The Great Grid Upgrade

North Humber to High Marnham

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North Humber to High Marnham

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1. Introduction

1.1 Overview

1.1.1 This groundwater (GW) baseline and qualitative groundwater risk assessment appendix has been produced to inform **Application Document 6.12 Chapter 12: Geology and Hydrogeology** of the Environment Statement (ES) for the North Humber to High Marnham Project (the 'Project'). This appendix has been prepared to provide baseline information regarding groundwater (hydrogeology) and a preliminary groundwater risk assessment for the elements of the Project described below.

1.1.2 As described in **Application Document 6.12 Chapter 12: Geology and Hydrogeology** the Study Area for hydrogeology comprises the physical extents of the Order Limits plus a buffer of 500 m.

1.1.3 The Project comprises approximately 90 km of new 400 kV proposed overhead line, together with modifications to existing 400 kV overhead lines. The Project itself does not propose any underground cabling for new 400 kV line. However, the Project does cross various existing utility assets (e.g. existing 11 kV and 33 kV overhead electricity lines), and in some instances, it is necessary to divert the existing third-party overhead line assets and underground them to facilitate the new 400 kV overhead line.

1.1.4 At scoping stage, the requirement for trenchless crossings (either for the Project or for utility diversions) and any associated dewatering was unknown and therefore this was scoped into the assessment for geology and hydrogeology. Significant effects on groundwater quality, levels and flows associated with the construction of proposed overhead line was scoped out of the assessment on the basis that dewatering to reduce groundwater levels was not anticipated. As the design of the Project has evolved, whilst there is no proposal for undergrounding of the Project itself, both the need for, and likely locations of, third-party asset diversions have been confirmed. Where these third-party asset diversions require undergrounding, there is potential for dewatering to be required, which could have an impact on groundwater flows, levels or quality, and therefore the diversions must be assessed to determine the likelihood for significant effects.

1.1.5 For third-party diversions that are proposed to be constructed via open cut trench outside of groundwater Source Protection Zones, these are scoped out of the groundwater risk assessment due to the shallow nature of the excavations (maximum 1.2 m depth) and groundwater levels being anticipated to be below the base of the excavations, together with the lower sensitivity of the water environment. At these locations dewatering would not be proposed and therefore impacts and effects on groundwater are not anticipated. Annex A presents details of the third-party diversions where a trenchless crossing (by Horizontal Directional Drilling) may be required and therefore an assessment has been undertaken. The assessment includes a preliminary assessment of the risks to groundwater from heat transfer from the underground cables – which may lead to impacts on sensitive groundwater receptors such as Woodland and Groundwater Dependent Terrestrial Ecosystems, Commitment GH10 in **Application document 7.3 Register of Environmental Actions and Commitments** secures the requirement for hydrogeological risk

assessment to be undertaken in any areas of trenchless crossings proposed following detailed design.

1.1.6 This appendix also includes an assessment of the potential for the Project to impact on each groundwater abstraction that has been identified within the Study Area, and this is presented in Annexes Annex B to Annex D. Although the Project has sought, where practicable, to avoid routeing and siting of infrastructure (including temporary works) within potentially contaminative sites such as landfills, and within sensitive locations such as groundwater Source Protection Zone 1 (SPZ 1); the northern part of the Project (Route Section A) is within a SPZ 1 and continues into the associated SPZ 2. In addition, as the Project has evolved, it has become necessary to place a construction compound (S-1) within the SPZ 1 in Route Section A, and to cross a historical landfill site near Ellerker in Route Section A. Therefore, this appendix includes an assessment of the proposed works within the SPZ 1 and 2, and the proposed works within the historical landfill site to determine whether there is potential for impacts and effects on groundwater and groundwater receptors associated with the Project.

1.1.7 These are the aspects of the Project where there is potential for either quality, flow or level impacts on groundwater and groundwater receptors, either through for example dewatering or through potential to mobilise existing contamination.

Engagement with the Environment Agency

1.1.8 Where the Project proposals involve works within a groundwater SPZ 1 or through a historical landfill, these specific scenarios have been discussed with the Environment Agency (EA) during separate consultation and engagement (as set out below), to agree the approach to construction and assessment.

- 19 September 2025 (Compound S-1 within SPZ 1);
- 23 April 2026 (works within historical landfill at Ellerker); and
- 8 June 2026 (third-party asset diversions – undergrounding in SPZ).

Structure of this Appendix

1.1.9 The structure of this appendix is as follows:

- Section 1.1: Overview
- Section 1.2: Baseline Information – provides information on, and identification of, potential receptors;
- Section 1.3: Methodology – presents information on the methodology followed in this appendix and the accompanying classification tables;
- Sections 1.4 to 1.7: Qualitative Groundwater risk assessment – presents an assessment of the groundwater risks of the Project proposals described in 1.1.3 to 1.1.7 above, using a combination of receptor identification and associated sensitivity and magnitude of the potential risk; and
- Section 1.8: Conclusions – presents a summary of the findings of this appendix.

1.1.10 For ease of reference the Project has been split into six geographical Route Sections (Route Sections A to F) for reader accessibility, which are described in **Application Document 6.4 Chapter 4 Description of the Project**.

Sources of Information

1.1.11 This baseline appendix is informed by a desk-based study of available information, including maps, geological data and other publicly available data. The following is a list of the key sources of information used to inform the desk study:

- British Geological Survey (BGS) 1:50,000 scale geological mapping (British Geological Survey, 2025)
- BGS GeoIndex Viewer (British Geological Survey, 2025), including the location of water wells;
- BGS Hydrogeological Maps of the UK (British Geological Survey, 2025);
- Mapped information, via the Multi-Agency Geographic Information for the Countryside (MAGIC) website (Defra, 2026) for Source Protection Zones (SPZ), aquifer designations, hydrological features, groundwater vulnerability, Drinking Water Safeguard Zones (DWSZ) and statutory designated sites;
- Groundwater abstraction data from the Environment Agency; and
- Private water supply information from East Riding of Yorkshire Council, North Lincolnshire Council and Bassetlaw District Council.

1.2 Baseline Information (Identification of Receptors)

Geology

1.2.1 The geology in the Study Area is shown on **Application Document 6.12.F1 Figure 12.1: Superficial Geology** and **Application Document 6.12.F2 Figure 12.2: Bedrock Geology** and summarised below.

1.2.2 An overview of the published geology indicated to be present within the Study Area is presented below, with detail relevant to the assessment of each of the proposed trenchless crossings and the Project elements within a SPZ 1 or historical landfill, presented in Annexes Annex B to Annex D and Sections 1.4 to 1.7. Further information on the geology within the Study Area is presented in **Application Document 6.12.A2 Appendix 12.2: Preliminary Contamination Risk Assessment**.

Published Geology – Superficial Deposits

1.2.3 The superficial geology beneath the eastern part of Route Section A generally comprises Diamicton (Till). The western part of Route Section A, as well as the whole of Route Sections B and C, and part of D predominantly comprise Alluvium and Warp. Route Sections E and F are found to be generally absent of superficial deposits.

Published Geology – Bedrock

1.2.4 The bedrock geology is indicated to predominantly comprise the Flamborough Chalk Formation and Burnham Chalk Formation in the east of Route Section A and the Mercia Mudstone Group in the west of Route Section A and across Route Sections B to F.

Aquifer Designation

1.2.5 An overview of the aquifer designations for the geological strata likely to be encountered within the Study Area is presented below, with further detail relevant to the assessment of each of the proposed trenchless crossings and the Project elements within a SPZ 1 or historical landfill, presented in Annexes Annex B to Annex D and Sections 1.4 to 1.7.

1.2.6 A review of the aquifer designations provided on the MAGIC online map viewer (Defra, 2026) indicates that the superficial deposits and bedrock deposits anticipated to be present within the Study Area of the Project are classified as follows:

- **Secondary A Aquifers (medium sensitivity):** Sand and gravel of uncertain age and origin, Bielby Sand Member, Alluvium, Warp, Breighton Sand Formation, Sutton Sand Formation, Glaciofluvial deposits, Holme Pierrepont sand and gravel member;
- **Secondary Undifferentiated Aquifers (low sensitivity):** Diamicton (Devensian and Mid Pleistocene Till) and Head Deposits; and
- **Unproductive Strata:** Hemingbrough Glaciolacustrine Formation and Peat.

1.2.7 The MAGIC Map (DEFRA, 2026) indicates that the bedrock deposits anticipated to be present within the Study Area are classified as follows:

- **Principal Aquifers (very high/high sensitivity):** Flamborough Chalk Formation, Burnham Chalk Formation, Welton Chalk Formation, Ferriby Chalk Formation, Hunstanton Formation, Brantingham Member, Lower Lincolnshire Limestone Member;
- **Secondary A Aquifers (medium sensitivity):** Kellaways Sand Member, Thorncroft Sand Member, Marlstone Rock Formation, Frodingham Ironstone;
- **Secondary B Aquifers (low sensitivity**): Mercia Mudstone Group, Scunthorpe Mudstone Formation;
- **Secondary Undifferentiated Aquifers (low sensitivity**): Clarborough Member, Charmouth Mudstone Formation, Penarth Group; and
- **Unproductive Strata:** Ancholme Group, Whitby Mudstone Formation.

1.2.8 Principal and Secondary Aquifers are described by the Environment Agency as rock layers that "*provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes, and wetland*" (Environment Agency, 2026).

1.2.9 Secondary A Aquifers are described by the Environment Agency as "*permeable layers that can support local water supplies and may form an important source of base flow to rivers*" (Environment Agency, 2026).

1.2.10 Secondary B Aquifers are described by the Environment Agency as "*mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks and openings or eroded layers*" (Environment Agency, 2026).

1.2.11 The Secondary Undifferentiated Aquifer classification is applied by the Environment Agency "*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" (Environment Agency, 2026).

1.2.12 Unproductive Strata are described by the Environment Agency as "*largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them*" (Environment Agency, 2026).

Groundwater Source Protection Zones

1.2.13 A groundwater SPZ is a zone defined around a groundwater source such as a well, borehole or spring, by the Environment Agency, to protect a drinking water supply from pollution. Groundwater SPZs are generally split into three zones showing the level of risk to a groundwater source from contamination.

1.2.14 A SPZ 1 (very high sensitivity) is defined as the inner zone which is a 50-day travel time of a pollutant to the abstraction point. A SPZ 2 Outer Zone (medium sensitivity) is defined as a 400-day travel time of a pollutant to the abstraction point. A SPZ 3 (low sensitivity) is defined as the total catchment, which is the area around an abstraction point within which all the groundwater ends up at the abstraction (Environment Agency, 2024).

1.2.15 MAGIC map (DEFRA, 2026) indicates that the majority of the Study Area is not within a groundwater SPZ, with the exception of:

- Route Section A, Birkhill Wood Substation to proposed pylon 4AF6, and associated Study Area = SPZ 1;
- Route Section A, proposed pylon 4AF6 to proposed pylon 4AF25, and associated Study Area = SPZ 2;
- Route Section A, proposed pylon 4AF25 to proposed pylon 4AF32, and associated Study Area = SPZ 3.

1.2.16 The MAGIC map (DEFRA, 2026) also shows that the majority of the Study Area is not located within a groundwater DWSZ, except for the same areas that are within the groundwater SPZs, discussed above.

1.2.17 The following Project elements are located within a groundwater SPZ in Route Section A (**Application Document 6.12.F4 Figure 12.4 Hydrogeology and Hydrogeological Receptors)**

- Satellite construction compound S-1 and an associated open-cut trench (NPG-01) to accommodate the installation of a power supply to the compound in SPZ 1 (see Section 12.4);
- Undergrounding of third-party assets NPG-02 (open cut) and NPG-03 (trenchless) in SPZ 1(see Section 1.4);
- Undergrounding of third-party assets NPG-04 (open cut) and NPG-05 (open cut) in SPZ 2 (see Section 1.5); and
- Undergrounding of third-party assets NPG-06 (trenchless) and NPG-07 (trenchless) in SPZ 3 (see Annex A).

Groundwater Vulnerability

1.2.18 The MAGIC map (DEFRA, 2026) indicates that the groundwater within the majority of the Study Area is classified as 'high' or 'medium-high' vulnerability. Within small discrete sections of the Order Limits the groundwater is classified as 'medium' or 'low', and these are coincidental with areas where clay rich, low permeability, superficial deposits are located overlying the bedrock deposits or where the bedrock is identified as being Unproductive Strata or a Secondary Undifferentiated Aquifer.

1.2.19 The Environment Agency define High vulnerability as "*Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits*" and areas of Low vulnerability as "*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 superficial deposits characterised by a low permeability*". Medium vulnerability is described as intermediate between Low and High vulnerability (Environment Agency, 2017).

Groundwater Bodies

1.2.20 The Study Area crosses the following Water Framework Directive groundwater bodies (Environment Agency, 2026) shown in Table 1.1.

