Fosse Green Energy

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EN010154

6.3 Environmental Statement Appendices

Appendix 9-B: Water Framework Directive Assessment

VOLUME

6

Planning Act 2008 (as amended)

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

18 July 2025

Planning Act 2008

The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulation 2009 (as amended)

Fosse Green Energy

Development Consent Order 202[ ]

6.3 Environmental Statement Appendices

Appendix 9-B: Water Framework Directive Assessment

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Author	Fosse Green Energy Limited

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1. Introduction

1.1 Background

1.1.1 This Water Framework Directive (WFD) Assessment has been prepared as part of the Environment Statement (ES) for Fosse Green Energy (hereafter, 'the Proposed Development'). This appendix should be read in conjunction with **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

1.1.2 The Proposed Development comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility, associated electrical equipment, cabling and on-site Battery Energy Storage System (BESS) across a proposed site which lies to the south and south west of Lincoln (hereafter referred to as the 'Principal Site'), together with grid connection infrastructure to be located within the 'Cable Corridor'.

1.1.3 The Proposed Development comprises the following key pieces of infrastructure:

a. Solar PV panels (also known as 'modules');
b. PV panel mounting structures;
c. BESS;
d. Inverters;
e. Transformers;
f. Switchgear;
g. An Onsite Substation and control buildings;
h. Onsite cabling;
i. Ancillary infrastructure (e.g. combiner boxes, weather stations);
j. Electricity export and import via high-voltage Grid Connection Cable and connection to the National Electricity Transmission System;
k. Fencing and security;
l. Access Tracks; and
m. Landscaping, permissive paths and biodiversity mitigation and enhancement areas.

1.1.4 More detailed information regarding these elements is described in **Chapter 3: The Proposed Development** of the ES **[EN010154/APP/6.1]** and are also described later in this report where relevant (**Table 5**).

1.1.5 The Proposed Development interacts with ten WFD water bodies (seven surface water bodies and three groundwater bodies) and thus it is necessary to consider the activities and constituent parts of the Proposed Development

to determine compliance with WFD objectives. This includes assessing the impact of new solar PV panels, supporting infrastructure, site drainage and cable crossings of water bodies on the biological, physico-chemical and hydromorphological quality elements that comprise the WFD to ensure no deterioration and no prevention of future improvement in water body status. Both surface and groundwater bodies are considered.

1.1.6 In accordance with the Planning Inspectorate's Advice on the Water Framework Directive (Ref 1), a three-stage approach to WFD assessment has been adopted, comprising screening, scoping and impact assessment. Each stage is described in **Section 2** of this Report.

1.1.7 This Report therefore presents the findings of the full WFD assessment (all three stages of the WFD assessment process) which has been undertaken in relation to the Proposed Development.

1.1.8 This Report should be read in conjunction with **Chapter 9: Water Environment** of the **[EN010154/APP/6.1]** and is supported by **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]** and **Figure 9-2: Groundwater Features and their Attributes [EN010154/APP/6.2]**.

1.2 Water Environment Study Area

1.2.1 The Proposed Development is located within the Anglian River Basin District, with a small area around Morton Hall falling under the Humber River Basin District. The Proposed Development is located approximately 9km south and south west of Lincoln in a predominantly agricultural landscape surrounded by the villages of Witham St Hughs, Bassingham, Thurlby, and Thorpe on the Hill, amongst others. **Chapter 2: The Site and Surroundings** of the ES **[EN010154/APP/6.1]** presents further details on the area surrounding the Proposed Development.

1.2.2 For the purposes of this assessment, and consistent with **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**, a general study area (Zone of Influence (ZOI)) of approximately 1km from the DCO Site has been considered in order to identify water bodies that are hydrologically connected to the Proposed Development, and potential works associated with the Proposed Development, that could cause direct impacts. However, given that impacts may propagate downstream, where relevant the assessment also considers a wider study area to account for any impacts that may be transmitted downstream that may influence WFD quality element receptors (which in this case is typically for a few kilometres). Professional judgement has been applied to identify the extent to which such features are considered.

1.2.3 In this case, watercourses across the Study Area drain towards the River Witham, and so this is considered the final receiving water body that could conceivably be affected (and which is within 1km of the DCO Site). As such, a 1km buffer around the DCO Site is considered appropriate for the Study Area.

1.2.4 The Study Area falls within the following management catchments and surface water body catchments:

a. Witham Upper / Witham from Cringle Brook to Brant Lower Water Body (GB105030056780);

b. Witham Upper / Brant Lower Water Body (GB105030056770);

c. Witham Upper / South Hykeham Catchwater Water Body (GB105030062460);

d. Witham Lower / Dunston Beck Water Body (GB105030056230);

e. Witham Lower / Metheringham Beck Water Body (GB105030056210);

f. Trent and Trib / Fleet Lower Catchment (trib of Trent) (GB104028058250);

g. Witham Upper / Boultham Catchwater Drain Water Body (GB105030062380).

1.2.5 There are also a number of smaller water features within the Study Area, which do not have WFD classifications in their own right, but which would all ultimately drain to the River Witham or The Fleet (and these are covered by their WFD designations).

1.2.6 The Study Area is also underlain by three groundwater WFD water bodies:

a. Witham Lias Water Body (GB40502G401400);

b. Witham Limestone Unit A Water Body (GB40501G444800); and

c. Lower Trent Erewash – Secondary Combined Water Body (GB40402G990300).

1.2.7 Further baseline details and WFD classifications for each of the WFD waterbodies is given in **Section 3** of this report. WFD waterbody locations in relation to the Proposed Development and a depiction of the study area are presented in **Figure 9-1** and **Figure 9-2 [EN010154/APP/6.2]**.

1.3 Introduction to the Water Framework Directive

1.3.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the Water Environment Regulations 2017) (Ref 2) commonly referred to as the WFD, aims to protect and enhance the water environment.

1.3.2 The WFD takes a holistic approach to sustainable management of the water environment by considering interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem conditions are evaluated according to interactions between the following 'Quality Elements':

a. Ecological status;

b. Biological quality;

c. General chemical and physico-chemical quality;

d. Hydromorphological quality;

e. Specific pollutants with UK Environmental Quality Standards (EQS);

f. Chemical status; and

g. Priority substances and other EU level substances with EU EQS.

1.3.3 Under the WFD, 'water bodies' are the basic management units, defined as all or part of a river system or aquifer. Waterbodies form part of a larger 'river basin district' (RBD), for which 'River Basin Management Plans' (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. RBMPs are produced every six years, in accordance with the river basin management planning cycle. The current RBMPs are at Cycle 3 and were published in 2022.

1.3.4 In England, the Environment Agency is the competent authority for implementing the WFD, although objectives are delivered in partnership with other public bodies and private organisations, for example local planning authorities, water companies, rivers trusts, and private landowners and developers.

1.3.5 The Environment Agency is also responsible for managing flood risk and other activities on Main Rivers. Local planning authorities or drainage boards are typically responsible for consenting activities on Ordinary Watercourses. Local planning authorities are typically responsible for highways drains, and landowners are typically responsible for ditches and watercourses within their property including piped watercourses and culverts. While the Environment Agency is ultimately responsible for enforcing the WFD on any water body, local authorities are required to plan and consent WFD related activities on Ordinary Watercourses.

1.3.6 As part of its regulatory and statutory consultee role on planning applications and environmental permitting (under the Environmental Permitting Regulations (England and Wales) 2016), the Environment Agency and WFD-partnering organisations, must consider whether proposals for new developments have the potential to:

a. Cause a deterioration of any quality element of a water body from its current status or potential; and / or

b. Prevent future attainment of good status or potential where not already achieved.

1.3.7 Regulation 33 of the Water Environment Regulations 2017 (Ref 2) states that public bodies "*must, in exercising their functions so far as affecting a river basin district, have regard to - (a) the river basin management plan for that district as approved under regulation 31, and (b) any supplementary plan prepared under regulation 32".* The Proposed Development must therefore reflect water body improvement priorities as outlined in the Humber RBMP and the Anglian RBMP.

1.3.8 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, the Environment Agency and partnering organisations must also consider the conservation objectives of any Protected

Areas (e.g. Natura 2000 sites or water dependent Sites of Special Scientific Interest) and adjacent WFD water bodies, where relevant.

2. Methodology

2.1 WFD Methodology

2.1.1 There are no fixed methods for WFD assessment. The nature of the water environment and the breadth of the legislation mean that assessments are tailored to proposals on a case-by-case basis.

2.1.2 The following general guidance is available which has been applied for this assessment:

a. Environment Agency (2016a). Water Framework Directive risk assessment. How to assess the risk of your activity (Ref 3);

b. Environment Agency (2016b). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers (Ref 4); and

c. The Planning Inspectorate (2024). Advice on the Water Framework Directive (Ref 1).

2.1.3 A stepwise approach consisting of screening, scoping and impact assessment phases is generally followed in order to: (a) rationalise the levels of WFD assessment and impact mitigation that are required; and (b) verify that proposals meet the requirements of the WFD. The general approach is described by the Planning Inspectorate (2024): Advice on the Water Framework Directive and briefly summarised below. The stepwise approach means that not all WFD assessment stages are necessarily required.

Stage 1: Screening

2.1.4 Screening identifies the extent to which a proposed development is likely to affect water bodies. Where impacts are 'screened out' from further assessment, this is clearly justified.

2.1.5 The screening stage:

a. Shows all relevant WFD water bodies on a map or plan;

b. Identifies the zone or zones of influence based on specific activities and/or characteristics of a proposed development that could affect the identified water bodies; and

c. Identifies any specific activities and/or characteristics of the proposed development that have been screened out and why.

2.1.6 Screening may find that no further consideration of WFD matters is needed. For example, where water bodies are not located within the development's zone of influence or where no impact pathways exists.

Stage 2: Scoping

2.1.7 After screening, the scope of further assessment is determined if required.

2.1.8 The scoping stage involves:

a. An initial assessment to identify the risks from a proposed development to receptors within the zone of influence, based on the relevant water bodies and their water quality elements; and

b. Identification of those water bodies where a more detailed impact assessment is needed.

Stage 3: Impact Assessment

2.1.9 The impact assessment is a detailed assessment of the water bodies and activities carried forward from the WFD screening. It is set within the context of the appropriate River Basin Management Plans and includes:

a. Identification of water bodies that are potentially affected, directly or indirectly, or at risk from a proposed development;

b. The baseline characteristics of the water bodies affected;

c. A description of the proposed development and the aspects of the development considered within the scope of the WFD assessment;

d. The methods used to determine and quantify the scale of WFD impacts;

e. An assessment of the risk of deterioration, where Article 4.7 may apply if the proposed development may risk deterioration in status or prevent achievement of good status;

f. An explanation of any mitigation required and how it is secured;

g. An explanation of any enhancements and/or positive contributions to the River Basin Management Plan objectives proposed and how they would be secured;

h. Where a derogation is required, information to justify the case for derogation; and

i. Identification of any areas of non-compliance.

2.2 Mitigation Commitments

2.2.1 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. Mitigation could be secured through planning licence conditions, Development Consent Order requirements, or other legally binding methods.

2.3 Further Assessments if WFD Derogation is to be Considered by the Applicant

2.3.1 Regulation 17 and Regulation 19 of the Water Environment Regulations 2017 set out 'last resort' planning and legal processes for WFD derogation that are not part of this report. Case review of any proposed justification by an applicant would be a matter for the Secretary of State and is likely to require a substantial body of multi-disciplinary evidence.

2.3.2 Where the potential for deterioration of water bodies is identified, and the *"body of water is so affected by human activity or its natural condition is such that the achievement of the environmental objectives set would be infeasible or disproportionately expensive"*, it is possible for an applicant to present further assessments in the context of Regulation 17. Derogation has not been considered herein and would require detailed further analyses of options, environmental impacts and business cases, for WFD and all relevant legislation pertaining to planning and sustainability. For WFD context, Regulation 17 covers part of the procedures for WFD derogation, including but not limited to that *"the environmental and socio-economic needs served by such human activity cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs"*.

