estuary as Special Protection Areas. Southwold the Denes, Lowestoft (South of Claremont Pier), Lowestoft (North of Claremont Pier) and Southwold the Pier under Bathing Water Directive. Minsmere-Walberswick and Alde-Ore Estuary as Ramsar Sites. Benacre To Easton Bavents Lagoons, Minsmere To Walberswick Heaths and Marshes, Orfordness-Shingle	Out

Water body ID	Operational Catchment	Management Catchment	Water Body	Water Body Type	Overall Status	Protected area	Scoped in/Out
						Street and Alde-Ore and Butley Estuaries as Special Areas of Conservation.	
GB610050076000	Anglian TraC	Suffolk TraC	Walberswick Marshes	Coastal Water	Good	Minsmere-Walberswick as Special Protection Area. Minsmere-Walberswick as Ramsar Site. Minsmere To Walberswick Heaths and Marshes as Special Area of Conservation.	Out

A.2 Local Licensed Surface Water Abstractions

Licence Number	Source	Use	Maximum abstraction quantities (m³/d)	Distance from Draft Order Limits	Scoped In/Out
Scenario 1					
7/35/03/*S/0084/R01	Minsmere Old River	Spray agriculture storage	2,400	625m east	Out - Downgradient from the proposed Underground Cable Corridor but with extensive dewatering unlikely and distance from construction unlikely to be impacted
AN/035/0004/018	Tributary of River Fromus	Spray agriculture storage	4,320	Within	In
Scenario 2 (in addition to those in scenario 1)					
AN/035/0005/004	Tributary of Ham Creek	Spray agriculture storage	2,750	860m south	Out - Downgradient from the proposed Underground Cable Corridor but with extensive dewatering unlikely and

Licence Number	Source	Use	Maximum abstraction quantities (m³/d)	Distance from Draft Order Limits	Scoped In/Out
					distance from construction unlikely to be impacted

A.3 Local Licensed Groundwater Abstractions

Licence Number	Use	Maximum abstraction quantities (m³/d)	Distance from Draft Order Limits	Scoped In/Out
Scenario 1				
7/35/02/*G/0130	Direct spray irrigation	500	995m west (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
7/35/02/*G/0138	Direct spray irrigation	1,500	640m east (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
AN/035/0003/005	Direct spray irrigation	1,100	475m east (Section C)	In
7/35/03/*G/0060 (Various well points – 10 originally but 2 now not working)	Direct spray irrigation	900	225m east (Section C)	In

Licence Number	Use	Maximum abstraction quantities (m³/d)	Distance from Draft Order Limits	Scoped In/Out
AN/035/0003/004	Direct spray irrigation	738	720m east (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
7/35/03/*G/0009	Direct spray irrigation	682	50m east (Section B)	In
7/35/03/*G/0052	Direct spray irrigation	910	880m east (Section B)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
7/35/03/*G/0073	Direct spray irrigation	1,091	Two abstraction points located approximately 400m and 610m east (Section B)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
7/35/05/*G/0008	Direct spray irrigation	728	910m south (Section B)	Out - Downgradient from the proposed Underground Cable Corridor, but with dewatering unlikely and distance from construction unlikely to be impacted
Scenario 2 (in addition to those in scenario 1)				
7/35/04/*G/0090	Direct spray irrigation	500	800m west (Section A)	Out - Downgradient from Proposed Onshore Scheme but

Licence Number	Use	Maximum abstraction quantities (m^3/d)	Distance from Draft Order Limits	Scoped In/Out
				with dewatering unlikely and distance from construction unlikely to be impacted
7/35/03/*G/0001	Direct spray irrigation	655	135m south (Section A)	In
AN/035/0005/026	General farming and domestic supply	50	770m west (Section A)	Out - Downgradient from Proposed Onshore Scheme but with dewatering unlikely and distance from construction unlikely to be impacted
AN/035/0005/016/R02	Direct spray irrigation	1,200	750m west (Section A)	Out - Downgradient from Proposed Onshore Scheme but with dewatering unlikely and distance from construction unlikely to be impacted
7/35/05/*G/0094	Direct spray irrigation	1,636	965m south (Section A)	Out - Downgradient from Proposed Onshore Scheme but with dewatering unlikely and distance from construction unlikely to be impacted

A.4 Local Private Groundwater Abstractions

Licence Number	Use	Distance from Draft Order Limits	Scoped In/Out
Scenario 1			
01/00065/PWWELL	Domestic residential use	850m north (Section D)	Out - only water supply on the farm. Downgradient from the proposed

Licence Number	Use	Distance from Draft Order Limits	Scoped In/Out
			Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
01/00045/PWWELL	Domestic residential use	760m west (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
00/00520/PWBORE	Domestic residential use	990m west (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
00/00190/PWWELL	Domestic residential use	40m west (Section C)	In
18/00003/PWBORE	Commercial use on a campsite	660m west (Section C)	Out - Upgradient of the proposed Underground Cable Corridor and dewatering unlikely
00/00532/PWBORE	Domestic residential use	800m west (Section C)	Out - Downgradient from the proposed Underground Cable Corridor but with