Table 1.1 – Groundwater bodies crossed by the Study Area

Groundwater Body	Route Section	Quantitative Status	Chemical Status	Overall Status
Hull and East Riding Chalk (ref: GB40401G700700)	A	Poor	Poor	Poor
East Riding Mercia Mudstone (ref: GB40402G990200)	A, B	Poor	Poor	Poor
Trent Lower Erewash – Secondary Combined (ref: GB40402G990300)	B, C, E and F	Good	Good	Good
Idle Torne – Secondary Mudrocks (ref: GB40402G992200)	B, C, D and E	Good	Good	Good

Abstraction Data

Licensed and Deregulated Groundwater Abstractions

1.2.21 Information providing licenced groundwater abstractions and deregulated groundwater abstractions has been provided by the Environment Agency (27 April 2026) in response to a data request (9 December 2025).

1.2.22 Annex B presents an assessment of the potential for impacts related to the Project, on each of the licensed and deregulated groundwater abstractions within the Study Area. The locations of these abstractions are shown on Figure 12.4: Hydrogeology and Hydrogeological Receptors (**Application Document 6.12 Chapter 12 Geology and Hydrogeology**).

Private Water Supplies

1.2.23 Data describing private water supplies has been provided by East Riding of Yorkshire Council, North Lincolnshire Council and Bassetlaw District Council.

1.2.24 An assessment of the potential of the Project on each of the private water supplies identified within the Study Area has been undertaken and is presented within the tables in Annex C, the locations of which are presented on (**Application Document 6.12.F4 Figure 12.4 Hydrogeology and Hydrogeological Receptors**) British Geological Survey Water Well Data

1.2.25 The BGS has a data set containing water well data from its archive of borehole records. This data has been obtained and where a BGS water well point has been identified that does not appear on the lists of licensed groundwater supplies and private water supplies presented in Annex B and Annex C, these have been presented in Annex D and an assessment of the potential for impacts of the Project on each of the water wells undertaken.

1.3 Methodology

1.3.1 This qualitative groundwater risk assessment has been based on standard industry guidance provided within the Construction Industry Research and Information Association (CIRIA) report C552, Contaminated Land Risk Assessment (CIRIA, 2001). To determine the risk to the identified receptor, both the probability (Table 1.2) and the degree of harm to a potential receptor (Table 1.3) are used, and the risk estimated using the matrix in Table 1.4. The risk classifications are defined in Table 1.5. The receptor sensitivity for hydrogeology receptors is provided within Table 12.7 of **Application Document 6.12 Chapter 12: Geology and Hydrogeology**.

Table 1.2 – Classification of probability

Classification	Definition
High Likelihood	There is a linkage and an event either appears very likely in the short-term and almost inevitable over the long-term, or there is already evidence at the receptor of harm.
Likely	There is a linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low Likelihood	There is a linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter-term.
Unlikely	There is a linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table 1.3 – Classification of consequence

Classification	Examples
Severe	Controlled water effect – short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Persistent and/or extensive effects on water quality leading to closure of potable abstraction point or loss of amenity, agriculture or commercial value. Major fish kill. Major or irreversible change to groundwater aquifer(s) flow, water levels, quality or available yield. Groundwater resource use/abstraction is irreparably impacted upon, with a major or total loss of an existing supply or supplies.
Medium	Controlled water effect – pollution of sensitive water resources. Moderate long term or temporary significant changes to groundwater aquifer(s) flow, water level, quality or available yield which results in moderate long term or temporarily significant decrease in resource availability. Groundwater resource use/abstraction is impacted slightly, but existing supplies remain sustainable.
Mild	Controlled water effect – pollution of non-sensitive water resource. Minor changes to groundwater aquifer(s) flow, water level, quality or available yield leading to a noticeable change, confined largely to the Project area. Changes to water table level, groundwater quality and yield result in little discernible change to existing resource use.
Minor	Equivalent to insubstantial pollution incident with no observed effect on water quality. Very slight change from groundwater baseline conditions, approximating to 'no change' conditions. Dewatering effects create no or no noticeable effects.

Table 1.4 – Classification of risk

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High	High	Moderate	Low
	Likely	High	Moderate	Moderate	Low
	Low Likelihood	Moderate	Moderate	Low	Very low
	Unlikely	Low	Low	Very low	Very low

Table 1.5 – Risk rating definitions

Risk Classification	Description
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability.

Risk Classification	Description
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

1.4 Qualitative Groundwater Risk Assessment – Works proposed within SPZ 1

1.4.1 The works proposed within the SPZ 1 comprise:

- Construction of satellite construction compound S-1 alongside an open-cut trench (NPG-01) to facilitate the construction of an 11 kV electrical supply to the compound;
- NPG-02 - an open-cut trench excavated to underground an existing 11 kV overhead line between pylons 4AF3 and 4AF4.
- NPG-03 - a trenchless crossing that traverses the proposed access route for the Hornsea Project Four Offshore Wind Farm project; and

Ground Conditions

Geology

1.4.2 At the locations of the works proposed within the SPZ 1 the geology is anticipated to comprise superficial deposits of Diamicton overlying Chalk bedrock. The BGS archive boreholes in the vicinity of the proposed works indicate that the Diamicton is approximately 10 m thick and is described variably as “*brown soft clay*”, “*hard clay*”, “*sandy clay*” and “*yellow clay*”.

Hydrogeology

1.4.3 The Diamicton is classified as a Secondary Undifferentiated Aquifer, and the underlying Chalk is classified as a Principal Aquifer. The proposed works within the SPZ 1 are also located within a DWSZ. The SPZ 1 and DWSZ are assumed to relate to the groundwater within the Chalk aquifers. The Chalk aquifers are assigned a sensitivity of very high whilst the overlying Diamicton is assigned a sensitivity of low.

1.4.4 It is recognised that the geological composition of Diamicton is variable, and whilst predominantly clayey, the Diamicton can locally be more granular and therefore more permeable.

1.4.5 Whilst the Diamicton is not considered to fully confine the groundwater within the underlying Chalk, it is of significantly lower permeability than the Chalk and will therefore provide protection to the Chalk were contamination to be mobilised in the overlying strata or introduced during the proposed works within the SPZ 1.

1.4.6 A significant or continuous groundwater body is not anticipated within the Diamicton, and therefore groundwater is anticipated to be present at depth within the underlying Chalk.

Satellite Construction Compound S-1

1.4.7 Satellite Construction Compound S-1 in Section A is one of the compounds proposed to facilitate construction of the Project, as described in **Application Document 6.4 Chapter 4: Project Description.**

1.4.8 The compound would be formed by demarcating and securing the compound area with temporary fencing appropriate to the location. Once secured, the upper layers of soil would be stripped (assumed to be to a depth of no more than 1.0 m) and stored appropriately before finishing with a geotextile membrane and appropriate surface (assumed to be compacted aggregate).

1.4.9 Due to the sensitive hydrogeological nature of the location, a meeting was held with the Environment Agency on 19 September 2025 to discuss the Compound S-1 and the following proposed activities that would take place within it:

- Machinery storage;
- Site office parking area;
- Site offices and welfare facilities;
- Fencing;
- Lighting;
- Working yard and laydown area;
- Storage area for conductor drums;
- Wheel wash;
- Lockable containers;
- Soil bund; and
- Fuel storage.

1.4.10 There are no recorded licenced or deregulated groundwater abstractions within 500 m of Compound S-1; however, a private water supply borehole providing drinking water to a single residential property is located approximately 410 m to the northwest and a BGS water well record (TA03SW118/BJ) is recorded approximately 480 m to the southwest.

1.4.11 As described in **Application document 6.12.A2 Preliminary Contamination Risk Assessment** a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.4.12 Dewatering is not expected to be required for the construction of the compound as groundwater is anticipated to be below the base of the relatively shallow excavations required within the Diamicton. Therefore, risks to groundwater quality, flows or levels from dewatering at Compound S-1 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.4.13 The construction of Compound S-1 requires only a shallow excavation (approximately 1 m), which will be entirely within the cohesive Diamicton that is anticipated to be present at thicknesses of greater than 10 m. Groundwater is not anticipated to be present within the depth of the excavation (or in any significant quantity anywhere within the Diamicton).

1.4.14 Therefore, risks associated with the creation of new flow pathways and/or connection of aquifers are considered to be very low.

Introduction of New Contamination During Construction

1.4.15 A meeting to discuss the proposed satellite compound was held with the Environment Agency on 19 September 2025. The proposed activities within the compound were discussed and the following measures agreed to provide protection to the underlying Chalk aquifer. These are secured by Commitment GH12 in **Application Document 7.3 Register of Environmental Actions and Commitments**

- Pre-commencement and pre-restoration site condition assessments to be completed;
- Fuel storage to be above ground and bunded;
- Refuelling to be undertaken in a designated area, following standard good practice guidance and utilising drip/spill trays;
- Wheel wash will be a fully contained system with no water discharged on site; and
- There will be no discharge of site run-off either to ground or to local watercourses – all site run off will be removed from site.

1.4.16 In addition to the above, **Application Documents 7.2 Outline Code of Construction Practice** and **7.3 Register of Environmental Actions and Commitments** contains measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported the scoping out the potential for the introduction of new contamination during construction.

1.4.17 Therefore, the control measures together with the anticipated thickness of low permeability Diamicton overlying the Chalk at the compound location result in a very low risk associated with the introduction of new contamination and drainage.

Trenchless Crossing NPG-03

1.4.18 A single trenchless crossing (NPG-03) is proposed within the groundwater SPZ 1 in Section A of the Project, and as described in **Application Document 6.4 Chapter 4 Project Description**. The crossing traverses the proposed access for the Hornsea

Project Four Offshore Wind Farm project and will therefore be relatively short and relatively shallow.

1.4.19 The trenchless crossing is proposed to be installed using horizontal directional drilling (HDD) and would reach a maximum depth of 6 m below ground level (bgl). The depth of the launch and reception pits are anticipated to be approximately 1.2 m bgl and whilst the method doesn't require dewatering itself, it may be necessary to remove any ingress of surface water or groundwater from the launch and reception pits.

1.4.20 One private water supply (East Riding of Yorkshire dataset, feature ID 16) and three BGS water well records (TA03SW118/BJ, TA03NW150/BJ and TA03NW177/BJ) are recorded within 500 m of NPG-03. These wells are not within the Order Limits and are either indicated to or considered highly likely to abstract water from the Chalk beneath the Diamicton.

1.4.21 As described in **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

1.4.22 In accordance with Commitment GH10 within the **Application Document 7.3 Register of Environmental Actions and Commitments**, a Hydrogeological Risk Assessment will be undertaken in any areas of trenchless crossings following detailed design.

Dewatering

1.4.23 Dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) within the HDD launch/reception pits is unlikely to be required as any groundwater is anticipated to be below the base of the pits. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-03 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.4.24 The construction of NPG-03 is unlikely to create new groundwater flow pathways or connections between aquifers as the anticipated geology is Diamicton extending to significantly greater depth than the maximum 6.0 m depth of the HDD which will remain within the Diamicton.

1.4.25 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.4.26 Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.4.27 Groundwater is anticipated to be significantly below the maximum HDD depth of 6.0 m; therefore, it is considered that the risk of impacts on groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.4.28 During the construction of the trenchless crossings there is the potential to create turbidity within the aquifer and also for the unplanned breakout of drilling fluids which could have an impact on nearby groundwater abstractions and other groundwater receptors.

1.4.29 NPG-03 is anticipated to be constructed within the Diamicton, within which a continuous groundwater table is not anticipated. Therefore, risks to groundwater and groundwater receptors associated with an increase in turbidity are considered to be very low.

1.4.30 During the HDD construction process, unplanned losses of drilling fluids can occur when the drilling bore encounters paths of lesser resistance, such as fractures, fissures or voids in the ground, and also when the strength and pressure of the ground overlying a trenchless bore is exceeded by the drilling fluid pressures. Unplanned losses of drilling fluids are often known as breakouts or frac outs.

1.4.31 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.4.32 Therefore, the risks associated with unplanned losses of drilling fluids are considered to be very low.

Groundwater Heat Pollution

1.4.33 The trenchless crossing is anticipated to remain within the Diamicton at this location and a continuous groundwater body is not anticipated within the low permeability superficial deposits. It is anticipated this trenchless crossing will be constructed via Horizontal Direction Drilling (HDD) and therefore the cables will be sealed into a duct (at the ends) within the ground. Therefore, whilst the project has identified an area of woodland with characteristics of Ancient Woodland within 200 m of the crossing – impacts on groundwater, or therefore this Woodland, relating to groundwater heat pollution, are not anticipated. The groundwater abstractions identified within 500 m of this crossing are not considered to be at risk from any groundwater heat pollution due to their distance away and the likelihood that they are abstracting from the chalk aquifer. However, given the location of this crossing within a SPZ 1 and close to the Woodland, additional groundwater heat pollution assessment will be undertaken following the ground investigation and hydrogeological risk assessment that is required in accordance with commitments GH01 and GH10 - to confirm the assumptions in this assessment and determine whether any additional mitigation or remediation is required.

Open Cut Trench NPG-01

1.4.34 The NPG-01 third-party diversion is proposed to be an open-cut trench to underground an existing 11 kV overhead line and is located immediately north of construction compound S-1. The maximum depth of the trench is anticipated to be 1.2 m bgl.