2.3.3 Where the potential for *"failure is the result of new modifications to the physical characteristics of the body of surface water or alterations to the level of the body of groundwater"*, it is possible for an applicant to present further assessments in the context of Regulation 19. Regulation 19 is also still commonly referred to as Article 4.7 of the original EU Directive. Derogation has not been considered herein and as above would require detailed further analyses. For WFD context, Regulation 19 covers part of the procedures for WFD derogation, including but not limited to that:

a. "*all practicable steps are taken to mitigate the adverse impact on the status of the body of water*".

b. "*the reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest*".

c. "*the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development*".

d. "*the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option*".

2.4 Desk Study

2.4.1 A desk-based study was carried out to capture information pertaining to the Proposed Development to support the understanding of baseline conditions. A Review of relevant information relating to the study area was undertaken to develop a baseline overview for WFD catchments, watercourses, and surrounding areas. The following data sources were used for the desk study:

a. WFD status and objectives from the appropriate River Basin Management Plan for Cycle 3 data, available from the Catchment Data Explorer (Ref 5);

b. Defra's Multi-agency government information for the countryside website (MAGIC), including contemporary Ordnance Survey (OS) maps (Ref 6);

c. Historical maps (Ref 7);

d. British Geological Survey maps (Ref 8);

e. Soilscapes website (Ref 9);

f. Aerial photography (Ref 10);

g. Hydrological information (Ref 11);

h. Climate information (Ref 12);

i. Environment Agency Fish and Ecology Data Viewer (Ref 13);

j. Environment Agency Water Quality Archive website (Ref 14).

2.5 Field Survey

2.5.1 An initial site walkover survey was undertaken by a water scientist and hydromorphologist on 3 October 2023 in dry and overcast conditions to assess watercourse connectivity, quality and condition. This survey covered the DCO Site as described at the time of survey and while minor design changes have been made since the Environmental Impact Assessment (EIA) Scoping Report, the survey covered the waterbodies that might be affected by the Proposed Development and has since been supported by further observations undertaken as part of the development of **Appendix 8-C: Aquatic Ecology [EN010154/APP/6.3]**, thus ensuring that survey findings remain valid.

2.6 Limitations and Assumptions

2.6.1 This WFD assessment has been undertaken based on design information at the time of submission of the Application, and as described in **Chapter 3: The Proposed Development** of the ES **[EN010154/APP/6.1]** and further information provided in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

2.6.2 Where there is uncertainty in the design, reasonable assumptions have been made, and these are described at relevant points within this assessment. Further assessment or updates may therefore be required if there are material changes to the design elements post planning or it is determined that

proposed embedded mitigation cannot be implemented as currently proposed for whatever reason.

2.6.3 A request for WFD information and water quality and flow data was issued to the Environment Agency to inform the desk study in April 2023. A full response was received in May 2023 and has therefore been taken into account in this assessment. It is considered that sufficient baseline information has been gathered from the desk study and site walkover to enable this assessment to be undertaken.

2.6.4 Temporary works will not be assessed unless they are of a potentially significant scale and have the potential to adversely impact the quality or form of water bodies. The temporary works where such risks are considered significant (for example, excavations for the Cable Corridor), have been identified and assessed where there is sufficient detail to do so at this stage. Operational maintenance activities are generally considered of insufficient scale to require assessment.

2.6.5 At the time of submission of the Application, the specific locations and methodologies of construction and installation of the cables within the Principal Site and the Cable Corridor remain subject to detailed design. However, it has been confirmed that the River Witham and the River Brant will be crossed using non-intrusive, underground techniques (e.g. horizontal directional drilling (HDD)) that would not disturb the watercourse. The depth of the cable below the bed will be a minimum of 5m so as not to disturb the channel or risk being exposed by future bed scour. The launch and receiving pits will be set back from the bank top of the watercourse to protect riparian habitats. Where the Interconnecting Cable Corridor is proposed to cross the River Witham, this setback will be extended to a minimum of 100m in recognition of the presence of a potential Otter holt. Maximum parameters considered for the launch and receiving pits as a worst case are dimensions of 8m length x 4m width x 1m depth.

2.6.6 Cable crossings of smaller watercourses are assumed to require open-cut installation techniques, with a maximum width of 5m per crossing being affected as a worst case. For these crossings, water flow would be maintained by damming, fluming, and/or over pumping. Several of the ditches within the DCO Site are ephemeral and if works could be carried out in the drier months this would reduce the risk of pollution propagating downstream, although this cannot be guaranteed and thus no weight has been attributed to this. It will be a requirement that the watercourses are reinstated as found and enhanced where opportunities are available. Water quality monitoring will be undertaken prior to, during, and following on from the construction activity.

2.6.7 Indicative crossing of watercourses for access tracks are shown in **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]**. Where watercourses/ditches are crossed for access (either temporarily during construction or permanently during operation), new crossings will be clear span and wide/high enough to avoid the loss of in-channel and riparian habitats. However, existing crossings are to be used where practicable, in

order to reduce the number of new crossings required. Where these exiting structures require replacement due to structural capacity or condition opportunities will be sought to replace them using an open span crossing.

2.6.8 The Proposed Development infrastructure will be set back from all water features by at least 10m to create a buffer zone, except where watercourse crossings are required. The point of measurement will be from the top of bank, or landward toe of a flood defence as agreed with the Environment Agency and Internal Drainage Board (IDB). There will also be a 16m buffer from the landward toe of flood defences, where present.

2.6.9 This buffer from water features will ensure all construction activities for the installation of solar PV panels, Onsite Substation, solar stations, and BESS would be offset from surface watercourses, other than where there is a need for crossing of a watercourse (such as for cabling installation or temporary vehicle access for construction) or connection for surface water drainage (that may be for temporary works or from the operational Proposed Development). Any works to enhance watercourses would also require direct works to the channel and banks, although given the aim of these works construction impacts would be expected to be minimal, given that their small-scale and 'soft-engineering' approach. Overall, the inclusion of this buffer reduces the risk of pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences) where they are required and maintaining access (e.g. for the IDBs).

2.6.10 The risk from surface water runoff to surface or groundwater features has been assessed on the basis of **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]**. The delivery of a detailed Surface Water Drainage Strategy and implementation of the measures identified in **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** are secured through a Requirement of the DCO.

2.6.11 In the UK climate, solar PV panels are largely self-cleaning and deterioration in PV system output due to dust or dirt is generally low. The pollution risk from this runoff is minimal as solar PV panels do not contain any liquid (hazardous or not) that could contaminate rainwater. They will be cleaned on two yearly cycles as a worst case. As the use of cleaning products (chemicals) can damage panels and void manufacturer's warranties no cleaning products would be used, only water. It is assumed at this stage that clean water will be delivered to the site for use in specially adapted tractors and this will not lead to any significant pollution risk.

2.6.12 The BESS will have built-in fire detection and will be fitted with an automatically operated internal fire extinguisher system. Emergency fire water would be stored within onsite water tanks with appropriate allowance for fire water storage provided. A **Framework Battery Safety Management Plan (FBSMP) [EN010154/APP/7.17]** has been prepared to support the DCO Application. This sets out the parameters for the management of fire risk associated with the BESS. This management plan forms the basis for the preparation of a fully detailed Battery Safety Management Plan at a later stage

to ensure the delivery of a robust fire safety strategy in relation to the BESS and is secured as a Requirement of the DCO.

2.6.13 Provision of fire water containment (impermeable water capture to prevent used firewater reaching ground/the surrounding environment) is required. It is currently proposed to contain the external fire water runoff within the swales surrounding the BESS areas, where it can be held and tested before either being released into the surrounding watercourses or to ground (if found to have no contaminants present, or contaminants that are within acceptable legal limits) or taken off site by a tanker for treatment elsewhere. The swale will then be cleaned of all contaminants.

2.6.14 Land use change relating to ceasing productive arable agriculture within the Principal Site to accommodate the Proposed Development will reduce water quality risk to watercourses associated with diffuse agricultural chemicals and possibly reduce soil erosion and need for local abstractions for irrigation, thereby providing a beneficial impact. However, there is limited data on the existing conditions and activities, and therefore no further consideration has been given to this potential benefit at this stage.

2.6.15 There will be welfare facilities associated with the Proposed Development for up to four permanent full time equivalent members of staff, with up to 20 being in attendance for periods of maintenance, cleaning, or solar infrastructure replacement. Given the low daily occupancy only small volumes of foul drainage will be generated. This will be managed using a self-contained foul drainage system to a sealed cesspit. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

3. Baseline

3.1 Catchment Characteristics

3.1.1 A summary of baseline characteristics in the study area is provided below. For further detail refer to **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**. Also refer to **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]** and **Figure 9-2: Groundwater Features and their Attributes [EN010154/APP/6.2]**.

Topography and Land Use

3.1.2 The topography of the Cable Corridor Study Area generally rises east of the River Brant (at less than 10m AOD) forming an escarpment at around 80m AOD at Navenby and this high point broadly follows the A607. The land gently recedes in elevation beyond Navenby, falling to around 40m AOD to the east of the Study Area of Scopwick Heath. Land use is generally agricultural, but with the villages of Coleby, Navenby, Boothby Graffoe and Wellingore all falling within the Study Area.

3.1.3 The topography of the Principal Site and its surrounding Study Area is relatively flat, with existing ground levels generally under 20m Above Ordnance Datum (AOD) according to online Ordnance Survey mapping (Ref 15) with gentle undulations around the larger watercourses. There are flood plains associated with:

a. The River Witham (Main River) which flows through the Study Area;

b. The River Brant (Main River), a tributary of the River Witham which flows through the Study Area and meets the Witham to the south of South Hykeham; and

c. The South Hykeham Catchment, a Main River located to the northeast of the Study Area.

3.1.4 These watercourses are shown in **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]**. In addition, there are numerous other Ordinary Watercourses within the Study Area that fall under the jurisdiction of the Lead Local Flood Authority (LLFA) (Lincolnshire County Council) or IDB (Upper Witham Internal Drainage Board and Trent Valley Internal Drainage Board areas both cross into the Study Area, illustrated on **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]**). These watercourses drain surface water from the surrounding agricultural areas.

Rainfall

3.1.5 Based on the Meteorological Office website (Ref 12), the nearest weather station is located in Waddington (NGR SK 98952 65231), approximately 3.5km north of the Study Area. Using data from this weather station, for the period 1991–2020, it is estimated that the Study Area experiences approximately 614mm of rainfall per year, with it raining more than 1mm on approximately 116 days per year, which are both low in the UK context. This is relevant to the whole Study Area.

Geology, Groundwater and Soils

3.1.6 The bedrock and superficial geology for the area is identified by the BGS GeoIndex online mapping (Ref 8).

3.1.7 Superficial deposits are largely absent from the Principal Site however, isolated pockets of Balderton Sand and Gravel Member are mapped north of High Walks Farm, a larger area south of Aubourn and also along the western boundary of the Proposed Development. Alluvium, River Terrace Deposits and Fulbeck Sand and Gravel Member are mapped associated with the watercourses crossing the Proposed Development area.

3.1.8 The Principal Site is underlain by two bedrock formations. The majority of the Principal Site is underlain by Scunthorpe Mudstone Formation comprised of interbedded mudstone and limestone. The eastern part of the Principal Site, which includes the proposed substation and BESS compound (under the centralised BESS arrangement), is underlain by the Charmouth Mudstone Formation. The Charmouth Mudstone Formation is described as dark grey

laminated shales, and dark, pale and bluish grey mudstones with local limestone beds.

3.1.9 Superficial deposits are largely absent along the cable corridor, specifically, the section of the corridor to the east of Broughton Lane. Superficial deposits of Balderton Sand and Gravel Member are found between Aubourn and Bassingham and Alluvium, River Terrace deposits and Fulbeck Sand and Gravel Member are mapped associated with the watercourses. These deposits are comprised of silts, clays, sands of gravels.