Licence Number	Use	Distance from Draft Order Limits	Scoped In/Out
			dewatering unlikely and distance from construction unlikely to be impacted
03/00006/PWWELL	Domestic residential use	100m west (Section C)	Out – from site visit information this abstraction has not been used in 18 years
00/00206/PWBORE	Domestic residential use	700m east (Section B)	Out - Downgradient from the proposed Underground Cable Corridor but with dewatering unlikely and distance from construction unlikely to be impacted
00/00204/PWWELL	Domestic residential use	185m west (Section B)	In
00/00210/PWWELL	Domestic residential use	690m west (Section B)	Out – upgradient from the proposed Underground Cable Corridor, dewatering unlikely and distance from the proposed Underground Cable Corridor, unlikely to be impacted
00/00207/PWWELL	Domestic residential use	725m west (Section B)	Out – upgradient from the proposed Underground Cable Corridor, dewatering unlikely and distance from the proposed Underground

Licence Number	Use	Distance from Draft Order Limits	Scoped In/Out
			Cable Corridor, unlikely to be impacted
00/00209/PWWELL	Domestic residential use	820m west (Section B)	Out – upgradient from the proposed Underground Cable Corridor, dewatering unlikely and distance from the proposed Underground Cable Corridor, unlikely to be impacted
00/00366/PWWELL	Domestic residential use	400m east (Section B)	Out – from site visit information well no longer in use due to low water levels
00/00218/PWWELL (Well in house and comes from crag. Water levels have been low over recent years)	Domestic residential use	200m east (Section B)	In
00/00010/PWWELL	Domestic residential use	340m south (Section A)	In
Scenario 2 (in addition to those in scenario 1)			
04/00001/PWWELL	Domestic residential use	795m east (Section A)	Out - Downgradient from Proposed Onshore Scheme but with distance from construction unlikely to be impacted
00/00199/PWWELL	Domestic residential use	930m south (Section A)	Out - Downgradient from Proposed Onshore Scheme but with distance

Licence Number	Use	Distance from Draft Order Limits	Scoped In/Out
			from construction unlikely to be impacted

A.5 Deregulated Groundwater Abstraction Points

Number	Distance from Draft Order Limits	Scoped In/Out
3277	20m west	In
3278	520m west	Out – upgradient from the proposed Underground Cable Corridor and dewatering unlikely and distance from the proposed Underground Cable Corridor, unlikely to be impacted
3303	20m west	In
3259	380m west	In
3312	700m west	Out – upgradient from the proposed Underground Cable Corridor and dewatering unlikely and distance from the proposed Underground Cable Corridor, unlikely to be impacted
3257	160m east	In
3258	30m west	In

Number	Distance from Draft Order Limits	Scoped In/Out
3253	330m east	In
3308	250m south	In
3260	345m east	In

A.6 Active Discharge Consents to Controlled Waters within 1km of Draft Order Limits

Consent Number (*only applicable under Scenario 2)	Licence Holder	Discharge Type	Distance from Draft Order Limits
PRETS04078	Harbour Inn	Food + Beverage Services/Cafe/Restaurant/Pub	870m north
PRETS11236	The Harbour Inn	WwTW (not water co) (not STP at a private premises)	860m north
PRENF19291	Haw wood Caravan Park	Holiday Accom/Camp Site/Caravan Site/Hotel/Hostel	500m west
PRENF16231	High Lodge Shooting School	Sport, Amusement + Recreation/Golf Club/Gym/Theme Pk/Spa	870m west
EPRJP3025GK	High Lodge Leisure and Shooting School	Domestic property (multiple) (incl. farmhouses)	845m west
AW4NF1830	Middleton Causeway PS	Pumping Station on Sewerage Network (water company)	240m east

Consent Number (*only applicable under Scenario 2)	Licence Holder	Discharge Type	Distance from Draft Order Limits
PRELF13997	Rose Cottage	Domestic property (single) (incl. farmhouse)	Within
PRENF04303	Land off moat road	Sale of Motor Vehicles/Maintenance + Repair	30m east
PRELF20769	Theberton House (barn conversion)	WwTW (not water co) (not STP at a private premises)	999m east
EPRFB3798WR	1 and 2 West House Farm Cottages	Domestic property (multiple) (incl. farmhouses)	230m east
ASCNF2628	Sternfield-Benhall Bridge PS	Pumping Station on Sewerage Network (water company)	60m south
PRENF20206	Woodside Cottages	WwTW (not water co) (not STP at a private premises)	330m east
EPRMB3794VW	Cloverlee STP	Domestic property (single) (incl. farmhouse)	420m east
EPRYB3390DR	The Chestnuts	Domestic property (single) (incl. farmhouse)	385m west
EPRQB3497AP*	St Lawrence Church	Church/Monastery/Abbey/Religious Retreat/Association HQ	510m east (of scenario 2)

A.7 Source Protection Zones (SPZs) within 1km of Draft Order Limits

Zone and description	Distance from Draft Order Limits	Scoped In/Out
SPZ1 associated with Rendham Road, Saxmundham boreholes	910m west	Out - distance from Proposed Onshore Scheme, unlikely to be impacted
SPZ1 associated with Coldfair Green boreholes and WTW	905m east	Out - distance from Proposed Onshore Scheme, unlikely to be impacted
SPZ2 associated with Rendham Road, Saxmundham boreholes	840m west	Out - distance from Proposed Onshore Scheme, unlikely to be impacted

Zone and description	Distance from Draft Order Limits	Scoped In/Out
SPZ2 associated with Coldfair Green boreholes and WTW and Leiston Water Tower	800m east	Out - distance from Proposed Onshore Scheme, unlikely to be impacted
SPZ3	Across the Draft Order Limits	In

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