1.4.35 It is considered unlikely that groundwater would be encountered by the shallow excavations for the open cut trench within the predominantly clayey Diamicton.

1.4.36 One private water supply (East Riding of Yorkshire dataset, feature ID 16) and two BGS water well records (TA03NW150/BJ and TA03NW177/BJ) are recorded within 500 m of NPG-01. These wells are not within the Order Limits and are either indicated to, or considered highly likely to, abstract water from the Chalk beneath the Diamicton.

1.4.37 As described in **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.4.38 Groundwater is unlikely to be encountered within the predominantly clayey Diamicton within the depth of the proposed trench, and dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) is unlikely to be required. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-01 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.4.39 The excavation of the NPG-01 trench is unlikely to create new groundwater flow pathways as shallow groundwater is not expected to be encountered and the trench will remain wholly within the Diamicton Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

1.4.40 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

Introduction of New Contamination

1.4.41 **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** contain measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported scoping out the introduction of new contamination during construction.

1.4.42 Therefore, the control measures together with the anticipated thickness of low permeability Diamicton overlying the Chalk at the crossing location result in a very low risk associated with the introduction of new contamination.

Open Cut Trench NPG-02

1.4.43 The NPG-02 third-party diversion is proposed to be an open-cut trench to underground an existing 11kV OHL between pylons 4AF3 and 4AF4. The maximum depth of the trench is anticipated to be 1.2 m bgl.

1.4.44 It is considered unlikely that groundwater would be encountered by the shallow excavations for the open cut trench within the predominantly clayey Diamicton.

1.4.45 One private water supply (East Riding of Yorkshire dataset, feature ID 16) and three BGS water well records (TA03SW118/BJ, TA03NW150/BJ and TA03NW177/BJ) are recorded within 500 m of NPG-02. As described in Tables 12.10 and 12.13, these wells are not within the Order Limits and are either indicated to, or considered highly likely to, abstract water from the Chalk beneath the Diamicton.

1.4.46 As described in **Application Document 6.12.A2 Preliminary Contamination Risk Assessment,** a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.4.47 Groundwater is unlikely to be encountered within the predominantly clayey Diamicton within the depth of the proposed trench, and dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) is unlikely to be required. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-02 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.4.48 The excavation of the NPG-02 trench is unlikely to create new groundwater flow pathways as shallow groundwater is not expected to be encountered and the trench will remain wholly within the Diamicton Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

1.4.49 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

Introduction of New Contamination

1.4.50 **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** contain measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported scoping out the introduction of new contamination during construction.

1.4.51 Therefore, the control measures together with the anticipated thickness of low permeability Diamicton overlying the Chalk at the crossing location result in a very low risk associated with the introduction of new contamination.

1.5 Qualitative Groundwater Risk Assessment – Undergrounding in SPZ2

Open Cut Trench NPG-04

1.5.1 The NPG-04 third-party diversion comprises an open-cut trench (maximum depth of 1.2 m bgl) to underground an existing 11 kV overhead line between proposed pylons 4AF6 and 4AF7.

1.5.2 British Geological Survey mapping indicates that NPG-04 is located within an area underlain by Diamicton beneath which Chalk bedrock of the Burnham Chalk Formation is recorded. There are no BGS archive boreholes located within 500 m of NPG-04.

1.5.3 The Diamicton is classified as a negligible sensitivity Secondary Undifferentiated Aquifer, whilst the underlying Chalk is classified as a very high sensitivity Principal Aquifer. NPG-04 is located within a groundwater SPZ 2 and a groundwater DWSZ both of which are anticipated to relate to the groundwater within the Chalk aquifer.

1.5.4 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-04.

1.5.5 As described in the **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.5.6 Groundwater is unlikely to be encountered within the predominantly clayey Diamicton within the depth of the proposed trench, and dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) is unlikely to be required. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-04 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.5.7 The excavation of the NPG-04 trench is unlikely to create new groundwater flow pathways as shallow groundwater is not expected to be encountered, and the trench will remain wholly within the Diamicton. Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

1.5.8 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

Introduction of New Contamination

1.5.9 **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** contain measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported scoping out the introduction of new contamination during construction.

1.5.10 Therefore, the control measures together with the anticipated thickness of low permeability Diamicton overlying the Chalk at the crossing location result in a very low risk associated with the introduction of new contamination.

Open Cut Trench NPG-05

1.5.11 The NPG-05 third-party diversion comprises an open-cut trench (maximum depth of 1.2 m bgl) to underground an existing 11 kV overhead line between proposed pylons 4AF17 and 4AF18.

1.5.12 British Geological Survey mapping indicates that superficial deposits are not recorded at NPG-05 and that this area is underlain directly by Chalk bedrock of the Burnham Chalk Formation; a very high sensitivity Principal Aquifer. BGS archive borehole SE93SE83 records that the Chalk extends to at least 72.5 m bgl, with groundwater struck at 72 m bgl and a resting water level of 51.6 m bgl. NPG-05 is located within a groundwater SPZ3 and a groundwater DWSZ.

1.5.13 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-05.

1.5.14 As described in the **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.5.15 Groundwater is unlikely to be encountered within the Chalk within the depth of the proposed trench, and dewatering (lowering of groundwater levels rather than incidental pumping out of surface water ingress into excavations) is unlikely to be required. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-05 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.5.16 The excavation of the NPG-05 trench is unlikely to create new groundwater flow pathways as shallow groundwater is not expected to be encountered, and the trench will remain wholly within the Chalk. Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

1.5.17 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

Introduction of New Contamination

1.5.18 **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** contain measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported scoping out the introduction of new contamination during construction.

1.5.19 Therefore, there is considered to be a low risk associated with the introduction of new contamination.

1.6 Qualitative Groundwater Risk Assessment – NPG-09B - Trench for Electricity Supply to Construction Compound M-1

1.6.1 Proposed construction compound M-1 is located within agricultural land to the south of Ellerker in the East Riding of Yorkshire. This compound will require an electricity supply, proposed (as part of third-party diversion NPG-09A/B) to span between the compound and Cave Road, approximately 430 m to the east. The land between Cave Road and the proposed compound comprises three fields, the middle one in part comprising a historical landfill. Whilst the Project preference is to traverse the historical landfill using an proposed overhead line supported by wooden poles , there also remains the potential that an underground cable within a trench could be required. The maximum depth of the cable trench is anticipated to be 1.2 m bgl. The length of open-cut trench within the historical landfill is approximately 140 m. The potential cable trench and historical landfill were discussed with the Environment Agency at a meeting on 23 April 2026.

1.6.2 Since the meeting with the Environment Agency, the need for flexibility in the design of the electricity supply to compound M-1 has been established. Therefore, the possibility of a wooden pole within the landfill boundary is considered in this section, as well as the potential for an underground cable. The depth below ground of any wooden pole used to support overhead electrical connection to the construction compound, would be designed to respond to the specific ground conditions and

environmental conditions at the proposed location, including within the historical landfill.

Historical Land Use

1.6.3 Information received from the Environment Agency indicates that there are three historical landfills within the wider area between the proposed compound and Cave Road:

- Ellerker Pits Landfill No 2 (south of Whin Moor Lane);
- Land adjacent to former A63 Ellerker – Brough Road (north of Whin Moor Lane); and
- Stockbridge Roundabout (north of 'Land adjacent to former A63 Ellerker – Brough Road' landfill.

1.6.4 It is the 'Land adjacent to former A63 Ellerker – Brough Road' historical landfill that the Project proposes to traverse for the electricity supply to Compound M-1.

1.6.5 Limited information relating to the specified historical landfill is available within the Environment Agency's publicly available dataset of historical landfill information. Further, more detailed information was provided by the Environment Agency following the meeting in April 2026. A summary of the relevant information is provided below.

1.6.6 A licence (55/19/618) was granted by Humberside County Council on 11 July 1983. The licence states:

"The type of material deposited at the site shall be limited to… soil, subsoil, excavation waste and inert mineral wastes… agricultural wastes, excluding agrichemicals. No liquids or sludges shall be deposited on the site. No material failing to be defined as Special Waste… shall be accepted at this site".

1.6.7 A plan that accompanies the licence shows that the field through which the cable trench would be excavated was "*to be worked to an average depth of 5.0 metres and restored*".

1.6.8 The Environment Agency state that the landfill is also listed under reference EAHLD05031, and is "*believed to be 70% inert, 30% general industrial waste, permeable soil cap, dilute and disperse landfill in Lincs Limestone"*. The licence was surrendered on 28 April 1994.

Ground Conditions

1.6.9 On the basis of the information provided the landfill is anticipated to be approximately 5.0 m thick, consisting predominantly of inert waste such as soils and construction materials. An upper layer of subsoil and topsoil is understood to be present, supporting agricultural use since restoration.

1.6.10 The BGS published geology indicates that superficial deposits are absent in the area between Cave Road and proposed Compound M-1, and that the bedrock limestone (Upper Lincolnshire Limestone Member) is exposed. However, a historical borehole record (SE92NW/6A) within this area indicates '*4ft*' of '*drift*' overlying limestone.

1.6.11 At an anticipated maximum depth of 1.2 m, any trench to facilitate undergrounding of the proposed electricity connection to Compound M-1 would remain entirely within the upper part of the waste mass of the historical landfill.

Hydrogeological Setting

1.6.12 It is considered unlikely that shallow groundwater would be encountered in the trench excavation within the landfill as water infiltrating through the landfill is able to migrate downwards into the Upper Lincolnshire Limestone Member (a member of the Inferior Oolite Group). Locally, perched water may be present where the landfill waste mass contains pockets of more granular or more permeable material within a wider more clayey waste mass.

1.6.13 It is noted that the landfill is indicated by the Environment Agency to operate on the "*dilute and disperse*" principle whereby any leachate[1] that has formed within the landfill is able to migrate out of the landfill into the wider water environment. It should be noted that based on the anticipated predominantly inert nature of the landfill mass, significant leachate is not anticipated.

1.6.14 The Limestone beneath the landfill is classified as a very high sensitivity Principal Aquifer. The groundwater vulnerability at the location of the NPG-09B trench is classified by the Environment Agency as Medium to High. The NPG-09B trench is not located within a groundwater DWSZ or groundwater SPZ.

1.6.15 There are no recorded licenced or deregulated groundwater abstractions within 500 m of the open cut trench within the landfill. A single BGS water well record (SE92NW15/BJ) is located approximately 470 m to the southeast.

Dewatering

1.6.16 Groundwater is unlikely to be encountered within the landfill waste mass within the depth of the proposed trench, and dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) is unlikely to be required for either underground cable or overhead line supported on wooden poles. Therefore, risks to groundwater quality, flows or levels from dewatering at this location are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.6.17 Groundwater is anticipated to be below the base of the excavations required to underground the proposed electricity connection to Compound M-1. Therefore, it is considered that there is a low risk associated with creation of new groundwater flow pathways presented by underground cable. However, depending on the depth below ground of any wooden pole and/or foundations required, there is a risk of creating a flow pathway between the waste mass and the underlying Principal Aquifer. It should be noted that because the historical landfill has been identified as dilute and disperse – the placement of a wooden pole within the landfill boundary is not considered to present a significantly greater risk to the underlying aquifer than the landfill itself. Notwithstanding this, ground investigation and further assessment will be undertaken in accordance with commitments GH01, GH02 and GH13 requiring that prior to construction the site is investigated and assessed to confirm the assumptions in this assessment and determine whether any additional mitigation or remediation is required, in agreement with the Environment Agency.

[1] Water that has infiltrated through or into the landfill and reacted with the waste mass, leaching potential contamination from the solid phase into the liquid phase.

1.6.18 Therefore, risks associated with the creation of new flow pathways and connection of aquifers are considered to be very low.

Introduction of New Contamination

1.6.19 **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** contain measures to protect the environment including controlled waters during construction. In particular GH04 (training in the handling and use of potentially hazardous substances) and GH08 (use and storage of chemicals and fuels) supported scoping out the introduction of new contamination during construction.

1.6.20 Therefore, it is considered that there is a low risk associated with the introduction of new contamination.

1.7 Qualitative Groundwater Risk Assessment – Trenchless Crossings (Outside of Groundwater SPZ 1)

1.7.1 Up to approximately 53 trenchless crossings may be required (outside of groundwater SPZ 1) to facilitate construction of the Project, as described in **Application Document 6.4 Chapter 4: Project Description** and summarised in Annex A of this report. Whilst no sections of undergrounding of the proposed new 400 kV overhead line are proposed, there is the requirement to divert existing third-party assets up to 33 kV to facilitate the Project. This section presents an assessment of the potential risks from the trenchless crossings in relation to groundwater and groundwater receptors.

1.7.2 A description of the HDD construction methodology is included within **Application Document 6.4 Chapter 4: Project Description**.

1.7.3 The following assumptions have been made for this assessment:

- HDDs would reach a maximum depth of 6.0 m below ground level (bgl); and
- The depth of any launch and reception pits for HDD is assumed to be approximately 1.2 m bgl. Whilst HDD itself does not require dewatering, dewatering of the launch/reception pits may be required.

1.7.4 Table 1.6 presents an initial screening assessment undertaken to identify which of the 52 trenchless crossings are likely to encounter groundwater, and to assess potential risks to groundwater and groundwater receptors.