3.1.10 The Cable Corridor Study Area is underlain by six bedrock formations. The boundaries between the formations are roughly north-to-south orientated and perpendicular to the cable corridor. The bedrock formations are outlined below from west to east.

3.1.11 A small section to the western extent of the Cable Corridor is underlain by the Scunthorpe Mudstone Formation (interbedded mudstone and limestone).

3.1.12 The bedrock formation east of the Scunthorpe Mudstone Group is the Charmouth Mudstone Formation. The Charmouth Mudstone Formation underlies the majority of the Cable Corridor.

3.1.13 To the east of the Charmouth Mudstone Formation is a narrow band of Whitby Mudstone Formation. The Whitby Mudstone Formation is comprised of interbedded mudstone, siltstone and calcareous sandstone beds. This narrow band runs north-to- south in between the Charmouth Mudstone Formation and the Grantham Formation and Northampton Sand Formation.

3.1.14 To the east of the Whitby Formation is a very narrow band (approximately 45m at outcrop) of Grantham Formation and Northampton Sand Formation. This formation is comprised of sandstone and ironstone.

3.1.15 To the east of Grantham Formation and Northampton Sand Formation outcrops the Lower Lincolnshire Limestone Member, part of the Lincolnshire Limestone Formation. This member outcrops in the vicinity of Boothby Graffoe and is dominated by peloidal wackestone and packstone.

3.1.16 The final bedrock formation crossed by the Cable Corridor is the Lincolnshire Limestone Formation comprised of typically calcilutites, and peloidal wackestones and packstones in the lower part ooidal and shell fragmental grainstones in the upper part. The thickness of this formation can be up to 30m thick.

3.1.17 The Cable Corridor is partly located within a Source Protection Zone 3 (SPZ3, total catchment), in the area of Boothby Graffoe to Harmston. This SPZ3 is associated with a groundwater abstraction and SPZ1 located approximately 5.7km northeast of the Proposed Development. There is also an SPZ1 located approximately 4.1km east of the Proposed Development however, there are no SPZ2 or SPZ3 associated with is abstraction (Ref 9-40).

3.1.18 The Proposed Development lies within a Nitrate Vulnerable Zone, indicating an area at risk of agricultural nitrate pollution. The proposed development is not located within any Drinking Water Safeguard Zones for Groundwater.

Hydrogeology

3.1.19 No site-specific ground investigation information is currently available at this stage, however a review of selected BGS borehole records available on the Geoindex website has been undertaken (Ref 8). Only five boreholes within the DCO Site recorded groundwater levels. These are described below.

3.1.20 Borehole data for BGS borehole record SK96SW4 and SK96SW38, located in the centre of Aubourn 660m northeast from the Cable Corridor, recorded groundwater levels 4.5m below ground level (bgl) in the Scunthorpe Mudstone Formation.

3.1.21 Borehole data for BGS borehole record SK86SE139, located in Tunman Wood approximately 100m from the northwestern extent of the Principal Site, recorded groundwater levels 2.5m bgl. This area is underlain by the Scunthorpe Mudstone Formation.

3.1.22 Borehole data for BGS borehole record SK95NE1/A and SK95NE1/B, located to the northwest of Navenby within the Cable Corridor recorded groundwater levels 11m bgl. This area is underlain by the Lincolnshire Limestone Formation.

3.1.23 The Environment Agency Hydrology Data Explorer has provided further data on groundwater levels at three stations in the area. These provide data on average groundwater levels (dipped only) since January 2020.

3.1.24 Thorpe on the Hill monitoring station, located north of the Principal Site, reported average groundwater levels of 12.37mAOD. The monitoring station is 14.2mAOD. Average groundwater levels are 1.8m bgl.

3.1.25 Norton Lane Thurlby monitoring station, located south of the Principal Site, reported average groundwater levels of 13.39mAOD. The monitoring station is 16.23 mAOD. Average groundwater levels are 2.84m bgl.

3.1.26 Coleby monitoring station, located north of the Cable Corridor, reported average groundwater levels of 47.10mAOD. The monitoring station is 55.05mAOD. Average groundwater levels are 7.97m bgl.

3.1.27 Where present, groundwater flow within the superficial deposits is likely to be via intergranular flow towards local watercourses and drains. The groundwater flow will be influenced by the presence of lower permeability deposits such as silts and clays and also by the lateral extent of the deposits.

3.1.28 Groundwater flow in the bedrock is likely to be predominantly via fracture flow. Within the mudstone formations flow is likely to be restricted, however, flow can occur where interconnected fractures are present. Flow will be greater within the more permeable limestone bedrock with flow occurring through fractures, enlarged fissures and even karsts.

3.1.29 A Ground Investigation (GI) and groundwater monitoring will be undertaken to obtain groundwater level data and aquifer properties to inform the detailed design, post consent.

Historical Channel Change

3.1.30 There are no clear alterations in the alignments of watercourses within the Study Area since the advent of available historic mapping at the end of the 19th century. However, this does not mean the channels are unmodified but merely that modifications pre-date available mapping. The area has been heavily managed for agriculture with this most clearly seen through the network of linear drainage ditches that form field margins. These channels are expected to be severely over deep, laterally disconnected from their floodplain, and not possessing of any notable diversity in channel form and process. This was confirmed by observations during the site walkover undertaken in October 2023.

3.2 WFD Status

WFD Status – Surface Water

3.2.1 Baseline WFD classifications for the seven WFD surface waterbody catchments in the study area are presented in **Table 1** (Ref 5).

Table 1 Summary of the WFD status (Cycle 3) of surface water bodies in the study area

Water Body ID	Hydromorph-ological Designation	Overall Ecological Status	Biological Quality Elements	Physico-chemical Quality Elements	Hydromorph-ological Quality Elements	Chemical
Witham from Cringle Brook to Brant Lower Water Body (GB105030056780)	Heavily modified	Moderate	Good	Moderate	Supports good	Fail (2019)
Brant Lower Water Body (GB105030056770)	Heavily modified	Moderate	Moderate	Moderate	Supports good	Fail (2019)
South Hykeham Catchwater Water Body (GB105030062460)	Heavily modified	Moderate	Moderate	Moderate	Supports good	Fail (2019)
Dunston Beck Water Body (GB105030056230)	Heavily modified	Moderate	Bad	High	Supports good	Fail (2019)
Metheringham Beck Water Body (GB105030056210)	Heavily modified	Moderate	N/A	Moderate	Supports good	Fail (2019)
Fleet Lower Catchment (trib of Trent) (GB104028058250)	Not designated artificial or heavily modified	Poor	Poor	Moderate	Supports good	Fail (2019)
Boultham Catchwater Drain Water Body (GB105030062380)	Heavily modified	Moderate	Moderate	Moderate	Supports good	Fail (2019)

WFD Status – Groundwater

3.2.2 The Proposed Development is underlain by three groundwater bodies. A summary of the WFD status of these groundwater bodies is presented in **Table 2** (Ref 5).

Table 2 Summary of the WFD status of the screened-in groundwater bodies

WFD Parameter	Witham Lias	Witham Limestone Unit A	Lower Trent Erewash – Secondary Combined
Water body ID	GB40502G401400	GB40501G444800	GB40402G990300
Groundwater area (ha)	68356.717	34053.33	192440.179
Overall Status	Good	Poor	Good
Quantitative	Good	Poor	Good
Quantitative Status Elements	Good	Poor	Good
Quantitative Saline Intrusion	Good	Good	Good
Quantitative Water Balance	Good	Good	Good
Quantitative GWDTEs test	Good	Good	Good
Quantitative Dependent Surface Water Body Status	Good	Poor	Good
Chemical	Good	Poor	Good
Chemical Status Elements	Good	Poor	Good
Chemical Drinking Water Protected Area	Good	Good	Good
General Chemical Test	Good	Poor	Good
Chemical GWDTEs test	Good	Good	Good
Chemical Dependent Surface Water Body Status	Good	Good	Good
Chemical Saline Intrusion	Good	Good	Good

3.2.3 The Witham Lias and Lower Trent Erewash – Secondary Combined water bodies have Good Overall Status, while Witham Limestone Unit A is at Poor Overall Status.

3.3 Hydromorphological Quality Elements

3.3.1 A site walkover was conducted on 3 October 2023 in overcast, dry conditions, to assess the hydromorphological condition and quality of watercourses set to be crossed by the Grid Connection Corridor. The findings of this are summarised in **Table 3**.

Table 3 Summary of the hydromorphological characteristics of watercourses within the study area

Photo	Crossing reference*	Description
	River Brant crossing	River Brant: EA Main River, 10m wide bank top to bank top and estimated bankfull depth of 5m. Channel is straight and has very little in the way of flow variation or diversity. Flow depth was around 0.5m. Large embankments have been built on both banks that will have entirely cut off any lateral connectivity. At the viewing point, water levels and channel characteristics may be heavily influenced by the presence of Sand Syke pumping station found at the confluence between the Brant and West Brant Syke.
	West Brant Syke	West Brant Syke: roughly 10m wide from bank top to bank top and estimated bankfull depth of 5m. Flow very slow moving and almost still. Channel is clearly artificial, straight, and trapezoidal in profile with little diversity in flow conditions and little chance of any lateral connectivity. Channel was heavily vegetated. The drain flows into the Brant through Sand Syke pumping station. An addition drain flowed into the watercourse from the north through a culvert.
	Ditch at SK 93554 60614	Trapezoidal drainage ditch that does not visibly connect to any other watercourses. Channel was heavily vegetated and had a small amount of standing water at the bottom.

Photo	Crossing reference*	Description
	Ditch at SK 92618 60608	Trapezoidal drainage ditch that runs parallel to Fen Lane. Watercourse was dry on day of inspection and heavily vegetated. It does not appear to connect to any other watercourse.
	Ditch at SK 92100 61579	Bank top to bank top width of 2m, heavily vegetated and disconnected channel. No water was visible on the day of inspection, and channel was heavily covered in terrestrial vegetation.
	Ditch at SK 91438 61807	Trapezoidal drain, 1m wide bank top to bank top and water depth of 0.1m. Water does not appear to be flowing and channel is heavily vegetated by brambles and terrestrial vegetation.
	River Witham Crossing	The River Witham: Environment Agency Main River, 8m bank top to bank top. Embankments have been built which will limit lateral connectivity, but the channel still exhibits a degree of flow variation and geomorphological process.
	Tributary of River Witham	Tributary of the Witham, deep, trapezoidal, and linear channel. Small degree of flow variability and large assemblage of macrophytes.

Photo	Crossing reference*	Description
	Ditch at SK 90569 61196	Channel around 2.5m bank top to bank top and densely vegetated by brambles. Small amount of water at the base of the channel but did not appear to be flowing. Channel was trapezoidal and linear in profile.
	Ditch at SK 90479 62551	Drainage channel running underneath road through culvert. Water is very turbid and grey in colour, suggesting water quality issues. Water has almost imperceptible flow. Channel is trapezoidal and over deep, around 1m wide bank top to bank top and bankfull depth estimated at 1m.
	Ditch at SK 89796 61220	Trapezoidal drainage channel, over deep and linear. Bank top to bank top width is 3m, with bankfull depth at 2m. Slow amount of water in the channel (around 0.2m) but very slow flowing and of no variability.

** Locations shown on **Figure 9-1 [EN010154/APP/6.2]**.*

3.4 Biological Quality Elements

3.4.1 The aquatic ecology desk study described in **Appendix 8-C: Aquatic Ecology** provides an overview of any protected, notable or invasive species of aquatic macroinvertebrates, macrophytes and fish within the Study Area based on desk study and site survey. A summary is provided in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

3.4.2 There is only one site which has been sampled for fish, invertebrates and macrophytes by the Environment Agency within the study area. This site is located within the Witham Upper / Witham from Cringle Brook to Brant Lower WFD waterbody at NGR SK9180062800. Within this waterbody fish, invertebrates and macrophytes were given a WFD classification of Good, High and Poor, respectively, in 2022.

3.4.3 **Appendix 8-C: Aquatic Ecology** indicates that presence of protected and notable fish species in waterbodies connected to the Proposed Development, and as such there is the potential that they may occur within the watercourses and ditches to be impacted within the Site. For example, Bullhead *Cottus*

gobio, European Eel *Anguilla anguilla* and Barbel *Barbus barbus* have all been noted downstream of the DCO Site within the River Witham. European Eel may utilise all connected watercourses and ditches in a catchment and may cross land between them. Therefore, consideration will need to be given to maintaining passage along watercourses and ditches for transitory fish species and avoiding impacts to them during construction.

3.4.4 No suitable spawning habitat for fish was identified in any of the surveyed waterbodies, and therefore there are no seasonal constraints due to the presence of spawning fish.

3.4.5 No aquatic macroinvertebrate species were recorded that receive specific legal protection or are of principal importance for nature conservation in England. However, there were two Regionally Notable macroinvertebrate species found in the DCO Site: a water beetle *Hydraena testacea* and a dragonfly *Sympetrum vulgatum* (larva found) in drain WC3 (see **Figure 9-1 [EN010154/APP/6.2]** for drain locations). Four Locally Notable species were also found across the DCO Site: a freshwater snail, Leach's Bithynia (*Bithynia leachii*), three water beetle species, two water scavenger beetles, *Laccobius colon* and *Anacaena bipustulata,* and a diving beetle *Ilybius quadriguttatus*.

3.4.6 A single notable plant species, Opposite-leaved Pondweed *Groenlandia densa*, was present in drains BL5 and BL6 only. This threatened species has a Vulnerable status on the England Red List of vascular plants but does not receive specific legal protection. Water body BL6 supports a total of 12 qualifying freshwater macrophyte species listed in the Local Wildlife Site Guidelines for Greater Lincolnshire. This water body therefore meets the criteria for selection of Local Wildlife Site (LWS) and is of County conservation value.

3.5 Physico-chemical Quality Elements

3.5.1 Water quality data for the River Witham at Aubourn Bridge, River Brant at Blackmore Bridge, South Hykeham Catchment at South Hykeham headwaters, Dunston Beck at Dunston Beck Spring and Metheringham Beck at Metheringham downstream of a sewage treatment works has been interrogated from the Environment Agency's Water Quality Archive website (Ref 14). Data has been compared to WFD Environmental Quality Standards (EQS) and is tabulated within **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**. A summary is provided below. Refer to **Figure 9-1: Surface Water Features and their Attributes [EN010154/APP/6.2]** for monitoring locations.

3.5.1 The water quality within the Witham at Aubourn Bridge is slightly alkaline in nature with an average pH of 8.14 but falls within the threshold for WFD high classification based on data sampled here from 2019 to 2025. A 10th percentile dissolved oxygen saturation of 80.13% falls within the high WFD classification (with 70% being high). Electrical conductivity is moderate (mean 844.50 µS/cm). Ammonia (90th percentile of 0.00094mg/l) would fall under the WFD high classification.

3.5.2 Water quality within the River Brant at Blackmore Bridge is circum-neutral with an average pH of 7.91 but falls within the WFD high classification based on data sampled here from 2020 to 2025. A 10th percentile dissolved oxygen saturation of 58.4% falls within the Moderate WFD classification. A 90th percentile of 2.52 mg/l and 0.00203 mg/l for Biological Oxygen Demand (BOD) and ammonia respectively, fall under the high WFD classifications. Electrical conductivity is moderate (mean 890.11 µS/cm).

3.5.3 Water quality within the South Hykeham Catchwater at South Hykeham is circum-neutral with an average pH of 7.74 and falls within the WFD high classification based on data sampled here from 2019 to 2025. A 10th percentile dissolved oxygen saturation of 50.84% is within the poor WFD classification (with 45-54% being poor). A 90th percentile for BOD of 5.28 mg/l falls within the moderate WFD classification (with >5 mg/l being the threshold to moderate). A 90th percentile for ammonia of 0.0115 mg/l falls within the high WFD classification. Electrical conductivity is moderate (mean 1043.04 µS/cm).

3.5.4 Water quality within the Dunston Beck WFD water body at Dunston Beck Spring is circum-neutral with a pH of 7.75, falling within the WFD high classification based on data sampled here from 2020 to 2025. A 10th percentile dissolved oxygen saturation of 90.5% falls within the WFD high classification. There has been no monitoring of BOD at this site. Electrical conductivity is moderate (mean 857.30 µS/cm).

3.5.5 Water quality within Metheringham Beck at Metheringham Ds Stw is circum-neutral with an average pH of 7.60 but falls within the WFD high classification based on data sampled here from 2019 to 2023. A 10th percentile dissolved oxygen saturation of 76.74% is within the good WFD classification. A 90th percentile for BOD of 5.64 mg/l falls within the moderate classification and 0.003 mg/l for ammonia both fall within the high WFD classifications. Electrical conductivity is moderate (mean 869.07 µS/cm).

3.5.6 Pike Drain is circum-neutral with a pH of 7.96. It has moderate electrical conductivity (680 µS/cm), but fewer determinants have been monitored at this site (which is not a WFD water body).

3.5.7 Nitrate and orthophosphate values are somewhat elevated for all monitored sites and indicates probable pressure from the surrounding agricultural land uses through use of fertilisers and other products which may runoff to the watercourses.

4. WFD Screening

4.1.1 The purpose of the WFD screening stage as outlined in the Planning Inspectorate Advice Note on the WFD (Ref 1) is to identify a zone of influence of the Proposed Development and to determine whether that influence has the potential to adversely impact upon WFD water body receptors; this approach has been taken in this assessment and is outlined in this section.

4.1.2 A study area of 1km from the Proposed Development boundary has been considered to identify water bodies that are potentially hydrologically connected to the Proposed Development and potential works associated with the Proposed Development that could cause direct impacts.

4.1.3 The screening stage also identifies specific activities of the Proposed Development that could affect receptor water bodies' WFD status, and which should be carried forward to subsequent stages of the assessment. Justification is provided where water body receptors are screened out and are not carried forward through the assessment. Water bodies or activities screened 'out' of the assessment are not considered further at the impact assessment stage.

Screening of WFD Water Bodies

4.1.4 The Proposed Development interacts with seven WFD surface water bodies and three WFD groundwater bodies. WFD Screening of these water bodies is provided in **Table 4**. Watercourses such as smaller tributaries within each of the WFD water body catchments that may be impacted by the Proposed Development have been included in this assessment. Any other remaining downstream water bodies not mentioned below are considered sufficiently far downstream to avoid impacts of the Proposed Development and are therefore screened out of further assessment.

Table 4 Screening of WFD water bodies potentially impacted by the Proposed Development

Water Body ID	Screening Outcome	Justification
Witham from Cringle Brook to Brant Lower Water Body (GB105030056780)	**In**	WFD surface water body may be directly impacted by the Proposed Development due to a range of activities that would interact with the local watercourse network during construction, operation, and decommissioning phases.
Brant Lower Water Body (GB105030056770)		
South Hykeham Catchwater Water Body (GB105030062460)	**Out**	The wider WFD catchments for these water bodies covers some of the Study Area and so there is potential for hydrological connectivity to the watercourse via the drains and tributaries that extend into the Site. However, due to the small scale and generally ephemeral nature of the drains and tributaries, potential impacts are deemed unlikely and insignificant. It is anticipated that any water quality impacts related to construction runoff or spillages that have potential to enter these tributaries will be adequately mitigated by a Construction Environmental Management Plan (CEMP), which
Dunston Beck Water Body (GB105030056230)		
Metheringham Beck Water Body (GB105030056210)		
Fleet Lower Catchment (trib of Trent) (GB104028058250)		

Water Body ID	Screening Outcome	Justification
Boultham Catchwater Drain Water Body (GB105030062380)		will be secured through a DCO requirement, and supported by an associated Water Management Plan (WMP) which will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction including requirements for water quality monitoring. The CEMP will be standard procedure for the Proposed Development and will describe the principles for the protection of the water environment during construction. A **Framework CEMP [EN010154/APP/7.7]** is included in the DCO Application. Similarly, during decommissioning there would be a Decommissioning Environmental Management Plan (DEMP) (see **Framework DEMP [EN010154/APP/7.9]**). During operation the Drainage Strategy for the Proposed Development would ensure no pollution to waterbodies that might be in hydrological connectivity to these watercourses. Given this mitigation and the lack of any direct works to these waterbodies, it is considered that they can be screened out of further assessment.
Witham Limestone Unit A (GB40501G444800) Witham Lias (GB40502G401400) Lower Trent Erewash – Secondary Combined (GB40402G990300)	**In**	Activities relating to the construction and operation of the Proposed Development have been assessed in terms of their potential impact upon these groundwater bodies. There are potential anticipated impacts at the water body scale, therefore assessment of impacts to groundwater is scoped in.

Screening of Activities

4.1.5 The Proposed Development comprises a number of activities, some of which present a potential risk to the WFD status of water bodies. These components and activities are listed in **Table 5** together with a screening assessment.

Table 5 Screening of the Proposed Development's Activities

Activity	Description	Screening Outcome	Justifications
Solar PV panels and PV mounting structures	Solar PV panels will: - have a maximum height of 3.5m above ground level (AGL). The lowest part of the panel will be 0.8m AGL; - be mounted on steel frames driven into the ground to a maximum depth of 2m for the south facing fixed panel and 4m for the single axis tracker panel arrangement; and - maintain a 10m buffer will be maintained from all watercourses.	**Out -** Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** (i.e. the activity does not interact with this water body) **-** Witham Limestone Unit A (GB40501G444800)	There will be no direct hydromorphological impacts to watercourses given the 10m buffer between infrastructure and any water features. **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** has been developed in accordance with planning policy guidance to manage surface water runoff from the operational Principal Site. Individual solar PV panels will be held above the ground surface on mounting structures (a minimum of 800mm above ground level). This prevents sealing the ground with an impermeable surface beneath the solar panels, allowing rainfall/runoff to infiltrate to ground throughout the Principal Site. As a result, it is considered that the impermeable area within solar PV panel areas will remain substantively consistent to its pre-development state. Despite not contributing towards the impermeable areas, in order to limit the potential for channelisation from rainfall dripping off the end of the panels, the areas between, under and surrounding the solar PV panels will be planted with native grassland and wildflower mix (noting that planting types are described within the **Framework Landscape and Ecological Management Plan (LEMP) [EN010154/APP/7.15]**). This planting will intercept and absorb rainfall running off the

Activity	Description	Screening Outcome	Justifications
			panels, preventing it from concentrating and potentially forming channels in the ground. As part of the non-statutory consultation for the Proposed Development, properties along The Avenue in Morton are known to experience surface water flooding from natural overland runoff from these fields. As a voluntary enhancement measure by the Applicant edge swales are proposed to capture excess runoff from the PV fields to reduce existing surface water risk. Edge swales within Fields 25, 30, and 34 will be sized and located accordingly to capture as much excess overland surface water runoff that can be reasonably accommodated, providing betterment in this area by reducing the existing surface water flood risk to properties along The Avenue. This is secured within the **Design Approach Document (Appendix A: Design Commitments) [EN010154/APP/7.3])**. Also refer to **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** for further detail on the proposed swales to reduce flood risk to The Avenue. SuDS in the form of swales will provide treatment for any contaminants collected on areas of hardstanding. The rate of runoff from each development location within the whole Principal Site would ensure nil detriment in terms of no increase in runoff rate from the DCO Site to receiving watercourses. In addition, the risk of agricultural diffuse pollution would be reduced from the change in land use as the application of agro-chemicals, inorganic and organic fertilisers to crops would cease in the areas of solar PV panels during the operational life of the Proposed Development.