1.7.5 A trenchless crossing is taken forwards for further assessment where it:

- has the potential to encounter groundwater; or
- has an active Private Water Supply (PWS) or licenced abstraction within 500 m; or
- is within a sensitive location such as groundwater source protection zone 2 or 3 or a DWSZ; or
- Interacts with an identified potential source of contamination.

1.7.6 Where none of these criteria are fulfilled, it is considered that there is a low risk to groundwater and groundwater receptors from the proposed HDD and the trenchless crossing is not taken forwards for further assessment.

1.7.7 As described in Section 12.8 of **Application Document 6.12 Chapter 12 Geology and Hydrogeology**, the following commitments relevant to trenchless crossings have been made:

- GH01: Intrusive ground investigations and assessment will be undertaken prior to construction, including the measurement and monitoring of groundwater levels, geotechnical and geoenvironmental sampling and testing as appropriate. The information will inform geoenvironmental assessment, where required, and appropriate geotechnical design in relation to the site/structure specific ground conditions, identified by the intrusive ground investigation including ground instability/adverse ground conditions/ground gas etc. Therefore, any risks from these hazards would be considered within the engineering design of the new infrastructure in accordance with good practice.
- GH03: A protocol for dealing with any unexpected contamination will be developed and complied with by the Main Works Contractor(s). The protocol will include as a minimum:
  - Details of a watching brief and toolbox talks to be implemented throughout the construction phase;
  - Details regarding how any affected area will be delineated, protected, investigated and assessed;
  - The qualifications and competencies of the person appointed to oversee the works;
  - The preparation of a method statement for how the contamination will be dealt with or remediated (as appropriate);
  - An escalation policy describing when and how any notifications and approvals will be agreed with the local planning authority; and
  - Details of verification procedures for any mitigation or remediation works demonstrating compliance with the method statement.
- GH09: Any temporary dewatering activities during construction will be undertaken in accordance with Environment Agency guidance (including appropriate assessment undertaken as required by the guidance) and, if required, an Abstraction Licence and Environmental Permit (for the discharge) will be obtained and the works will be limited to the depth and time required to facilitate construction activities.
- GH10: In any areas of trenchless crossings and where otherwise identified within the ES, a hydrogeological risk assessment will be undertaken to assess the specific risks to groundwater and groundwater receptors at those locations and identify any additional mitigation or remediation that may be required. The nature and scope of any mitigation or remediation will be agreed with the Environment Agency or other stakeholders, as appropriate.
  - GH11: Where horizontal directional drilling is proposed, a drilling fluid breakout plan will be developed and complied with by the Main Works Contractor(s). This will be informed by suitable ground investigation and will include: Detailed

and appropriate design of all trenchless crossings including demonstration of a suitable drilling profile and depth to mitigate the risk of breakout;

- Description of drilling procedure and demonstration of suitability, including removal of borehole cuttings during drilling;
- Annular pressure monitoring;
- Regular walkovers of the drill path to check for visible evidence of breakouts;
- Measures to limit the volume of the drilling fluid loss;
- Measures to contain the lost drilling fluid;
- Measures to remove the lost drilling fluid;
- Measures to seal the area of the breakout; and
- Measures to provide any remediation, if appropriate.

Table 1.6 – Trenchless crossings initial screening

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NPG-06 (x2)	Made Ground and Potential Sources of Contamination (PSCs) are not anticipated at this location. Superficial deposits not recorded by the BGS at this location. Bedrock geology of the Burnham Chalk Formation is recorded. BGS archive borehole SE93SE1 records the resting groundwater level in the BCF to be approximately 17.1 m bgl.	No (Groundwater anticipated to be present within Chalk below maximum HDD depth)	Principal Aquifer	Yes – SPZ3 & DWSZ	No	Moderate risk	Yes
NPG-07	Made Ground and PSCs are not anticipated at this location. Superficial deposits are not recorded by the BGS at this location. Bedrock geology of the Burnham Chalk Formation is recorded. BGS archive borehole SE93SE1 records the resting groundwater level in	No (Groundwater anticipated to be present within Chalk below maximum HDD depth)	Principal Aquifer	Yes – SPZ3 & DWSZ	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	the BCF to be approximately 17.1 m bgl.						
NPG-08	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of the Bielby Sand Member overlying bedrock of the Thorncroft Sand Member (a member of the Great Oolite Group) and the Upper Lincolnshire Limestone Member. BGS archive borehole SE29NW130 records the resting groundwater level in the limestone bedrock to be 11.9 m bgl.	Yes	Superficial deposits - Secondary A Aquifer Bedrock – Secondary A Aquifer & Principal Aquifer	No	Yes (x4)	High risk	Yes
NPG-09A (x2)	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of the Bielby Sand Member overlying bedrock of the Charmouth Mudstone Formation (a member of the Lias Group).	Yes (superficials)	Superficial deposits - Secondary A Aquifer. Bedrock – Secondary Undifferentiated Aquifer	No	Yes (x2)	High risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NPG-09B (x5)	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of the Bielby Sand Member overlying bedrock of the Upper Lincolnshire Limestone Member. BGS archive borehole SE29NW130 records the resting groundwater level in the limestone bedrock to be 11.9 m bgl.	Yes	Superficial deposits – Secondary A Aquifer. Bedrock – Principal Aquifer	No	Yes (x13)	High risk	Yes
NPG-11	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium overlying bedrock of the Scunthorpe Mudstone Formation (a member of the Lias Group). BGS archive borehole SE82NW21 recorded a standing water level within the Alluvium of 1.6 m bgl.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NPG-15	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium and Warp overlying bedrock of the Mercia Mudstone Group. BGS archive borehole SE82NW21 recorded Warp/Alluvium to termination at 6.0 m bgl, and a standing water level within the Alluvium of 1.6 m bgl.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-17	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-18	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium	Yes (superficials)	Superficial deposits – Secondary A Aquifer	No	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	overlying bedrock of the Mercia Mudstone Group.		Bedrock – Secondary B Aquifer				
NPG-19	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-20	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-21	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium/Warp overlying bedrock of the Mercia Mudstone Group. BGS archive borehole SE81NW27 recorded Warp/Alluvium to termination at 9.4 m bgl,	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	and a standing water level within the Warp/Alluvium of 0.5 m bgl.						
NPG-22 (x2)	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Warp overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-23	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Warp overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-24	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium/Warp and the Sutton Sand Formation overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NPG-25	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NPG-26	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	Yes	Low risk	No
NPG-28	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of the Sutton Sand Formation overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NPG-33 (x2)	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Alluvium and the Sutton Sand Formation overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NGED-01	Made Ground and PSCs are not anticipated at this location. BGS record superficial deposits of Peat/Alluvium, overlying bedrock of the Mercia Mudstone Group.	Yes (superficials)	Superficial deposits – Secondary A Aquifer Bedrock – Secondary B Aquifer	No	No	Moderate risk	Yes
NGED-01	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
NGED-03	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent, and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-04 (x5)	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-05	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-06	Made Ground and PSCs are not anticipated at this location.	No	Secondary B Aquifer	No	No	Low risk	No

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	(Groundwater unlikely to be encountered)					
NGED-08	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	Yes (x3)	Moderate risk	Yes
NGED-09	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	Yes (x1)	Moderate risk	Yes
NGED-10 (x3)	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	of the Mercia Mudstone Group.						
NGED-11	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-13	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-14 (x2)	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	Yes (x1)	Moderate risk	Yes

ID	Anticipated Ground Conditions	HDD Likely to Encounter GW?	Aquifer	Designation	GW Abstraction within 500 m?	Initial Assessment	Further Assessment Required?
	area is underlain by bedrock of the Mercia Mudstone Group.						
NGED-16	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-17 (x2)	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No
NGED-18 (x2)	Made Ground and PSCs are not anticipated at this location. BGS record that superficial deposits are absent and this area is underlain by bedrock of the Mercia Mudstone Group.	No (Groundwater unlikely to be encountered)	Secondary B Aquifer	No	No	Low risk	No

1.7.8 Based on the above, the following trenchless crossings are taken forwards for further assessment:

- NPG-06 (x2);
- NPG-07;
- NPG-08;
- NPG-09A (x2);
- NPG-09B (x5);
- NPG-11;
- NPG-15;
- NPG-17;
- NPG-18;
- NPG-19;
- NPG-20;
- NPG-21;
- NPG-22 (x2);
- NPG-23;
- NPG-24;
- NPG-25;
- NPG-28;
- NPG-33 (x2);
- NGED-01 (crossing beneath Anglian Water Pipeline and Private Track only);
- NGED-08;
- NGED-09; and
- NGED-14 (x2).

1.7.9 In accordance with Commitment GH10 within **Application Document 7.3 Register of Environmental Actions and Commitments**, a Hydrogeological Risk Assessment will be undertaken in any areas of trenchless crossings following detailed design.

Trenchless Crossings NPG-06 and NPG-07

1.7.10 NPG-06 and NPG-07 are located within an area of agricultural land which BGS mapping indicates is directly underlain by Chalk bedrock, with an absence of superficial deposits.

1.7.11 The Chalk is classified as a very high sensitivity Principal Aquifer. NPG-06 and NPG-07 are both located within a groundwater SPZ3 and a groundwater DWSZ. The BGS archive borehole SE93SE1 records the resting groundwater level in the Chalk to be approximately 17.1 m bgl.

1.7.12 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-06 or NPG-07.

1.7.13 As described in the **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.7.14 Dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) within the launch/reception pits is unlikely to be required as any groundwater is anticipated to be below the base of the pits. Therefore, risks to groundwater quality, flows or levels from dewatering at NPG-06 and NPG-07 are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.15 Ground disturbance during construction could create new groundwater flow pathways, where permeable materials or flow routes are introduced through permeable backfill material or through the construction of trenchless crossings, allowing movement of existing contamination or mixing of aquifers.

1.7.16 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.17 The trenchless crossing is unlikely to connect aquifers as it is anticipated to remain entirely within the Chalk.

1.7.18 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.19 Groundwater is anticipated to be significantly below the maximum HDD depth of 6.0 m; therefore, it is considered that the risk of impacts to groundwater flow are very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.20 During the construction of trenchless crossings there is the potential to create turbidity within the aquifer and also for the unplanned breakout of drilling fluids which could have an impact of nearby groundwater abstractions and other groundwater receptors.

1.7.21 NPG-06 and NPG-07 are anticipated to be constructed above the groundwater table. On this basis, an increase in turbidity within the groundwater in the Chalk due to construction is not anticipated. Therefore, it is considered that there is a very low risk to groundwater from turbidity associated with the construction of this trenchless crossing.

1.7.22 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed (following detailed design) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.23 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata.

1.7.24 Assuming the incorporation of the above, the risks associated with unplanned losses of drilling fluids are considered to be very low.

Groundwater Heat Pollution

1.7.25 The trenchless crossing is anticipated to be within Chalk bedrock at this location and groundwater is expected to be present at depth below the depth of the crossing. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct (at the ends) within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-08

1.7.26 The published geological information indicates that the Bielby Sand Member is present at this trenchless crossing location but thins at the eastern end of NPG-08 and therefore the trenchless crossing may extend into the underlying bedrock of the Thorncroft Sand Member before also crossing into the Upper Lincolnshire Limestone Member as it moves westwards.

1.7.27 Groundwater within the Limestone is anticipated to be present at depth, below the base of the proposed trenchless crossing, although there is also potential for some groundwater within the superficial deposits at the eastern end of the crossing.

1.7.28 Two permitted groundwater abstractions are present within 500 m of NPG-08, approximately 250 m and 280 m to the north. Two BGS archive borehole records are present in the same area. The record for water well SE92NW129/BJ describes a "*shallow well into Alluvium*" and indicates it is brick-lined but does not provide a depth for the lining and does not provide any water level information. The record for water well SE92NW130/BJ describes a well to a depth of 26.0 m with a resting water level of 11.9 m bgl.

1.7.29 As described in the **Application Document 6.12.A2 Preliminary Contamination Risk Assessment**, a worst-case low risk of contamination is anticipated within the Order Limits.

Dewatering

1.7.30 It is anticipated that groundwater could be encountered in the launch/reception pits excavated through the superficial deposits. The nearest groundwater abstraction, as detailed above, is located approximately 280 m north of the launch/reception pit at the eastern end of NPG-08. Whilst the well record describes the well within Alluvium, we have assumed this to be the Bielby Sand Member for the purpose of the assessment. Therefore, as groundwater may be encountered and dewatering may be required, a dewatering radius of influence calculation has been completed for the eastern launch/reception pit.

1.7.31 For the calculation, the hydraulic conductivity of silty sand has been used within the calculation (based on the superficial deposits likely to be encountered at the eastern pit), as described by (Cherry, 1979), which quotes a hydraulic conductivity of

between 10^{-7} m/s and 10^{-3} m/s. As a sensitivity test the median of 10^{-5} m/s as well as the highest and lowest extents published have been selected.

1.7.32 The maximum groundwater level has been assumed to be 0.5 m bgl. This is a worst-case assumption pending confirmation through ground investigation. Although the maximum depths of the launch and reception pits is anticipated to be 1.2 m, for the purpose of the assessment a worst-case depth of 2 m has been used to allow for any variations within the pit depth or the groundwater depth. This means that the drawdown of the groundwater level, would be approximately 1.5 m.

1.7.33 Table 1.7 presents the inputs and results of the radius of influence calculations.

Table 1.7 – Input and results for calculating the radius of influence at NPG-08

Parameter	Highest Hydraulic Conductivity	Median Hydraulic Conductivity	Lowest Hydraulic Conductivity
Expected groundwater level (m bgl	0.5	0.5	0.5
Hydraulic Conductivity, K, (m/s)	1×10^{-7}	1×10^{-5}	1×10^{-3}
Drawdown, s (m)	1.5	1.5	1.5
Factor, C	2000	2000	2000
Total radius of influence, R_0 (m)	0.95	9.49	94.87

1.7.34 Based on the information presented above the total radius of influence, even when using the most conservative hydraulic conductivity (and using the worst-case groundwater levels and pit depths), is significantly less than the distance from the pit to the receptor, therefore impacts on the abstraction (and any further away) from changes in groundwater levels are not anticipated.

New Flow Pathways and Connection of Aquifers

1.7.35 Ground disturbance during construction could create new groundwater flow pathways, where permeable materials or flow routes are introduced through permeable backfill material or through the construction of trenchless crossings, allowing movement of existing contamination or mixing of aquifers.

1.7.36 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.37 The trenchless crossing is unlikely to connect aquifers that are not already in hydraulic continuity.

1.7.38 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.39 Following the installation of the cables, part of the crossing may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the duct containing the cables. For the majority of its length however, the crossing is

anticipated to predominantly lie within the Limestone bedrock, within which the groundwater is anticipated (on the basis of nearby BGS information) to be approximately 6.0 m below the maximum HDD depth of 6.0 m. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.40 During the construction of the trenchless crossings there is the potential to create turbidity within the aquifer and also for the unplanned breakout of drilling fluids which could have an impact of nearby groundwater abstractions and other groundwater receptors.

1.7.41 NPG-08 is anticipated to be constructed predominantly through the Limestone bedrock, above the groundwater table. On this basis, an increase in turbidity within the groundwater in the Limestone due to construction is not anticipated. In the limited part of the crossing to be constructed within the superficial deposits, the nearest recorded abstraction from the superficials is 280 m away (anticipated up hydraulic gradient). Therefore, it is considered that there is a very low risk to groundwater from turbidity.

1.7.42 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed (following detailed design) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.43 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata.

1.7.44 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids are considered to be very low.

Groundwater Heat Pollution

1.7.45 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although it is anticipated that groundwater within the bedrock aquifer will be present below the depth of the crossing. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct (at the ends) within the ground. The groundwater abstractions identified within 500 m of this crossing are not considered to be at risk from any groundwater heat pollution due to their distance away and other sensitive groundwater receptors have not been identified within the Study Area. It is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-09A

1.7.46 NPG-09A comprises two separate trenchless crossings at the same location, both of which are anticipated to commence within the superficial Bielby Sand Member and may cross into the underlying bedrock of the Charmouth Mudstone Formation.

1.7.47 The Bielby Sand Member is classified as a medium sensitivity Secondary A Aquifer, whilst the Mudstone is classified as a low sensitivity Secondary Undifferentiated Aquifer. It is anticipated that whilst groundwater is unlikely to be encountered in any excavations into the Mudstone, excavations through the superficial deposits may

encounter groundwater. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.48 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of the eastern crossing. A single BGS water well record (SE92NW42) is located within the former (now disused) Westland Nurseries approximately 380 m to the west of the western crossing.

Dewatering

1.7.49 It is anticipated that groundwater could be encountered in the launch/reception pits excavated through the superficial deposits. The nearest groundwater abstraction is located approximately 380 m to the west of the western launch/reception pit. Therefore, as groundwater may be encountered and dewatering may be required, a dewatering radius of influence calculation has been completed for the western launch/reception pit of the western crossing.

1.7.50 For the calculation, the hydraulic conductivity of silty sand has been used within the calculation (based on the more permeable layers of the Bielby Sand Member), as described by (Cherry, 1979), which quotes a hydraulic conductivity of between 10^{-7} m/s and 10^{-3} m/s. As a sensitivity test the median of 10^{-5} m/s as well as the highest and lowest extents published have been selected.

1.7.51 The maximum groundwater level has been assumed to be 0.5 m bgl. This is a worst-case assumption pending confirmation through ground investigation. Although the maximum depths of the launch and reception pits is anticipated to be 1.2 m, for the purpose of the assessment a worst-case depth of 2 m has been used to allow for any variations within the pit depth or the groundwater depth. This means that the drawdown of the groundwater level, would be approximately 1.5 m. Table 1.8 presents the inputs and results of the radius of influence calculations.

Table 1.8 – Input and results for calculating the radius of influence at NPG-09A

Parameter	Highest Hydraulic Conductivity	Median Hydraulic Conductivity	Lowest Hydraulic Conductivity
Expected groundwater level (m bgl	0.5	0.5	0.5
Hydraulic Conductivity, K, (m/s)	1×10^{-7}	1×10^{-5}	1×10^{-3}
Drawdown, s (m)	1.5	1.5	1.5
Factor, C	2000	2000	2000
Total radius of influence, R_0 (m)	**0.95**	**9.49**	**94.87**

1.7.52 Based on the information presented above the total radius of influence, even when using the most conservative hydraulic conductivity (and using the worst-case groundwater levels and pit depths), is significantly less than the distance from the pit to the receptor, therefore impacts on the abstraction from changes in groundwater levels are not anticipated.

New Flow Pathways and Connection of Aquifers

1.7.53 The construction of NPG-09A could create new groundwater flow pathways between the superficial and bedrock geology where the trenchless crossings cross between the two strata. However, the bedrock geology is a low sensitivity secondary undifferentiated aquifer and the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.54 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.55 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.56 Following the installation of the cables, parts of the crossing may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the duct containing the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.57 NPG-09A is anticipated to be constructed predominantly through the Bielby Sand Member and there is potential to create turbidity within the groundwater in the superficial deposits during construction. However, given that the nearest recorded abstraction (potentially discussed) is 380 m away it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.58 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within the **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.59 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.60 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.61 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct (at the ends) within the ground. The groundwater abstraction identified within 500 m of this crossing is not considered to be at risk from any groundwater heat pollution due to distance away and other sensitive groundwater receptors have not been identified

within the Study Area. It is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-09B

1.7.62 NPG-09B comprises five separate trenchless crossings at the same location, all of which are anticipated to commence within the superficial deposits of the Bielby Sand Member and may cross into the underlying bedrock of the Upper Lincolnshire Limestone Member.

1.7.63 The Bielby Sand Member is classified as a medium sensitivity Secondary A Aquifer, whilst the Limestone is classified as a very high sensitivity Principal Aquifer. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.64 There are multiple licenced groundwater abstractions and BGS water well records located in proximity to the NPG-09B trenchless crossings, the closest approximately 100 m to the northeast, and all anticipated to be abstracting from the Limestone.

1.7.65 A review of the borehole record relevant to the closest abstraction (2/26/34/027/SE92NW147) indicates the resting water level following lining was 12.5 m bgl which is approximately 9 m below the top of the Limestone.

Dewatering

1.7.66 The nearest groundwater abstraction is located approximately 100 m to the northeast. This abstraction (along with all other identified abstractions relevant to NPG-09B) are known or assumed to be abstracting water from the bedrock at depth, rather than the shallow superficial deposits.

1.7.67 It is anticipated that shallow groundwater could be encountered in the launch/reception pits excavated through the superficial deposits. However, as the identified abstractions are assumed to be abstracting from the deeper Limestone aquifer, and it is anticipated that there is an unsaturated zone at the top of the Limestone, dewatering radius of influence calculations have not been undertaken because impacts on the identified abstractions are considered unlikely.

New Flow Pathways and Connection of Aquifers

1.7.68 The construction of NPG-09B could create new groundwater flow pathways between the superficial deposits and bedrock where the trenchless crossings cross between the two strata. However, the proposed HDD is unlikely to connect aquifers that aren't already in hydraulic continuity, and the HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.69 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.70 On this basis the risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.71 Following the installation of the cables, parts of the crossings may lie below the water table. The cross-sectional area of the trenchless crossings would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the duct

containing the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.72 The NPG-09B trenchless crossings are anticipated to be constructed predominantly through the Bielby Sand Member but may extend downwards into the Limestone. There is potential to create turbidity in any groundwater in the Bielby Sand Member but the unsaturated zone at the top of the Limestone and depth to groundwater mean that impacts associated with turbidity are unlikely in the Limestone aquifer. Therefore, it is considered that there is a very low risk to the abstractions identified.

1.7.73 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within the **Application Document 7.2 Outline Code of Construction Plan**.

1.7.74 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.75 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers at this location are considered to be very low.

Groundwater Heat Pollution

1.7.76 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although it is anticipated that groundwater within the bedrock aquifer will be present below the depth of the crossing. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. The groundwater abstractions identified within 500 m of this crossing are not considered to be at risk from any groundwater heat pollution due to their distance away and/or the likelihood that they are abstracting from the bedrock aquifer, and other sensitive groundwater receptors have not been identified within the Study Area. It is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-11

1.7.77 BGS mapping indicates that NPG-11 is located within an area underlain by Alluvium (clay, silt, sand and gravel), beneath which the interbedded mudstone and limestone bedrock of the Scunthorpe Mudstone Formation is recorded.

1.7.78 The Alluvium is classified as a medium sensitivity Secondary A Aquifer, whilst the Mudstone is classified as a low sensitivity Secondary B Aquifer. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.79 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-11.

Dewatering

1.7.80 There is potential for shallow groundwater to be encountered within the Alluvium and therefore dewatering may be required within the launch/reception pits. However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of NPG-11 and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.81 The construction of NPG-11 could create new groundwater flow pathways between the superficial deposits and bedrock, where the trenchless crossings cross between the two strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.82 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.83 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.84 Following the installation of the cables, some of the crossing may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.85 NPG-11 is anticipated to be constructed predominantly through the Alluvium and there is potential to create turbidity within the groundwater during construction. However, given that there are no recorded abstractions identified within 500 m it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.86 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.87 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.88 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.89 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not

anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct (at the ends) within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossings NPG-15, NPG-17 to NPG-23 and NPG-25

1.7.90 BGS mapping indicates that these trenchless crossings would all be constructed within areas underlain by superficial deposits of Alluvium or Warp (clay, silt, sand and gravel) overlying mudstone bedrock of the Mercia Mudstone Group. Groundwater is indicated by various BGS archive boreholes to be present within the superficial deposits. Significant groundwater is not anticipated to be present within the low permeability bedrock.

1.7.91 The superficial deposits are classified as medium sensitivity Secondary A Aquifers, whilst the bedrock is classified as a low sensitivity Secondary B Aquifer. These trenchless crossings are not located within a SPZ or groundwater DWSZ.

1.7.92 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of any of these trenchless crossings.

Dewatering

1.7.93 There is potential for shallow groundwater to be encountered within the superficial deposits and therefore dewatering may be required within the launch/reception pits. However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of these trenchless crossings and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.94 The construction of these trenchless crossings could create new groundwater flow pathways between the superficial deposits and bedrock, where the trenchless crossings cross between the strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.95 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.96 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.97 Following the installation of the cables, some of the crossings may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.98 These trenchless crossings are anticipated to be constructed predominantly through the Alluvium/Warp and there is potential to create turbidity within the groundwater during construction. However, there are no recorded abstractions identified within 500 m, therefore it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.99 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within the **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.100 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.101 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.102 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-24

1.7.103 BGS mapping indicates that NPG-24 is located within an area underlain by superficial deposits comprising the Sutton Sand Formation (silty sand) and Alluvium (clay, silt, sand and gravel), beneath which mudstone bedrock of the Mercia Mudstone Group is present. Groundwater is anticipated within the superficial deposits but not within the underlying low permeability bedrock.

1.7.104 The superficial deposits are classified as medium sensitivity Secondary A Aquifers, whilst the Mudstone is classified as a low sensitivity Secondary B Aquifer. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.105 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-24.

Dewatering

1.7.106 There is potential for shallow groundwater to be encountered within the superficial deposits and therefore dewatering may be required within the launch/reception pits. However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of these trenchless crossings and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.107 The construction of NPG-24 could create new groundwater flow pathways between the superficial deposits and bedrock, where the trenchless crossings cross between the strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.108 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.109 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.110 Following the installation of the cables, some of the crossing may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.111 These trenchless crossings are anticipated to be constructed predominantly through the superficial deposits and there is potential to create turbidity within the groundwater during construction. However, there are no recorded abstractions identified within 500 m, therefore it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.112 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.113 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.114 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.115 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-28

1.7.116 BGS mapping indicates that NPG-28 is located within an area underlain by superficial deposits of the Sutton Sand Formation (silty sand), beneath which mudstone bedrock of the Mercia Mudstone Group is present.