Activity	Description	Screening Outcome	Justifications
			Given that no continuous foundations are present in the design, the regularly spaced discrete solar PV panel foundations and infrastructure foundations across the Principal Site are considered to have negligible impact on groundwater level or flows.. The Study Area is not known to have a significant history of potentially contaminating land uses such as landfill (Ref 6). The installation of the mounting structures to a maximum depth of 4m below ground is not considered to create a significant risk of mobilising contaminants. Nonetheless, prior to construction works commencing, a targeted scheme of Ground Investigation (GI) and testing followed by a Quantitative Risk Assessment will be completed.
Supporting infrastructure (inverters, transformers, and switchgear)	Supporting infrastructure will be mounted on concrete foundations to create 'Solar Stations'. Solar Station Compounds are typically mounted on adjustable legs on an area of hardstanding, measuring 33m x 27m. There will be approx. 84 across the Principal Site (maximum 100), containing: - inverters, each measuring 6m x 2.5m and 3m in height. - transformers, each measuring 12.5m x 2.5m and 3m in height. - switchgear, each measuring 6.5m x 2.5m and 3m in height.	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** – Witham Limestone Unit A (GB40501G444800)	Infrastructure will not be located within proximity of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** provides for the attenuation of surface water runoff from the operational Principal Site including areas of hardstanding associated with supporting infrastructure. In accordance with planning policy guidance, runoff from the Principal Site would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a Requirement of the DCO. Transformers will be installed with suitable bunds to contain any oil spillage in case of an oil-leakage event. Bunds will be designed to contain at least 110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. Under normal conditions any rainwater collected within

Activity	Description	Screening Outcome	Justifications
			the bund will be removed by use of special pump, which automatically switches off if it detects the smallest presence of oil in the water. Pumps will be linked to control and monitoring equipment to raise alarms if oil is detected. Given the above mitigation, there are considered to be no mechanisms for impacts to surface water bodies from the Solar Stations. Indicative foundations for the Solar Stations specify that they will have a maximum depth of 2m. Given the discrete, spread out nature of these compounds there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies in question. Furthermore, GI and groundwater monitoring will be undertaken to inform the detailed design and appropriate construction methodology.
Battery and Energy Storage System (BESS) Compound or BESS adjacent to the Solar Station Compounds	The BESS will allow for the storage of energy generated by the solar panels, with an expected requirement of 480 megawatt hours (MWh) of BESS capacity, equating to approx. 328 batteries. This would be either distributed throughout the Principal Site (referred to as 'distributed BESS' arrangement) and located alongside the Solar Stations, or located at a single BESS Compound (referred to as 'centralised BESS' arrangement). The 480MWh BESS capacity would be fully charged by 2 hours of peak production of the Proposed Development. The dimensions of the battery containers will measure 6.5m x 2.5m and 3m in height	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300)	Infrastructure will not be located within proximity of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** provides for the attenuation of surface water runoff from the areas of hardstanding associated with the BESS. In accordance with planning policy guidance, runoff from the BESS would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a Requirement of the DCO. The BESS require fire water tanks to supress a fire, should one break out. The BESS containers will contain an internal fire suppression system, with a sump to contain any water

Activity	Description	Screening Outcome	Justifications
	and be located on areas of hard standing, with a minimum clearance of 0.1m beneath the container and the hardstanding. The BESS switchgear and control room would be located alongside the battery containers and will have a maximum dimension up to 4.5m in height, and 12.5m by 2.5m footprint. Emergency fire water will be stored within onsite water tanks with appropriate allowance for fire water storage provided. A **Framework Battery Safety Management Plan (FBSMP) [EN010154/APP/7.17]** has been prepared to support the DCO application. This sets out the parameters for the management of fire risk associated with the BESS. This management plan will form the basis for the preparation of a fully detailed fire safety management plan at a later stage to ensure the delivery of a robust fire safety strategy in relation to the BESS and will be secured as a Requirement of the DCO.	**N/A** – Witham Limestone Unit A (GB40501G444800)	used in the event of an internal fire. This water will not be directed to the surrounding swales. It is proposed to contain the external fire water runoff within the swale surrounding the Solar Station Compounds, where it can be held and tested before either being released into the environment (if found to have no contaminants present, or contaminants that are within acceptable legal limits) or taken off site by a tanker for treatment elsewhere. The swale will then be cleaned of all contaminants. A **Framework Battery Safety Management Plan (FBSMP) [EN010154/APP/7.17]** is included within the DCO Application and outlines the fire management plan in more detail. The detailed Framework Battery Safety Management Plan is a requirement of the DCO. Each swale will be underlain with an impermeable liner to prevent any contaminants entering the ground. The swale will be controlled by a penstock valve that can be closed before a fire is put out. The sizing of attenuation features has been undertaken in accordance with National Fire Chiefs Council (NFCC) guidance. Given the above mitigation which will be secured through the DCO, there are considered no mechanisms for impacts to surface water bodies. Indicative foundations for the BESS specify that it will have a maximum depth of 1m (or 3m if a pile foundation is required). An examination of boreholes across the Study Site found the groundwater level to typically be in excess of 2.5m, with no instances of the groundwater being within 1m of the surface (Ref 8). Given the discrete nature of the foundations, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Furthermore, GI and groundwater monitoring will be

Activity	Description	Screening Outcome	Justifications
			undertaken to inform the detailed design and appropriate construction methodology.
Electricity export via high-voltage cable located within the Grid Connection Corridor and connection to the National Electricity Transmission System	The electricity generated by the Proposed Development is expected to be exported via a 400kV connection between the Onsite Substation and a National Grid 400kV substation in the Navenby Area (the latter is not part of this DCO application). There would be one single circuit comprising three cables, as well as a communications cable, laid in trefoil formation in a trench of up to 4.5m wide. Subject to ground conditions, separate trenches could be required. The Grid Connection Cable will be installed using an open trench method requiring a 30m to 40m working width, including both the permanent installation area and temporary working area, with trench widths approximately 3m wide and up to 3m deep. Where other specific techniques are required, such as micro-tunnelling, boring, or HDD, wider working areas (up to 60m wide) may be required, for example to avoid a sensitive watercourse. In terms of installation, the three single-core cables will either be laid directly into trenches or into ducting that will be installed with the cables pulled through the ducting. It is anticipated that the cable temporary working area will be	**In -** Brant Lower Water Body (GB105030056770) **Out -** Witham Lias (GB40502G401400), Witham Limestone Unit A (GB40501G444800) **N/A -** Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Lower Trent Erewash – Secondary Combined (GB40402G990300)	Intrusive open cut installation methods (as proposed as a worst case) have the potential to cause direct hydromorphological impacts to the channel and riparian zone and so this activity is screened in for the Brant Lower Water Body (where crossings for this activity will be located). Mitigation for the intrusive crossings is proposed to include a pre-works morphology survey of the channel of each watercourse to be crossed prior to construction. This is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works. The survey is a precautionary measure so that should there be any unforeseen adverse impacts there is a record against which any remedial action can be determined. Water flow would be maintained by damming and over pumping during cable installation. Works would be carried out in the drier months where possible as this would reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales would be used initially to capture mobilised sediments until the watercourse has returned to a settled state. It will be a requirement that the watercourses are reinstated as found and water quality monitoring will be undertaken prior to, during, and following on from the construction activity. Regular observations of the watercourses will also be required post-works during vegetation re-establishment of the banks, especially following wet weather, to ensure that no adverse impacts have occurred. These requirements will be described in the Water

Activity	Description	Screening Outcome	Justifications
	narrowed to approximately 10m where the cable passes through hedgerows and trees to reduce the loss of vegetation, where possible. New land drains 300mm either side of the cable trench (or repair of existing drains where relevant) within the Cable Corridor will be implemented - the only exception to this is at HDD locations, where the land drains would terminate. The Cable Corridor will be further refined during detailed design post consent of the DCO to take account of any unexpected, localised issues, including but not limited to archaeological finds, implications with respect to protected species and reducing impacts upon trees and hedgerows, for example. The Cable Corridor crossing of the River Brant and Broughton Lane will be implemented using HDD. A minimum depth of 5m below the bed of watercourses is required, to avoid any impacts. The current Grid Connection Corridor is shown in **Figure 1-2 [EN010154/APP/6.2]**.		Management Plan (WMP) (which will be an appendix to the detailed CEMP). The River Brant will be crossed by HDD, or similar non-intrusive technique, but would not be directly impacted with launch and receive pits at least 10m from the channel margins (or 16m from the landward toe of flood defences where present). Cables would be installed at least 5m below the river bed and an appropriate drilling methodology would be adopted based on site specific risk assessment and a Hydraulic Fracture Risk Assessment at detailed design. This would reduce the potential for adverse water quality impacts. This assessment is secured within the **Framework CEMP [EN010154/APP/7.7].** With regard to the groundwater body, due to the thickness of overlying superficial deposits and the shallow depth of Proposed Development infrastructure, it is unlikely that groundwater in the bedrock aquifers will be encountered by the Proposed Development. An examination of boreholes across the Study Site found the groundwater level to typically be in excess of 2.5m, with no instances of the groundwater being within 1.8m of the surface (Ref 8). The profile of the cable ducting is considered to be small compared to the spatial and vertical extent of the aquifers. Furthermore, given that cable trenches will generally have a relatively shallow depth (although slightly deeper at crossing locations), a negligible impact on groundwater flow is predicted from installation of the Grid Connection Cable overall. GI and groundwater monitoring will be undertaken to inform the detailed design and appropriate construction methodology. As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the

Activity	Description	Screening Outcome	Justifications
			WFD groundwater bodies. Impact on the groundwater WFD water bodies can therefore be screened out.
Onsite cabling	Low voltage cabling between PV panels and the inverters (typically via 1.5/1.8kV cables) will typically be located above ground level (along a row of racks), fixed to the mounting structure, and then underground. Medium voltage cables (around 33kV) are required between the transformers, switch gear and the Onsite Substation. These buried interconnecting cables will be located within the Solar PV Array Areas. The trench will typically be up to 1m wide with a maximum depth of 1.2m and will be dependent on the method of installation, ground conditions and number of cables laid in parallel. A minimum backfill of 0.8m will be on top of the cable. HDD within the Principal Site will be required for the onsite cabling to cross under the A46 and the River Witham. A minimum depth of 5m below the bed of watercourses will be implemented. The remainder of watercourse crossings for onsite cabling are assumed to be via open cut methodologies as a worst case. Data cables will be required throughout the Principal Site to allow for the monitoring and control during operation. The data cables would typically be	**In** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770) **Out** – Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** – Witham Limestone Unit A (GB40501G444800)	Where open cut watercourse crossings are required, these would adopt the same mitigation measures as outlined in relation to electricity export via the Cable Corridor. Nonetheless, given the direct nature of the works this activity has been screened in for further assessment. There is also potential for indirect impacts to all watercourses to be crossed from uncontrolled release of construction site runoff that may include high levels of fine sediment, oils and drilling muds (water based) if this runoff is not carefully managed. The River Witham will be crossed by HDD, or similar non-intrusive technique, but would not be directly impacted with launch and receive pits at least 10m from the channel margins (or 16m from the landward toe of flood defences where present or 100m from an identified otter holt). Cables would be installed at least 5m below the river bed and an appropriate drilling methodology would be adopted based on site specific Hydraulic Fracture Risk Assessment at detailed design. This would reduce the potential for adverse water quality impacts. With regard to the groundwater body, indicative trench depths for the onsite cabling specify that it will have a maximum depth of 1.2m. An examination of boreholes across the Study Area found the groundwater level to typically be in excess of 2.5m, with no instances of the groundwater being within 1.8m of the surface (Ref 8). The profile of the cable ducting is also considered to be small compared to the spatial and vertical extent of the aquifers. GI and groundwater monitoring will be undertaken to inform the detailed design and appropriate construction methodology. As such, there would be negligible