1.7.117 BGS archive borehole SK79NE5 (approximately 750 m to the southwest of NPG-28), records that the Sutton Sand Formation comprises sandy clay, which extends to a depth of 0.6 m, beneath which Mudstone is recorded. The resting water level in the borehole is stated to be 1.5 m bgl.

1.7.118 The Sutton Sand Formation is classified as a medium sensitivity Secondary A Aquifer, whilst the Mudstone is classified as a low sensitivity Secondary B Aquifer. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.119 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of NPG-28.

Dewatering

1.7.120 There is potential for shallow groundwater to be encountered and therefore dewatering may be required within the launch/reception pits. However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of these trenchless crossings and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.121 The construction of NPG-28 could create new groundwater flow pathways between the superficial deposits and bedrock, where the trenchless crossings cross between the two strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.122 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.123 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.124 Following the installation of the cables, some of the crossing may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the duct containing the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.125 This trenchless crossing is anticipated to be constructed predominantly through the Mudstone and there is potential to create turbidity within any groundwater during construction. However, the aquifer is low sensitivity, significant groundwater is not anticipated in the low permeability bedrock and there are no recorded abstractions identified within 500 m, therefore it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.126 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.127 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.128 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.129 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct (at the ends) within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NPG-33

1.7.130 NPG-33 comprises two separate trenchless crossings. The western crossing is located within an area underlain by superficial deposits of the Sutton Sand Formation (sand) overlying bedrock of the Mercia Mudstone Group. The eastern crossing is located within an area underlain by Alluvium (clay, silt, sand and gravel) overlying the Sutton Sand Formation and Mudstone bedrock. The crossings are not located within a SPZ or groundwater DWSZ.

1.7.131 BGS archive borehole SK79NE27 is located approximately 270 m west of the western crossing. The ground conditions recorded in SK79NE27 comprise Alluvium (*"loam, light sandy, small peat fragments*") which extended to a depth of 25.0 m, overlying Mudstone which extended to a depth of 99 m bgl. Groundwater observations are not recorded.

1.7.132 BGS archive borehole SK79NE12 is located approximately 430 m northeast of the eastern crossing. The ground conditions in SK79NE12 comprise Alluvium ("*sand, mainly 'very clayey'"*) to a depth of 4.6 m, overlying "*Older River Sand and Gravel*" which extended to a depth of 10.0 m. Mudstone bedrock was encountered below the superficial deposits. The resting water level in the borehole is recorded as 2.0 m bgl.

1.7.133 The superficial deposits are classified as medium sensitivity Secondary A Aquifers, whilst the Mudstone is classified as a low sensitivity Secondary B Aquifer.

1.7.134 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of either HDD.

Dewatering

1.7.135 There is potential for shallow groundwater to be encountered within the superficial deposits and therefore dewatering may be required within the launch/reception pits.

However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of these trenchless crossings and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.136 The construction of NPG-33 could create new groundwater flow pathways between the superficial deposits and bedrock, where the trenchless crossings cross between the strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.137 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.138 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.139 Following the installation of the cables, parts of the eastern and western crossings may lie below the water table. The cross-sectional area of the trenchless crossings would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.140 This trenchless crossing is anticipated to be constructed predominantly through the superficial deposits and there is potential to create turbidity within any groundwater during construction. However, there are no recorded abstractions identified within 500 m, therefore it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.141 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.142 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.143 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.144 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. Sensitive groundwater receptors have not been identified within the

Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossing NGED-01

1.7.145 NGED-01 comprises two separate trenchless crossings although only the northern crossing has been considered for further assessment. This crossing is located within an area where the BGS record superficial deposits of Peat, which are anticipated to overlie (or form part of) deposits of Alluvium (clay, silt, sand and gravel). Bedrock of the Mercia Mudstone Group is recorded beneath the superficial deposits.

1.7.146 BGS archive borehole SK79SW10 is located approximately 95 m northeast of the crossing. The ground conditions in SK79SW10 comprise 0.5 m thickness of peaty soil, overlying layers of silty clay, clayey sand and clayey gravel (Alluvium) to a depth of 5.5 m bgl. Beneath the Alluvium, Mudstone bedrock was encountered and proved to a depth of 7.5 m. The resting water level in the borehole on completion of drilling was 2.0 m bgl.

1.7.147 The Alluvium is classified as a medium sensitivity Secondary A Aquifer, whilst the Mudstone is classified as a low sensitivity Secondary B Aquifer. This trenchless crossing is not located within a SPZ or groundwater DWSZ.

1.7.148 There are no recorded licenced or deregulated groundwater abstractions or private water supplies (including BGS water well records) within 500 m of the HDD.

Dewatering

1.7.149 There is potential for shallow groundwater to be encountered within the Alluvium and therefore dewatering may be required within the launch/reception pits. However, there are no recorded licenced or deregulated groundwater abstractions or private water supplies located within 500 m of these trenchless crossings and therefore risks to receptors from any dewatering are considered to be very low.

New Flow Pathways and Connection of Aquifers

1.7.150 The construction of NGED-01 could create new groundwater flow pathways between the Alluvium and Mudstone, where the trenchless crossings cross between the strata. However, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.151 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.152 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.153 Following the installation of the cables, parts of the crossing may lie below the water table. The cross-sectional area of the trenchless crossings would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.154 This trenchless crossing is anticipated to be constructed predominantly through the Alluvium and there is potential to create turbidity within any groundwater during construction. However, there are no recorded abstractions identified within 500 m, therefore it is considered that potential localised impacts on groundwater associated with any turbidity present a very low risk to receptors.

1.7.155 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.156 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.157 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.158 The trenchless crossing is anticipated to cross from superficial deposits into bedrock geology between different aquifers, although a continuous groundwater body is not anticipated within the low permeability bedrock. It is assumed this trenchless crossing will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. Sensitive groundwater receptors have not been identified within the Study Area and therefore it is considered this is a low risk crossing where impacts on groundwater receptors from any heat pollution are not anticipated.

Trenchless Crossings NGED-08, NGED-09 and NGED-14

1.7.159 BGS mapping indicates that these trenchless crossings would all be constructed within areas where superficial deposits are absent and the areas are directly underlain (beneath any topsoil and subsoil) by bedrock of the Mercia Mudstone Group.

1.7.160 The Mudstone is classified as a low sensitivity Secondary B Aquifer. These trenchless crossings are not located within a SPZ or groundwater DWSZ.

1.7.161 There are BGS water wells within 500 m of these trenchless crossings as follows:

- NGED-08 – 3No. BGS water wells (SK78SE40/BJ, SK78SE51/BJ and SK78SE53/BJ) the nearest of which is located 240 m to the east;
- NGED-09 – 1No. BGS water well (SK78SE54/BJ) located approximately 350 m to the west; and
- NGED-14 – 1No. BGS water well (SK77NE79/BJ) located approximately 190 m to the east.

Dewatering

1.7.162 Dewatering (lowering of groundwater levels rather than incidental pumping out of minor surface water and/or groundwater ingress into excavations) within the

launch/reception pits is unlikely to be required at these crossing locations as significant groundwater is not anticipated in the low permeability bedrock. Therefore, changes to groundwater quality, level and flow are not anticipated.

New Flow Pathways and Connection of Aquifers

1.7.163 The construction of these crossings is unlikely to create new groundwater flow pathways because they will remain within the Mudstone. Therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.7.164 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.7.165 Therefore, risks associated with the creation of new flow pathways/connection of aquifers are considered to be very low.

Impacts to Groundwater Flow

1.7.166 Following the installation of the cables, some of the crossings may lie below the water table. The cross-sectional area of the trenchless crossing would be relatively small compared to the wider aquifer, with groundwater able to freely flow around the cables. Therefore, it is considered that the risk of impacts to groundwater flow is very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity

1.7.167 These trenchless crossings are anticipated to be constructed entirely within the low permeability Mudstone where significant groundwater is not anticipated. It is therefore considered that there is a very low risk to groundwater receptors from the creation of turbidity associated with these crossings.

1.7.168 To mitigate the risk of potential breakouts of drilling fluid, a Drilling Fluid Breakout Management Plan will be developed by the specialist contractor (once appointed) in accordance with Commitment GH11 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.7.169 The Drilling Fluid Breakout Management Plan will be informed by sufficient appropriate ground investigation to provide information on the strata that will be encountered during any trenchless bore, and the nature/properties of the strata. The Drilling Fluid Breakout Management Plan will include the information and contingency measures previously described, as appropriate.

1.7.170 Assuming the incorporation of the above, the risks associated with unplanned loses of drilling fluids to the aquifers beneath the Site are considered to be very low.

Groundwater Heat Pollution

1.7.171 The trenchless crossings are anticipated to remain within the Mudstone at this location and a continuous groundwater body is not anticipated within the low permeability bedrock. It is anticipated these trenchless crossings will be constructed via HDD and therefore the cables will be sealed into a duct within the ground. The groundwater abstractions identified within 500 m of this crossing are not considered to be at risk from any groundwater heat pollution due to their distance away and other sensitive groundwater receptors have not been identified within the Study Area.

It is considered these are low risk crossings where impacts on groundwater receptors from any heat pollution are not anticipated.

1.8 Conclusion

General

1.8.1 This Qualitative Groundwater Risk Assessment provides an assessment of the potential risks from the Project to identified groundwater abstractions and also groundwater levels, quality and flow from elements of the Project that could impact groundwater, including the proposed trenchless crossings, works within the SPZ 1 and works within the historical landfill at Ellerker.

1.8.2 For each element of the Project, the risk assessment assesses the potential risks relating to dewatering, creation of new flow pathways (and mobilisation of contamination), connection of aquifers, impacts on groundwater flow and the introduction of new contamination at trenchless crossings, including the unplanned loss of drilling fluids. For trenchless crossings, the risk assessment also includes a preliminary qualitative assessment of the potential for groundwater heat pollution.

Dewatering

1.8.3 The risk assessment has determined that dewatering (requiring lowering of groundwater levels rather than incidental pumping out of surface water ingress into excavations) within the Project is generally unlikely to be required for the majority of the elements of the Project. Therefore, the anticipated risks from dewatering, including saline intrusion and changes to groundwater levels are considered to be very low.

1.8.4 Where dewatering may be required, a radius of influence calculation has been undertaken to identify potential risks to groundwater receptors. The dewatering radius of influence calculations have not identified any potential effects to groundwater receptors.

1.8.5 If dewatering is anticipated (following detailed design) that wasn't anticipated and included in this assessment, a Hydrogeological Risk Assessment will be undertaken in accordance with Commitment GH10 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

New Flow Pathways and Connection of Aquifers

1.8.6 The risk assessment has determined that the Project elements are generally unlikely to form new flow pathways and connect previously unconnected aquifer units. Even where there is low potential to connect aquifers, the proposed HDD construction methods include lining the drill with bentonite clay which will help seal the bore and prevent new flow pathways and therefore aquifer mixing due to creation of new pathways is unlikely to occur.

1.8.7 There is a low risk of existing contamination within the Order Limits and therefore mobilisation of existing contamination is unlikely.

1.8.8 However, due to the electrical connection to construction compound M-1 crossing through a historical landfill, ground investigation and further assessment will be required in accordance with commitments GH01,GH02 and GH13 in **Application**

Document 7.3 Register of Environmental Actions and Commitments requiring that prior to construction the site is investigated and assessed to confirm the assumptions in this assessment and determine whether any additional mitigation or remediation is required, in agreement with the Environment Agency.

Impacts on Groundwater Flow

1.8.9 The assessment has determined that the risks to groundwater flow from the trenchless crossings are considered to be very low.

Unplanned Losses of Drilling Fluids and Creation of Turbidity at Trenchless Crossings

1.8.10 The risk assessment has concluded that the potential risks to identified groundwater receptors from unplanned losses of drilling fluids and creation of turbidity during construction of the Project, is anticipated to be very low. This can be further reduced with implementation of Commitment GH11 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

Groundwater Heat Pollution at Trenchless Crossings

1.8.11 The assessment has concluded that the risks to groundwater and groundwater receptors from heat pollution at the trenchless crossings are considered to be very low.

1.8.12 However, the sensitive location of proposed trenchless crossing NPG-03 within a SPZ 1 and close to Woodland requires that the potential for heat pollution should be re-assessed in accordance with Commitment GH10 in **Application Document 7.3 Register of Environmental Actions and Commitments**, following detailed design and informed by site specific ground investigation.

Introduction of New Contamination During Construction – Works Proposed within SPZ 1 and 2

1.8.13 The assessment has concluded that the risks to groundwater and groundwater receptors from the introduction of new contamination during construction are considered to be very low.

Summary

1.8.14 In addition to Commitment GH10 in **Application Document 7.3 Register of Environmental Actions and Commitments** which requires that following detailed design, a Hydrogeological Risk Assessment will be completed for all trenchless crossing locations; the assessment for proposed trenchless crossing NPG-03 should include further heat pollution potential (to confirm the assumptions and conceptual site model used in this preliminary assessment).