Activity	Description	Screening Outcome	Justifications
	installed within the same trench and alongside the electrical cables.		or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
Onsite Substation and control building	A new Onsite Substation will be located within the Principal Site which will include transformers, switchgear and metering equipment required to facilitate the export of electricity to the National Grid. The Onsite Substation would have up to three transformers and would have a maximum footprint of up to 140m x 100m in plan and up to 13.5m in height. The Onsite Substation would also include a warehouse and storage building with a maximum footprint of 36m x 15m x 7.2m in height and a control building which would be 20m x 20m and up to 6m in height. This will include office space and welfare facilities as well as operational monitoring and maintenance equipment. The warehouse and storage building would have a new mains water connection from Anglian Water. The Onsite Substation will be connected to the Solar Stations and BESS via Interconnecting Cables in order to collect electricity (at 33kV) from those components of the Proposed Development. The Onsite Substation will	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** – Witham Limestone Unit A (GB40501G444800)	Infrastructure will not be located within 10m of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. **Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** provides for the attenuation of surface water runoff from the areas of hardstanding associated with the Onsite Substation and control building. In accordance with planning policy guidance, runoff would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Transformers will be installed with suitable bunds to contain any oil spillage in case of an oil-leakage event. Bunds will be designed to contain at least 110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. Under normal conditions any rainwater collected within the bund will be removed by use of special pump, which automatically switches off if it detects the smallest presence of oil in the water. Pumps will be linked to control and monitoring equipment to raise alarms if oil is detected. On the basis of this mitigation, adverse impacts to the WFD surface water catchment can be screened out. With regard to the groundwater body, indicative foundations for the Principal Site specify that it will have a maximum depth of 2m, which will likely be above the water table across most

Activity	Description	Screening Outcome	Justifications
	convert the electricity to 400 kV for onward transmission to the point of connection at the proposed Navenby Substation via the Grid Connection Cable. The Onsite Substation will also be able to import excess electricity from the grid for storage within the BESS and subsequent export into the grid when there is a need for electricity.		of the site, based on groundwater data available on the Geoindex website (Ref 8) and provided by the Environment Agency. GI and groundwater monitoring will be undertaken to inform the detailed design and appropriate construction methodology. As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
Fencing, security, lighting, and ancillary infrastructure	A fence will enclose the operational areas of the Proposed Development. The fence is likely to be a stock proof mesh-type security fence with wooden posts and approximately 2m in height. Pole mounted internal facing closed circuit television (CCTV) systems installed at a height of up to 3.5m are also likely to be deployed around the perimeter of the operational areas. Access gates will be of similar construction and height as the perimeter fencing. Clearances above ground, or the inclusion of mammal gates will be included to permit the passage of wildlife. The inward facing CCTV cameras would use infra-red night-vision technology with a 50m range, which would be monitored remotely and minimise the need for night-time lighting. No areas of the Proposed Development are proposed to be continuously lit. For security	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** – Witham Limestone Unit A (GB40501G444800)	Infrastructure will not be located within 10m of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. While there may be some potential to encounter superficial groundwater, given the limited extent of below ground works and their discrete nature, it is anticipated there would be negligible impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.

Activity	Description	Screening Outcome	Justifications
	requirements, operational lighting would include Passive Infra-red Detector (PID) systems which would be installed around the perimeter of the Proposed Development.		
Site access and access tracks	During construction there will be 20 site access points across the DCO Site which would provide access to an internal network of access tracks enabling access to each field parcel. During operation there will be seven operational access points across the Principal Site. In addition, during operation there will be three dedicated emergency accesses into the Principal Site. The internal access tracks would be constructed across the Principal Site and are shown on **Figure 3-2A [EN010154/APP/6.2]** and **Figure 3-2B [EN010154/APP/6.2]**. These would typically be 5m wide with passing bays provided as required. Initially at each of the main access points, access tracks would be required to be 6m wide on approach to the construction compounds to facilitate two-way Heavy Goods Vehicle (HGV) traffic. The internal access tracks will likely be constructed of compacted stone or gravel with excavation kept to a minimum, or for secondary tracks left as grass. Where drainage is required a ditch	**In** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), **Out** – Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300) **N/A** – Witham Limestone Unit A (GB40501G444800)	Existing crossings will be used where possible and the number of crossings required will be reduced wherever possible. Where upgrades to existing culverts might be required (to be determined at detailed design), they are assumed to be a maximum extension to the structure width of 2m. Any culvert extensions required would result in an unavoidable need to work directly within the watercourse channel in each case, and therefore raises a risk of hydromorphological impact, mobilisation of sediment directly in the channel or for accidental spillages to occur. However, good practice mitigation measures as outlined in the **Framework CEMP [EN010154/APP/7.7]** and WMP (that will accompany the detailed CEMP) would be implemented. Two new watercourse crossings are required for the installation of access tracks across the Proposed Development, which will take the form of open-span crossings, with no piers in the channel or on the banks. Abutments should be set back an appropriate distance from the bank tops, and the deck height should be sufficient to ensure flow is not restricted, and to reduce shading impacts. There is still the potential for indirect impacts to all watercourses to be crossed from uncontrolled release of construction site runoff that may include high levels of fine sediment if this runoff is not carefully managed.

Activity	Description	Screening Outcome	Justifications
	or a swale may be located downhill of the internal access track to control any potential for surface water run-off.		There is limited potential for impacts to the groundwater body, as no significant changes in runoff patterns compared to existing are expected from the internal access tracks.
Biodiversity and landscaping	The Proposed Development will involve new planting, field boundary enhancement and planting of seed mixes within the solar PV areas and within the wider Principal Site. Planting would be used to provide screening for visual and glint and glare mitigation, mitigation for wildlife, and habitat enhancement. The planting would increase biodiversity and contribute to the Proposed Development achieving Biodiversity Net Gain (BNG).	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300), Witham Limestone Unit A (GB40501G444800)	Enhancements will improve biodiversity and will be of benefit to hydromorphology across the Principal Site.
Foul Water Drainage	Once the Principal Site is operational, foul water drainage will only be required for the staffed control building. This building will only be used by a small number of staff (usually four, but up to 20 during maintenance and cleaning periods); therefore, the anticipated foul flows from the building will be low. As the site compound in the area of the single BESS compound is more than 30m from a public sewer and due to the low flows and no public sewers being present in the vicinity of the building, the foul water	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770), Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300),	As there would be no anticipated discharge of foul water to a waterbody, no further WFD assessment of foul waste from the Proposed Development is proposed. Appropriate treatment and discharge in line with WFD requirements would be the responsibility of the registered recycling and waste management contractor.

Activity	Description	Screening Outcome	Justifications
	flows will be dealt with via a sealed cesspit, i.e. with no overflow to ground pipe system. This would be regularly emptied under contract with a registered recycling and waste management contractor.	Witham Limestone Unit A (GB40501G444800)	
Surface Water Drainage	**Appendix 9-D Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** outlines how surface water will be managed during operation of the Principal Site in order to prevent any increase in flood risk. The drainage strategy includes the following: - Sustainable Drainage Systems (SuDS) to manage surface water flows generated by the Proposed Development, mimicking natural drainage conditions; - areas between and under solar PV panels will be planted with a suitable planting such as native grassland and wildflower mix to absorb and intercept rainfall running off the panels and preventing channelisation; - new access roads will be permeable; - swales will be constructed around the impermeable areas to collect and treat surface water before discharge and will be lined with a	**Out** – Witham from Cringle Brook to Brant Lower Water Body (GB105030056780), Brant Lower Water Body (GB105030056770) Witham Lias (GB40502G401400), Lower Trent Erewash – Secondary Combined (GB40402G990300), Witham Limestone Unit A (GB40501G444800)	**Appendix 9-D: Framework Surface Water Drainage Strategy [EN010154/APP/6.3]** aims to mimic natural drainage conditions and will include suitably sized swales within the drainage design and a maintenance of existing greenfield runoff rates. The swales are to be designed to attenuate flows for the 1 in 100 year + 40% climate change event and fire water runoff (if deemed to be clean) Firewater will be contained through use of impermeable membranes and penstocks to prevent any pollution associated with fire water runoff from entering the local watercourse without prior testing. Where surface water is required to drain from the Proposed Development's swale-based drainage system to local receiving watercourses, this will be via a new open green ditch wherever practicable. If a pipe system is required, the piped section will be shortened and the last 10m section of the outfall route will be open green ditch wherever possible, unless this affects maintenance of the watercourse by the IDB or Environment Agency or there are other circumstances that prevent this from being possible. Appropriate micro-siting of any engineered outfall required will minimise loss of bank habitat, the need for bed scour or hard bank protection, and localised flow disturbance or disruption to sediment transport processes. It will also avoid the creation of 'dead' spaces with sedimentation and vegetation blockage

Activity	Description	Screening Outcome	Justifications
	membrane to prevent any pollution associated with firewater from entering the ground; and - discharge rates will be maintained at existing greenfield runoff rates. The design of new drainage systems takes account of the **Flood Risk Assessment (FRA)**, which is provided as **Appendix 9-C [EN010154/APP/6.3]**.		risks and to that effect it is not proposed that outfalls are recessed into the bank. There is no anticipated mechanism for impacts to the groundwater body from surface water outfalls.

5. WFD Scoping

5.1.1 The scoping of WFD quality elements is shown in **Table 6**. Given that the screening stage indicated that none of the activities required by the Proposed Development have been shown to have an impact on groundwater elements when considered at the scale of the WFD groundwater body, the three WFD groundwater bodies have not been considered further.

Table 6 WFD Scoping Assessment

WFD Element	Scoping Outcome	Justification
Biological Quality Elements		
Fish	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Trenched, intrusive crossings of watercourses and any required culvert extensions would result in a temporary blockage in longitudinal connectivity during the construction phase and disrupt present habitat conditions. This activity would have the potential to impact fish populations through a loss of biological continuity and disturbance of the channel bed that would interfere with fish population movements and block the exchange of individuals among populations, reducing the gene flow and disrupting the ability of 'source' populations to support declining populations nearby. Potential direct impact on fish populations from disturbance of the bed and / or release of contaminated construction site runoff, including the risk of 'break out' during directional drilling operations. Depending on the height of the open span crossings it may cause shading that is anticipated to impact these quality elements.
Invertebrates	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Trenched, intrusive crossings of watercourses and any required culvert extensions would result in a temporary blockage in longitudinal connectivity during the construction phase and disrupt present habitat conditions. This activity would have the potential to impact invertebrate populations. Potential direct impact on invertebrate populations from disturbance of the bed and/or release of contaminated construction runoff, including the risk of 'break out' during directional drilling operations. Impacts on water quality related to general construction runoff and/or accidental spillages could also have impacts on invertebrate populations. Depending

WFD Element	Scoping Outcome	Justification
		on the height of the open span crossings it may cause shading that is anticipated to impact these quality elements.
Macrophytes and Phytobenthos Combined	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Trenched, intrusive crossings and any required culvert extensions would result in a temporary blockage in longitudinal connectivity during the construction phase. This activity may cause the removal of macrophytes, and removal of the bed or macrophytes supporting phytobenthos. New open span crossings may cause shading that could impact these quality elements locally.
Physico-chemical Quality Elements		
Temperature	**Out:** **'**Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Trenched, intrusive crossings may result in a temporary increase in the level of shading to water bodies following potential riparian vegetation removal. New open span crossings would provide very localised shading. Neither of these effects would be significant at the WFD waterbody scale.
Oxygenation conditions	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Possible increase in fine sediment and organic material delivered to water body from excavation activities for trenchless (e.g. launch and receive pits) and open-span watercourse crossings, as well as accidental chemical spillage risk. This could lead to temporary changes in dissolved oxygen levels during the construction phase. However, the **Framework CEMP [EN010154/APP/7.7]** and WMP include measures to be implemented to manage the spillage risk of chemicals used in construction and to manage construction site runoff. This will include water quality monitoring. Culverts may also influence oxygenation by alteration of flow conditions and pathways.
Salinity	**Out:**	No materials that may alter the salinity of the watercourses are known to be required for use in the Proposed Development. Nonetheless, there is potential for possible increase in fine sediment and organic material delivered to water body from excavation activities for