1.8.15 The proposed trench to provide construction compound M-1 with an electrical supply – and which crosses through a historical landfill near Ellerker – will be subject to further investigation and assessment in accordance with Commitments GH01, GH02 and GH13 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

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Annex A
Trenchless Crossings

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Annex A Trenchless Crossings

Table A.1 – Potential Trenchless Crossings Included in the Assessment

ID	Span	Feature to Cross
NPG-03	4AF4 – 4AF5	Hornsea P4 Access
NPG-06 (x2 HDDs)	4AF28 – 4AF29	1) Rowley Road/Riplingham Road and Yorkshire Water Pipeline 2) Yorkshire Water Pipeline
NPG-07	4AF29 – 4AF30	KCOM underground cable
NPG-08	4AF41 – 4AF42 4ZQ73 – 4ZQ72	Northern Gas Pipeline and Brough Road
NPG-09A (x2 HDDs)	M-1 Compound Connection (x2 HDDs)	1) Ditch/drain 2) Private track
NPG-09B (x5 HDDs)	M-1 Compound Connection	1) Whin Moor Lane, underground cables (BT x2, KCOM) and Northern Gas pipeline 2) Yorkshire Water pipeline 3) 2x Northern Gas pipelines 4) Brough Road 5) KCOM underground cable and Northern Gas pipeline
NPG-11	4AF50 – 4AF51 4ZQ66 – 4ZQ65	BT underground cables (x2), Ings Lane, Yorkshire Water pipeline and sewer pipeline
NPG-15	4AF71 – 4AF72	Ditches (x2)
NPG-17	4AF79 – 4AF80	Ditch
NPG-18	4AF85 – 4AF86	Ditch
NPG-19	King’s Causeway Access	Yorkshire Water pipeline

ID	Span	Feature to Cross
NPG-20	4AF95 – 4AF96	Carr Lane and watercourse
NPG-21(x2 HDDs)	4AF101 – 4AF102	1) Ditch 2) Ditch
NPG-22 (x2 HDDs)	4AF118 – 4AF119	1) Ditch and private track 2) Ditch, private track and BT underground cable
NPG-23	4AF126 – 4AF127	Private track
NPG-24	4AF130 – 4AF131	Exolum pipeline, private track and ditch
NPG-25	4AF137 – 4AF138	Watercourse
NPG-26 (x2 HDDS)	4AF148 – 4AF149	1) Melwood Hill and Yorkshire Water pipeline 2) Melwood Hill and Yorkshire Water pipeline
NPG-28	4AF157 – 4AF158	Ditch
NPG-33 (x2 HDDs)	4AF166 – 4AF167 S-4 Compound Connection	1) Tindale Bank Road and ditch 2) Watercourse and BT underground cable
NGED-01 (x2 HDDs)	4AF176 – 4AF177	1) Private track and Anglian Water pipeline 2) Ditch
NGED-03	4AF185 – 4AF186	BT underground cable
NGED-04 (x5 HDDs)	4AF191 – 4AF192	1) Anglian Water pipeline and A631 (road) 2) Anglian Water abandoned pipeline 3) Anglian Water abandoned pipeline 4) Watercourse, Anglian Water pipelines (x2 – one is abandoned), BT underground cable and A631 (road) 5) Private track
NGED-05	4AF193 – 4AF194	Wood Lane (private track)

ID	Span	Feature to Cross
NGED-06	4AF197 – 4AF198	Private track
NGED-08	4AF210-4AF211	Anglian Water pipeline (x2 – one is abandoned)
NGED-09	4AF222-4AF223	Anglian Water pipeline, Retford Road, BT underground cable and ditch
NGED-10 (x3 HDDs)	4AF228 – 4AF229	1) Anglian Water pipeline 2) Anglian Water abandoned pipeline and BT underground cable 3) Anglian Water pipeline (x2 – one is abandoned) and BT underground cable
NGED-11	4AF231 – 4AF232	Ashley Lane and private track
NGED-13	4AF238 – 4AF239	Dolegate Track
NGED-14 (x2 HDDs)	4AF243 – 4AF244	1) Private Track 2) Darlton Road, Anglian Water pipelines (x2), Severn Trent Water pipeline
NGED-16	4AF252 – 4AF253	Far Road
NGED-17 (x2 HDDs)	S-6 Construction Compound	1) Anglian Water pipeline (x2 – one is abandoned) and EU Networks fibreoptic cable 2) Anglian Water pipeline (x2 – one is abandoned)
NGED-18 (x2 HDDs)	4AF256 – 4AF257	1) Fledborough Road, EU Networks fibreoptic cable, Anglian Water pipelines (x2) and BT underground cable 2) Fledborough Road, EU Networks fibreoptic cable, Anglian Water pipelines (x2) and BT underground cable

Annex B Licensed and Deregulated Groundwater Abstractions

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Annex B Licensed and Deregulated Groundwater Abstractions

Table B.1 – Licenced and deregulated groundwater abstractions within the Study Area

Licence Number	Point Name	Purpose and Use	Aquifer	Approximate Distance from Order Limits (m)	Assessment
Abstractions within the Order Limits					
N/A	N/A	N/A	N/A	N/A	N/A – No recorded licenced or deregulated abstractions are present within the Order Limits.
Abstractions with the Study Area					
NE/026/0032/055	Point A At Park Lane	Horticulture And Nurseries, spray and trickle irrigation	Not stated	70	The abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project is not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
NE/026/0032/035/R01	Borehole-Chalk-Cottingham	Horticulture And Nurseries, Spray Irrigation – Direct	Not stated	410	The abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project is not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/32/235	Borehole - Chalk - Cottingham	Horticulture And Nurseries, Spray Irrigation – Direct	CHALK	360	The abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project is not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Licence Number	Point Name	Purpose and Use	Aquifer	Approximate Distance from Order Limits (m)	Assessment
NE/026/0032/062	Borehole At Creyke Beck Converter Station	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services	Not stated	440	The abstraction is located outside of the Order Limits and over 750 m from proposed works (NPG-02) that could impact groundwater. The Project is not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
NE/026/0034/009/R01	Catchpit - Superficial Drift-Brough	General Agriculture, Spray Irrigation - Direct	Not stated	410	The abstraction is located outside of the Order Limits and over 500 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/34/041	Ellerker Lodge Garden Centre Ltd	Horticulture And Nurseries, Spray Irrigation – Direct	JURASSIC OTHER	190	The abstraction is located outside of the Order Limits and over 250 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/34/041	Ellerker Lodge Garden Centre Ltd	Horticulture And Nurseries, Spray Irrigation – Direct	SUPERFICIAL DRIFT	180	The abstraction is located outside of the Order Limits and over 250 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/34/016	Borehole - Jurassic Other - Ellerker	Horticulture And Nurseries, Spray Irrigation – Direct	JURASSIC OTHER	240	The abstraction is located outside of the Order Limits and over 800 m from proposed works (Compound M-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Licence Number	Point Name	Purpose and Use	Aquifer	Approximate Distance from Order Limits (m)	Assessment
2/26/34/027	Borehole A - Oolitic Limestone - Elloughton	General Agriculture, Trickle Irrigation - Direct	OOLITIC LIMESTONE	120	The abstraction is located outside of the Order Limits and over 140 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/34/031	Boreholes A and B - Oolitic Limestone - Elloughton	General Agriculture, trickle/Spray Irrigation - Direct	OOLITIC LIMESTONE	470	There are two abstractions located outside of the Order Limits and between 200 m and 500 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
2/26/34/027	Borehole B - Oolitic Limestone - Elloughton	General Agriculture, Trickle Irrigation - Direct	OOLITIC LIMESTONE	90	
2/26/34/027	Borehole C - Oolitic Limestone - Elloughton	General Agriculture, Trickle Irrigation - Direct	OOLITIC LIMESTONE	60	This abstraction is located outside of the Order Limits and 100 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
MD/028/0082/014		Single Point/Single Purpose	MERCIA MUDSTONE	20	This abstraction area is located outside of the Order Limits and approximately 370 m southeast of NPG-26 – a trenchless crossing anticipated to be above groundwater. The EA's "Abstraction Licence Areas" dataset indicates four points located at the approximate corners of the former Low Melwood Quarry within which licence MD/028/0082/014 applies/applied. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction(s) are considered to be unlikely.

Licence Number	Point Name	Purpose and Use	Aquifer	Approximate Distance from Order Limits (m)	Assessment
MD/028/0069/024/R02	Beckingham - Borehole	I-PET-350	Not stated	310	This abstraction is located outside of the Order Limits and 440 m from proposed works (NGED-04) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
MD/028/0069/050	Borehole at Wheatley wood farm	A-AGR-600	Not stated	160	This abstraction is located outside of the Order Limits and 770 m from proposed works (NGED-04) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
MD/028/0069/046	BOREHOLE AT RAMPTON HOSPITAL	C-CRW-40	Not stated	360	This abstraction is located outside of the Order Limits and 970m from proposed works (NGED-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Annex C
Private Water Supplies

nationalgrid

Annex C Private Water Supplies

Table C.1 – East Riding of Yorkshire Private Water Supplies within the Study Area

Point Name	Approximate Distance from Order Limits (m)	Assessment
Private Water Supplies within the Order Limits		
N/A	N/A	N/A – No recorded PWS present within the Order Limits in East Riding of Yorkshire.
Private Water Supplies within the Study Area		
16	20	The abstraction is not within the Order Limits and is located 470 m northeast of NPG-03 and 410 m north-west of construction Compound S-1 (proposed works that could impact groundwater). The works at NPG-03 comprise a trenchless crossing to divert a third-party asset and the works at construction compound S-1 comprise the construction of a temporary construction compound only. BGS mapping shows that the geology at the location of the PWS comprises Diamicton overlying Chalk bedrock. BGS archive borehole and water well record(s) TA03NW150/TA03NW117/TA03NW3 (same log) is located at the same location as the PWS and indicates that the Diamicton is approximately 10 m thick It is assumed the PWS is abstracting from the Chalk aquifer. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
75	100	This abstraction is located outside of the Order Limits and over 1.4 km from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Table C.2 – Bassetlaw District Council Private Water Supplies within the Study Area

Point Name	Approximate Distance from Order Limits (m)	Assessment
Private Water Supplies within the Order Limits		
N/A	N/A	N/A – No recorded PWS present within the Order Limits covering Bassetlaw District Council.
Private Water Supplies within the Study Area		
WK/000050401	380	This abstraction is located outside of the Order Limits and over 800 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
WK/000060150	340	This abstraction is located outside of the Order Limits and over 1.1 km from proposed works (NGED-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
WK/000060250	50	This abstraction is located outside of the Order Limits and over 500 m from proposed works (NGED-09) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Table C.3 – North Lincolnshire Council Private Water Supplies within the Study Area

Point Name	Approximate Distance from Order Limits (m)	Assessment
-	-	N/A – No recorded North Lincolnshire Council PWS within the Order Limits or the Study Area.