WFD Element	Scoping Outcome	Justification
	‘Brant Lower Water Body’ (GB105030056770) ‘Witham from Cringle Brook to Brant Lower Water Body (GB105030056780)	trenchless (e.g. launch and receive pits) and open-span watercourse crossings, as well as accidental chemical spillage risk. This could lead to temporary changes in salinity during the construction phase. However, the **Framework CEMP [EN010154/APP/7.7]** and WMP include measures to be implemented to manage the spillage risk of chemicals used in construction and to manage construction site runoff. This will include water quality monitoring. There would not be expected to be any effects that would be significant at the WFD waterbody scale.
Acidification status	**Out:** ‘Brant Lower Water Body’ (GB105030056770) ‘Witham from Cringle Brook to Brant Lower Water Body’ (GB105030056780)	There is potential for possible increase in fine sediment and organic material delivered to water body from excavation activities for trenchless (e.g. launch and receive pits) and open-span watercourse crossings, as well as accidental chemical spillage risk. This could lead to temporary changes in acidification status during the construction phase. However, the **Framework CEMP [EN010154/APP/7.7]** and WMP include measures to be implemented to manage the spillage risk of chemicals used in construction and to manage construction site runoff. This will include water quality monitoring. There would not be expected to any effects that would be significant at the WFD waterbody scale.
Nutrient conditions	**Out:** ‘Brant Lower Water Body’ (GB105030056770) ‘Witham from Cringle Brook to Brant Lower Water Body’ (GB105030056780)	Possible increase in fine sediment and organic material delivered to water body from excavation activities for trenchless (e.g. launch and receive pits) and open-span watercourse crossings, culvert extensions as well as a risk of chemical spillage associated with these works. This could lead to changes in dissolved nutrient conditions during the construction phase, though this would be localised, temporary, and short-term. In the long-term there would be expected to be betterment because there will be reduced organic / inorganic fertiliser applications as fields will not be in active agricultural production. Construction risks can be effectively managed using standard mitigation measures set out within the **Framework CEMP [EN010154/APP/7.7]** and WMP. As such, there would not be expected to any effects that would be significant at the WFD waterbody scale.
Hydromorphological Supporting Elements		
Quality and Dynamics of Water Flow	**Out:** ‘Brant Lower Water Body’ (GB105030056770)	There is no mechanism for either trenched, trenchless, or open-span watercourse crossings to impact this element. Trenched crossings will preferably be carried out during dry periods, or else water body flow will be maintained by installation of a pipe or flume or by over-pumping

WFD Element	Scoping Outcome	Justification
	'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	the flow for the relatively short duration of the works. Minor culvert extensions could have minor impacts on flow dynamics at a very local scale but would not have significance at the WFD waterbody scale.
Connection to Groundwater Bodies	**Out:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Cables crossing beneath water bodies and other infrastructure, and water crossings for access may present a barrier to connection with groundwater bodies, but this would not impact connectivity to groundwater bodies due to the small scale of the activity compared to the water body size.
River Continuity	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Intrusive crossings will present a temporary blockage to continuity whilst excavation takes place. Watercourse crossings for site access can also interrupt river continuity for the duration of their use. The worst-case scenario for culvert extensions will be 2m and so any impacts would be very localised. Conversely, open-span watercourse crossings would not affect this quality element.
River Depth and Width Variation	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Intrusive crossings and minor culvert extensions may lead to localised changes in channel profile and so could impact this element. There is no mechanism for non- or open-span watercourse crossings to affect this quality element.
Structure and Substrate of the Riverbed	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Intrusive crossings and minor culvert extensions may lead to localised changes in bd substrate and structure and so could impact this element. There is no mechanism for non-intrusive or open-span watercourse crossings to affect this quality element.

WFD Element	Scoping Outcome	Justification
Structure of the riparian zone	**In:** 'Brant Lower Water Body' (GB105030056770) 'Witham from Cringle Brook to Brant Lower Water Body' (GB105030056780)	Intrusive crossings will involve excavation through and below the watercourse bed, which will inevitably involve disruption of the watercourse banks and the riparian zone as they will be temporarily removed before being reinstated. Non-trenched and open-span crossings will also involve excavations each side of the riverbanks, but these will be set back by a minimum of 10 m from the normal flow channel/water's edge.

6. WFD Impact Assessment

6.1.1 Components of the Proposed Development and their potential impacts have been introduced along with mitigation measures in **Table 7.** Details can be found **in Chapter 9: Water** Environment of the **ES [EN010154/APP/**6.1].

6.1.2 . The purpose of this table is to introduce the key sources of potential impact and associated mitigation; the compliance assessment which follows considers impacts on WFD quality elements of each water body.

6.1.3 There is a range of mitigation for the water environment within the Proposed Development, including (but not limited to) watercourse buffers, the **Framework Surface Water Drainage Strategy (Appendix 9-D** of the ES **[EN010154/APP/6.3])**, and measures set out within the **Framework CEMP [EN010154/APP/7.7]** and **Framework DEMP [EN010154/APP/7.9]**. Where relevant, these were referred to in the screening of the Proposed Development's activities and components (**Table 5**) and within the impact assessment presented within **Table 7**. Details can be found in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

Table 7 Proposed Development components, potential impacts, and associated mitigation measures for proposed works to water bodies scoped into this assessment

Scheme Component	Potential Impacts	Mitigation Measures
Trenchless (non-intrusive) crossing of water body – excavation of launch and receive pits to facilitate directional drilling beneath watercourse bed.	Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body. Impacts to biological and physico-chemical quality elements from spillages of drill fluids or pollutants. Potential impacts from groundwater ingress to excavations.	The **Framework CEMP [EN010154/APP/7.7]** has been developed for the Proposed Development and will be developed into a detailed CEMP (including WMP) post-consent. The Framework CEMP outlines measures that will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. Topsoil will be moved to the edge of the working area and stored such that the spoil heap does not encroach outside the fenced area. Topsoil storage will be managed to maintain the nature of the soils and measures taken to prevent compaction, soil loss due to erosion, excessive weed growth, etc. The **Framework CEMP [EN010154/APP/7.7]** also outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. A Site-specific Hydraulic Fracture Risk Assessment will be carried out post consent to support the detailed design should the HDD cross through bedrock, with Site specific mitigation included appropriate to the local ground conditions. The WMP will describe measures for implementation in the event of a 'break-out' under a watercourse to minimise the risk of pollution.

Scheme Component	Potential Impacts	Mitigation Measures
		The **Framework CEMP [EN010154/APP/7.7]** outlines that launch and receive pits will be located at least 10m from (measured from top of bank) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. The cable will be installed at least 5m below the riverbed level. With the proposed mitigation in place, it is not expected that there would be a significant impact from trenchless crossings.
Trenched (intrusive) open-cut crossing of water body – short-term disturbance of watercourses during the construction phase.	Localised but short-term loss of riparian habitat. Short-term impediment to fish passage and ecological connectivity from impact to river continuity. Potential removal of macrophytes and mortality of invertebrates. Short-term adverse impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, and chemical spillage risk. Loss of morphological diversity; change in structure of riverbed. Impacts to physico-chemical quality elements from potential increase in fine sediment load	The **Framework CEMP [EN010154/APP/7.7]** outlines that intrusive crossings will be carried out in dry weather at low-flow conditions wherever possible. If flow is present, this will be flumed through the works to maintain flow downstream and maintain a dry working area. The **Framework CEMP [EN010154/APP/7.7]** describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. Topsoil will be moved to the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. Topsoil storage will be managed to maintain the nature of the soils and measures taken to prevent compaction, soil loss due to erosion, excessive weed growth, etc. The WMP (which will be produced post consent) will describe all other

Scheme Component	Potential Impacts	Mitigation Measures
	and organic matter delivered to water body from the newly reinstated, bare earth banks.	pollution prevention measures and proposed water quality monitoring. A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will return in-stream vegetation, and the banks of the watercourse replanted and reseeded in accordance with the reinstatement measures contained within the **Framework Landscape and Ecological Management Plan (LEMP) [EN010154/APP/7.15].** Reinstatement will aim to provide an improved channel form with enhancement works to be carried out between 5 and 10m upstream and downstream of trenched open-cut crossings to ensure the reinstated improved channel form merges into the existing channel form. The area of bank reinstatement will be covered with hessian to encourage plant establishment and reduce the risk of soil erosion. The hessian will naturally degrade in-situ as the vegetation grows back. Proposed enhancements would be outlined with a WFD Mitigation and Enhancement Strategy to be developed post DCO submission (secured via the Framework CEMP), and this would be subject to consultation with the Environment Agency and relevant LLFA/IDB.

Scheme Component	Potential Impacts	Mitigation Measures
		With the proposed mitigation in place, it is not expected that there would be a significant impact from trenched crossings.
Site access and access tracks – open span crossings - short-term disturbance of watercourses during the construction phase.	Localised but short-term loss of riparian habitat. Short-term adverse impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, and chemical spillage risk. Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body from the newly reinstated, bare earth banks.	Open-span crossings will maintain connectivity along watercourses for aquatic species and riparian mammals, where present. There will be no piers within the channel and abutments will be set back an appropriate distance from the bank tops. The deck height should be sufficient to ensure flow is not restricted, and to reduce shading impacts. The **Framework CEMP [EN010154/APP/7.7]** and WMP to be prepared as part of the detailed CEMP describe measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. With the proposed mitigation in place, it is not expected that there would be a significant impact from open-span crossings.
Site access and access tracks – extensions of existing culverts (max. 2m)	Localised and non-temporary loss of riparian habitat due to culvert extensions. Non-temporary barrier to fish passage and ecological connectivity from impact to river continuity due to extended culverts.	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area, with the channel reconnected once the structure has been installed. The

Scheme Component	Potential Impacts	Mitigation Measures
	Potential removal of macrophytes and mortality of invertebrates during culvert installation and long-term loss of localised habitat. Long-term loss of morphological diversity; change in structure of river bed due to culverts. Temporary and short-term adverse impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, chemical spillage risk during the installation of culverts.	**Framework CEMP [EN010154/APP/7.7]** describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. Post-DCO consent, a final CEMP will be produced, with a WMP added as a technical appendix. This WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Reinstated banks will be covered with biodegradable geotextile/matting and seeded/planted as soon as practicable to reduce risk of bank erosion and fine sediment delivery to water bodies. Length for length watercourse enhancement will be required as a form of mitigation for culvert extensions, and this will be defined in a WFD Mitigation and Enhancement Strategy to be developed post DCO submission (secured via the Framework CEMP). It is anticipated that enhancements will consist of soft engineering techniques and improvements to the riparian corridor to improve channel diversity and biodiversity. With the proposed mitigation in place, it is not expected that there would be a significant impact from culvert extensions (maximum 2m) the scale of the WFD water body.

6.1.4 Site-specific impacts of the Proposed Development on the biological, physico-chemical and hydromorphological quality elements of the screened-in surface water bodies is provided in **Table 8**. The mitigation referred to in this table forms the basis of this assessment, and the outcomes of the assessment are subject to the appropriate implementation of the mitigation measures provided.