Annex D
BGS Water Well Data

nationalgrid

Annex D BGS Water Well Data

Table D.1 – BGS water well data within the Study Area

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
BGS Water Wells within the Order Limits				
SE92NW8/BJ	No.4 4720yds E Of Ellerker Church	NO AQUIFER	Within Order Limits	Located within Route Section B. This borehole is located approximately 350 m southwest of NPG-08 and 360 m northwest of NPG-09B. A review of this borehole records shows that it is not a water well but is a "*trial shaft for ironstone*". This 'water well' is not considered further.
SE82SW1/A/BJ	Ousefleet North Side 1	SUPERFICIAL DEPOSITS	Within Order Limits	Located within Route Section B. This abstraction is located over 500 m from proposed works that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW1/B/BJ	Ousefleet North Side 2	MERCIA MUDSTONE GROUP	Within Order Limits	Located within Route Section B. This abstraction is located over 500 m from proposed works that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW1/C/BJ	Ousefleet North Side 3	MERCIA MUDSTONE GROUP	Within Order Limits	Located within Route Section B. This abstraction is located over 500 m from proposed works that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW19/BJ	Power Station Ousefleet	MERCIA MUDSTONE GROUP	Within Order Limits	Located within Route Section B. A review of the borehole record shows that this was a WW1 era borehole drilled as part of exploratory works for a power station that was not constructed and is not a water well. This ‘well’ is not considered further.
SE81SW2/A/BJ	North Soak Drain Bh1	MERCIA MUDSTONE GROUP	Within Order Limits	Located within Route Section C. This abstraction is located over 500 m from proposed works that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
BGS Water Wells within the Study Area				
TA03NW452/BJ	Dogger Bank Offshore Windfarm Converter Station Construction Site Beverley	UNKNOWN	450	This abstraction is located outside of the Order Limits and over 750 m from proposed works (NPG-02) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03NW34/BJ	Lawnes Dunswell Rd Cottingham	CHALK GROUP	280	This abstraction is located outside of the Order Limits and over 700 m from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW97/BJ	Cottingham	CHALK GROUP	270	This abstraction is located outside of the Order Limits and over 800 m from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW96/BJ	Cottingham	CHALK GROUP	380	This abstraction is located outside of the Order Limits and over 900 m from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW36/L/BJ	Cottingham Pumping Station Shaft 5	CHALK GROUP	470	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW36/P/BJ	Cottingham Pumping Station Shaft 12	CHALK GROUP	480	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW31/BJ	Burn Park Cottages	CHALK GROUP	10	This abstraction is located outside of the Order Limits and over 600 m from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW66/BJ	Hull Water Corp Park Lane Cottingham 11	UNKNOWN	180	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW120/BJ	Park Lane	UNKNOWN	280	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW47/BJ	Schellingerhauts Mkt Gdn Park Lane Cottingham York	CHALK GROUP	390	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
TA03SW98/BJ	Market Garden	CHALK GROUP	450	This abstraction is located outside of the Order Limits and over 1 km from proposed works (Compound S-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
TA03SW118/BJ	Burn Park	UNKNOWN	360	This abstraction is located outside of the Order Limits and 440 m southeast of NPG-03 and 480 m southwest of compound S-1. BGS mapping shows that the geology at the location of the PWS comprises Diamicton overlying Chalk bedrock. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE82/BJ	Ralph Nook	CHALK GROUP	30	This abstraction is located outside of the Order Limits and over 3 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE8/A/BJ	Little Weighton N0.1 On The Hull Road	SUPERFICIAL DEPOSITS	420	This abstraction is located outside of the Order Limits and over 2.8 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE8/B/BJ	Little Weighton N0.2 On The Hull Road	CHALK GROUP	460	This abstraction is located outside of the Order Limits and over 2 km from proposed works (NPG-06) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE83/BJ	Wastewise Uk Obh	CHALK GROUP	240	This abstraction is located outside of the Order Limits and over 2.5 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE6/BJ	Mowley Rectory, Little Weighton, East Riding, York	CHALK GROUP	350	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SE1/BJ	York Grounds, Riplingham	CHALK GROUP	380	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SE93SE5/BJ	Weedley Farm, Weedley, Yorks	CHALK GROUP	370	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SW4/B/BJ & SE93SW37/BJ	Wold Dale / Wold Dale No. 1 (Same Location Stated)	GREAT OOLITE GROUP	5	This abstraction is located outside of the Order Limits and over 800 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE93SW1/BJ	Red Arrow Service Station, South Cave, Yorkshire	OTHER SECONDARY AQUIFER (undifferentiated)	330	This abstraction is located outside of the Order Limits and over 800 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW128/BJ	Hunsdale Farm South Cave Brough	LINCOLNSHIRE LIMESTONE FORMATION	430	This abstraction is located outside of the Order Limits and over 600 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW39/BJ	Mill Hill Housing Site, Ellerker	INFERIOR OOLITE GROUP	230	This abstraction is located outside of the Order Limits and over 600 m from proposed works (Compound M-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW36/BJ	Cavegate Nurseries Ellerker	OTHER SECONDARY AQUIFER (undifferentiated)	180	This abstraction is located outside of the Order Limits and over 900 m from proposed works (Compound M-1) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW130/BJ	Ellerker Grange	LINCOLNSHIRE LIMESTONE FORMATION	180	This abstraction is located outside of the Order Limits and over 250 m from proposed works (NPG-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW129/BJ	Ellerker Grange	ALLUVIUM	200	This abstraction is located outside of the Order Limits and over 250 m from proposed works (NPG-08) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW42/BJ	Sands Lane, Ellerker	OTHER SECONDARY AQUIFER (undifferentiated)	100	This abstraction is located outside of the Order Limits and over 350 m from proposed works (NPG-09A) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW6/A/BJ	No.2 Shaft 1310yds S 42 Deg East Of Church	NO AQUIFER	5	A review of this borehole records shows that it is not a water well but is a "*trial shaft for ironstone*". This 'water well' is not considered further.
SE92NW60/BJ	Cockle Pits	NO AQUIFER	70	A review of this borehole records shows that it is not a water well but was drilled for the purpose of determining "Rhaetic & Jurassic stratigraphy and structure". This 'water well' is not considered further.
SE92NW15/BJ	Roman Road, Brantingham	OTHER SECONDARY AQUIFER (undifferentiated)	100	This abstraction is located outside of the Order Limits and over 150 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SE92NW7/B/BJ	No.3 920yds E Of Ellerker Church	UNKNOWN	190	A review of this borehole records shows that it is not a water well but is a "*trial shaft for ironstone*". This 'water well' is not considered further.
SE92NW147/BJ	Cambridge Hok Branfield Nursery Elloughton	LINCOLNSHIRE LIMESTONE FORMATION	60	This abstraction is located outside of the Order Limits and over 180 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW37/B/BJ	Stockbridge Lane	INFERIOR OOLITE GROUP	250	This abstraction is located outside of the Order Limits and over 170 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW37/A/BJ	Stockbridge Lane	UNKNOWN	160	This abstraction is located outside of the Order Limits and over 260 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW113/BJ	E Baarda, 42 Stocksbridge Road, Elloughton	OTHER SECONDARY	460	This abstraction is located outside of the Order Limits and over 450 m from proposed works (NPG-09B) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
		AQUIFER (undifferentiated)		The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW16/BJ	The Bungalow Elloughton	OTHER SECONDARY AQUIFER (undifferentiated)	490	This abstraction is located outside of the Order Limits and 500 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW1/BJ	Near Brankingham Grange	GREAT OOLITE GROUP	420	This abstraction is located outside of the Order Limits and over 440 m from proposed works (NPG-09B) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE92NW127/BJ	Wold View Nursery Ellerker	LIAS GROUP	150	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SE92NW112/BJ	New Nursery Ellerker North Humberside	“NO AQUIFER”	240	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82NE2/A/BJ	Railway Cottages Broomfleet	SUPERFICIAL DEPOSITS	90	This abstraction is located outside of the Order Limits and over 3 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82NE2/B/BJ	Railway Cottages Broomfleet	MERCIA MUDSTONE GROUP	90	This abstraction is located outside of the Order Limits and over 3 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82NE4/BJ	Broomfleet	MERCIA MUDSTONE GROUP	310	This abstraction is located outside of the Order Limits and over 2.5 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
SE82NE3/BJ	North Hall	SUPERFICIAL DEPOSITS	80	This abstraction is located outside of the Order Limits and over 5 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82NW6/BJ	Oxmemdike Staddlethorpe Yorks	SUPERFICIAL DEPOSITS	5	This abstraction is located outside of the Order Limits and over 5 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82NW8/BJ	Oake Nurseries Yorks	SHERWOOD SANDSTONE GROUP	420	This abstraction is located outside of the Order Limits and over 5 km from proposed works (NPG-11) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW3/BJ	Blacktoft	SUPERFICIAL DEPOSITS	320	This abstraction is located outside of the Order Limits and over 2 km from proposed works (NPG-17) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW1/E/BJ	Ousefleet South Side 2	MERCIA MUDSTONE GROUP	170	This abstraction is located outside of the Order Limits and over 850 m from proposed works (NPG-17) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW1/F/BJ	Ousefleet South Side 3	SUPERFICIAL DEPOSITS	200	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NPG-17) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE82SW18/BJ	Ousefleet South Side 3	SUPERFICIAL DEPOSITS	210	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NPG-17) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SE82SW4/BJ	Hoggard Lane Bridge Adlingfleet	SUPERFICIAL DEPOSITS	420	This abstraction is located outside of the Order Limits and over 1.5 km from proposed works (NPG-18) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE71SE39/BJ	Corner House Farm Outgate Ealand	MERCIA MUDSTONE GROUP	20	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-22) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE71SE2/BJ	Crowle	“NO AQUIFER”	90	This abstraction is located outside of the Order Limits and over 1.5 km from proposed works (NPG-22) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SE71SE1/BJ	Bridge Cottages Crowle	MERCIA MUDSTONE GROUP	20	This abstraction is located outside of the Order Limits and over 1.5 km from proposed works (NPG-23) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
SE70SE6/BJ	Axholme 2	UNKNOWN	240	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-26) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK79NE27/BJ	Langholme	UNKNOWN	10	A review of this borehole records shows that it is not a water well but was an exploratory borehole "*to prove primary capacity coal*". This 'well' is not considered further.
SK79NE37/BJ	Lound House Graizelound	SHERWOOD SANDSTONE GROUP	180	This abstraction is located outside of the Order Limits and over 2 km from proposed works (NPG-33) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK79NE46/BJ	Langholme Farm Haxey	SHERWOOD SANDSTONE GROUP	220	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NPG-33) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SK79SE83/BJ	Beckingham 39	“NO AQUIFER”	310	This abstraction is located outside of the Order Limits and over 400 m from proposed works (NGED-04) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK79SE70/BJ	B P Walkeringham No 2	“NO AQUIFER”	310	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NGED-04) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE71/BJ	Wheatley Wood Farm Wood Lane North Wheatley	SHERWOOD SANDSTONE GROUP	150	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NGED-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE61/BJ	Gainsborough Road Saundby	MERCIA MUDSTONE GROUP	100	This abstraction is located outside of the Order Limits and over 1.5 km from proposed works (NGED-06) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
SK78SE53/BJ	Gainsborough Road Sturton Le Steeple	MERCIA MUDSTONE GROUP	30	These abstractions are located outside of the Order Limits 240 m east, 350 m east and 390 m south-east of NGED-08 respectively. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78SE51/BJ	Junction Cross St & Wheatley Rd Sturton Le Steeple	MERCIA MUDSTONE GROUP	20	
SK78SE40/BJ	Sturton Le Steeple	UNKNOWN	80	
SK78NE53/BJ	Flour Mill Lower Pasture Lane North Wheatley	MERCIA MUDSTONE GROUP	120	This abstraction is located outside of the Order Limits and over 2 km from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE58/BJ	High House Farm West Burton	MERCIA MUDSTONE GROUP	50	This abstraction is located outside of the Order Limits and over 1.8 km from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE35/BJ	C.E.G.B. W/Burton Power Station	SHERWOOD SANDSTONE GROUP	450	This abstraction is located outside of the Order Limits and over 1.2 km from proposed works (NGED-08) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE37/BJ	West Burton Power Station	MERCIA MUDSTONE GROUP	250	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE36/BJ	C.E.G.B. W/Burton Power Station	MERCIA MUDSTONE GROUP	250	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78NE59/BJ	Northeast Of Sturton Station	MERCIA MUDSTONE GROUP	110	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SK78SE52/BJ	Junction Church St & Leverton Rd Sturton Le Steeple	MERCIA MUDSTONE GROUP	460	This abstraction is located outside of the Order Limits and over 900 m from proposed works (NGED-08) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78SE54/BJ	Windmill View Nurseries	UNKNOWN	30	This abstraction is located outside of the Order Limits and over 250 m from proposed works (NGED-09) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK78SE42/BJ	Caddow Farm North Leverton	MERCIA MUDSTONE GROUP	390	This abstraction is located outside of the Order Limits and over 1.4 km from proposed works (NGED-09) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE69/BJ	B P Exploration South Leverton No 12	UNKNOWN	280	This abstraction is located outside of the Order Limits and over 750 m from proposed works (NGED-10) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE77/BJ	Town Street Treswell	MERCIA MUDSTONE GROUP	260	This abstraction is located outside of the Order Limits and over 700 m from proposed works (NGED-10) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely
SK77NE76/BJ	B P Exploration South Leverton No 15	UNKNOWN	410	This abstraction is located outside of the Order Limits and over 800 m from proposed works (NGED-10) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE68/BJ	B P Exploration South Leverton No 18	UNKNOWN	260	A review of this borehole records shows that it is not a water well but was an exploratory well drilled by BP Exploration Ltd. This ‘well’ is not considered further.
SK77NE47/BJ	Rampton Hospital	SHERWOOD SANDSTONE GROUP	250	This abstraction is located outside of the Order Limits and over 1 km from proposed works (NGED-10) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
SK77NE82/BJ	Drayton Field Farm East Drayton	MERCIA MUDSTONE GROUP	130	These abstractions are located outside of the Order Limits 220 m northwest, 460 m south and 460 m south of NGED-13 respectively. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE80/BJ	Drayton Field Farm East Drayton	UNKNOWN	20	
SK77NE81/BJ	Drayton Field Farm East Drayton	MERCIA MUDSTONE GROUP	50	
SK77NE21/BJ	Stokeham	UNKNOWN	140	This abstraction is located outside of the Order Limits and over 1.3 km from proposed works (NGED-13) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE79/BJ	Manor House Farm East Drayton	MERCIA MUDSTONE GROUP	160	This abstraction is located outside of the Order Limits and over 190 m from proposed works (NGED-14) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK77NE83/BJ	The Vicarage East Drayton	MERCIA MUDSTONE GROUP	370	This abstraction is located outside of the Order Limits and over 950 m from proposed works (NGED-14) that could impact groundwater.

Registration Number	Point Name	Aquifer	Approximate Distance from Order Limits (m)	Assessment
				The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK87SW28/BJ	High Marnham Power Station	SHERWOOD SANDSTONE GROUP	390	This abstraction is located outside of the Order Limits and over 850 m from proposed works (NGED-17) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.
SK87SW29/BJ	High Marnham Power Station	SHERWOOD SANDSTONE GROUP	350	This abstraction is located outside of the Order Limits and over 950 m from proposed works (NGED-17) that could impact groundwater. The Project proposals are not anticipated to have any impacts on groundwater quality, levels or flow at this location and therefore impacts on the abstraction are considered to be unlikely.

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