Table 8 Impact assessment on the WFD quality elements of the surface water bodies screened-in for this assessment

Proposed Development Component	Potential Impacts	Mitigation Measures
Biological Quality Elements		
Fish	**Cable Crossings and crossings for access** Potential for loss of biological continuity resulting in interference with fish population movements and blocking the exchange of individuals among populations, reducing gene flow, and disrupting the ability of "source" populations to support declining populations nearby, resulting from short-term blockages in longitudinal connectivity from the trenched crossing method and long-term blockages in longitudinal connectivity from	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010154/APP/7.7]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. It is proposed to carry out the works for trenched crossings and culvert extensions in relatively dry weather, wherein it is expected that the smaller watercourses proposed to be crossed by trenched methods may be expected to be dry, and it is unlikely fish will be present. If flow is present within the watercourse, this will be over-pumped which will reduce impact to flow dynamics. Fish surveys and rescues, if required at the time of construction, will be carried out prior to works; this will be detailed in the CEMP. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (measured from top of bank) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Flume capacity will be designed to ensure

Proposed Development Component	Potential Impacts	Mitigation Measures
	watercourse crossings for Site access. Possible harm to fish from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction and decommissioning (e.g. fuel and hydraulic oil), and through disturbance when trenched techniques are used.	flow velocities are not impacted, and the flume will be appropriately sized. All of these will mean that fish access is not impeded. Impacts to biological continuity are not considered to be significant given the localised, small scale, and short-term nature of the works, as well as the small nature of the watercourses that is unlikely to provide preferable habitat for fish. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** submitted with the DCO Application will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Invertebrates	**Cable Crossings and crossings for access** Harm or direct mortality to invertebrates through excavation of the channel bed and bank. Possible harm to invertebrates from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction (e.g. fuel and	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010154/APP/7.7]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (measured from top of bank) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. A **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** describe measures which will be taken to prevent the deposition of fine sediment or other material

Proposed Development Component	Potential Impacts	Mitigation Measures
	hydraulic oil), and through disturbance when trenched techniques and watercourse crossings for site access are used.	in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. Impacts to invertebrates from works are not considered to be a significant impact given the localised, small scale nature of the works. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Macrophytes and Phytobenthos	**Cable Crossings and crossings for access** Possible smothering of macrophytes and phytobenthos from excessive fine sediment from construction runoff or drilling fluids, or toxic effects from chemical pollutants that may be spilt on the Draft DCO Site, and through disturbance when trenched techniques are used. Possible removal of macrophytes and phytobenthos from excavation of the channel bed and bank (or at culvert extensions where required).	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010154/APP/7.7]** outlines measures to reduce the risk of spillages. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (measured from top of bank) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. Before installation of the cable by the trenched crossing method and watercourse crossings for Site access, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel. Macrophytes will be retained on site for reinstatement to the watercourse. Where macrophytes cannot be retained, they will be replaced like for like. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing and watercourse crossings for Site access to ensure the reinstated improved macrophytes and phytobenthos form merges into the existing macrophytes and phytobenthos form. This would be described within a WFD Mitigation and Enhancement Strategy. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describe measures which will be taken to prevent the deposition of fine

Proposed Development Component	Potential Impacts	Mitigation Measures
		sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. Impacts to macrophytes and phytobenthos are not considered to be significant given the localised, small scale nature of the works and the artificial nature of the majority of watercourses subject to this activity. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Physico-chemical Quality Elements		
Oxygenation conditions	**Cable Crossings and crossings for access** Possible reduction in levels of dissolved oxygen from excavation activities for launch and receive pits, and trenched crossing excavation activities (or culvert extensions where required) which may create a source and pathway for the delivery of fine sediments and organic material to the water body.	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010154/APP/7.7]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. Trenched crossings and culvert extensions will be carried out in dry weather when flow is at its lowest. Reinstated banks will be covered with biodegradable matting and seeded as soon as practicable to reduce risk of bank erosion and delivery of fine sediment and organic material to water bodies. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (measured from top of bank) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describes measures which will be taken to prevent the deposition of fine

Proposed Development Component	Potential Impacts	Mitigation Measures
		sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would not be a significant impact to oxygenation conditions.
Hydromorphological Quality Elements		
River continuity	**Cable Crossings and crossings for access** There will be some unavoidable short-term interruption to river continuity during the construction phase from trenched crossings. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal and ephemeral drainage ditches.	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for access. Trenched crossings and culvert extensions (where required) will be carried out in dry weather when flow is at its lowest. At trenched crossings and culvert locations, flow will be maintained if required by flumes or over-pumped. Flume pipes will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Before installation of the cable by the trenched crossing method and crossings for access, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form. Length for length enhancement works will be required for all culvert extensions and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement will be detailed in the WFD Mitigation and Enhancement Strategy to be produced post consent. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning.

Proposed Development Component	Potential Impacts	Mitigation Measures
		With the proposed mitigation in place, it is not expected that there would be a significant impact to river continuity given the small scale of the barrier and the ephemeral or artificial nature of the majority of water bodies subject to this activity.
River depth and width variation	**Cable Crossings and crossings for access** There will be some unavoidable short-term interruption to river continuity during the construction phase from trenched crossings and culvert extensions (where required). The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal and ephemeral drainage ditches.	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and crossings for access. Before installation of the cable and crossings, a pre-works condition survey will be carried out to inform reinstatement of the channel. Flow will be over-pumped or flumed around the works. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Reinstatement would aim to provide an improved channel form. Bed material, including any gravels will be retained on site for reinstatement to the watercourse. Material will be cleaned of fine sediment where appropriate prior to reinstatement. Length for length enhancement works will be required for all culvert extensions and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement will be detailed in the WFD Mitigation and Enhancement Strategy to be produced post consent. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to river depth and width variation.
Structure and substrate of the river bed	**Cable Crossings and crossings for access**	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings for access. The flume bed level will be set below the existing bed level to

Proposed Development Component	Potential Impacts	Mitigation Measures
	There will be some unavoidable short-term disturbance during the construction phase. There are possible changes to bed substrate upon reinstatement of the channel from trenched crossings and culvert extensions (where required). The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal and ephemeral drainage ditches.	allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Before installation of the cable by the trenched crossing method, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement would aim to provide an improved river bed. Bed material, including any gravels will be retained on site for reinstatement to the watercourse. Material will be cleaned of fine sediment where appropriate prior to reinstatement. Length for length enhancement works will be required for all culvert extensions and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement will be detailed in the WFD Mitigation and Enhancement Strategy to be produced post consent. The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to the structure and substrate of the river bed.
Structure of the riparian zone	**Cable Crossings and crossings for access** There will be some unavoidable short-term disturbance during the construction phase. The watercourses in question are of low hydromorphological quality	The **Framework CEMP [EN010154/APP/7.7]** will be followed for the installation of cables and watercourse crossings. Before installation of the cable and watercourse, a pre-works condition survey will be carried out to inform reinstatement of the riparian zone. Reinstatement would aim to provide an improved riparian zone form. The area of bank reinstatement will be covered with hessian to encourage plant establishment and reduce the risk of soil erosion. The hessian will naturally degrade in-situ as the vegetation grows back. Length for length enhancement works will be required for all culvert extensions and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement be detailed in the WFD Mitigation and Enhancement Strategy to be produced post consent.

Proposed Development Component	Potential Impacts	Mitigation Measures
	as they are artificial, trapezoidal drainage ditches.	Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (measured from top of bank), which will help to minimise disturbance of the bank and riparian vegetation.
	Loss of riparian habitat at the location of the excavation for the cable. Crossings would present a local removal and disconnection of the channel from the riparian zone.	The **Framework OEMP [EN010154/APP/7.8]** and **Framework DEMP [EN010154/APP/7.9]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to the structure of the riparian zone.

7. Construction Risks

7.1 Potential Construction Phase Risks

7.1.1 There are a number of general adverse impacts to the water environment which may occur from construction activity, including:

a. Pollution of surface water (and any designated ecology sites that are water dependent) due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through uncontrolled site run-off including dewatering of excavations;

b. Temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings;

c. Potential impacts on groundwater resources, local water supplies (licenced and unlicenced abstractions) and potentially the baseflow to watercourses from temporary dewatering of excavations or changes in hydrology; and

d. Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows during any open cut construction works) and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches; and changes in flood risk due to the construction of PV panels, which may alter runoff from the Site.

7.1.2 Further details are provided in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

7.2 Construction Mitigation

7.2.1 The construction will take place in accordance with the **Framework CEMP [EN010154/APP/7.7]** submitted with the DCO Application, which details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment.

7.2.2 The **Framework CEMP [EN010154/APP/7.7]** sets out good practice methods that are established and effective measures to which the development will be committed through the DCO. The detailed CEMP to be produced by the Contractor will need to be substantially in accordance with the **Framework CEMP [EN010154/APP/7.7]**. The measures within the document focus on managing the risk of pollution to surface waters and the groundwater environment. It also considers the management of activities within floodplain areas (i.e., kept to a minimum and with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable).

7.2.3 The detailed CEMP will be supported by a WMP (which will be produced post consent) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction.

7.2.4 It is anticipated that all WFD construction risks detailed in **Section 4** to **Section 6** could be adequately mitigated with the above measures. Therefore, there would not be expected to be any detrimental impact to WFD water bodies during construction.

7.3 Potential Operational Impacts

7.3.1 There are several general adverse impacts to the water environment which may occur from operation activity, including:

a. Impacts on surface or groundwater quality from site run-off and the potential for accidental spillages during maintenance activities;

b. Impacts to surface or groundwater quality as a result of the use of firewater in the event of a fire in the BESS;

c. Impacts on hydrology including subsequent impacts on aquatic habitats and water-dependent nature conservation sites;

d. Permanent hydromorphological impacts to watercourses;

e. Impact on local water supplies from water usage in a 'water stressed' area;

f. Impacts on groundwater resources (flows and level); and

g. Impacts on the rate and volumes of surface water run-off entering local watercourses and subsequent increase in flood risk.

7.3.2 Further details are provided in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

7.4 Operational Mitigation

7.4.1 The operation will take place in accordance with the **Framework OEMP [EN010154/APP/7.8]** submitted with the DCO Application. The aim of the **Framework OEMP [EN010154/APP/7.8]** is to provide a clear and consistent approach to the control of operational and maintenance activities within the DCO Site.

7.4.2 The **Framework OEMP [EN010154/APP/7.8]** outlines how the operational mitigation measures included within the ES will be implemented and sets out the monitoring and auditing activities designed to ensure that such mitigation measures are carried out, and that they are effective.

7.4.3 The key elements of the **Framework OEMP [EN010154/APP/7.7]** include:

a. An overview of the Proposed Development and associated operation programme;

b. Prior assessment of environmental impacts (through the EIA);

c. Reduction of potential adverse impacts through design and other mitigation measures;

d. Monitoring of effectiveness of mitigation measures;

e. Corrective action procedure; and

f. Links to other complementary plans and procedures.

7.4.4 It is anticipated that all WFD operational risks detailed in **Section 4** to **Section 6** could be adequately mitigated with the above measures. Therefore, there would not be expected for there to be any detrimental impact to WFD water bodies during operation.

7.5 Potential Decommissioning Impacts

7.5.1 Potential impacts from the decommissioning of the Proposed Development are similar in nature to those during construction, as some ground works will be required to remove infrastructure installed.

7.5.2 When the operational phase ends, the Principal Site will require decommissioning. All PV modules, mounting poles, inverters and transformers would be removed and recycled or disposed of in accordance with good practice and market conditions at the time. Buried medium voltage cables would either be removed or left in situ. The Principal Site would be returned to the landowner after decommissioning and will be available for its original use and any planting would be retained.

7.5.3 As per Environment Agency requirements, all cables and subsurface infrastructure will be removed where they are located within an SPZ or areas of Principal aquifer (i.e. to the eastern extent of the Cable Corridor, east of Boothby Graffoe).

7.5.4 Overall, it is considered the decommissioning impacts and effects will be no worse than those of the construction phase.

7.5.5 Further details are provided in **Chapter 9: Water Environment** of the ES **[EN010154/APP/6.1]**.

7.6 Decommissioning Mitigation

7.6.1 The decommissioning will take place in accordance with the **Framework DEMP [EN010154/APP/7.8]** submitted with the DCO Application. This details the measures that would be undertaken during decommissioning to mitigate the temporary effects on the water environment but will be subject to further review at the appropriate time, and a detailed DEMP prepared.

8. Assessment of the Proposed Development Against WFD Mitigation Measures

8.1 Assessment against Mitigation Measures

8.1.1 The Environment Agency identifies mitigation measures for water bodies, which are actions that can be implemented to protect and improve the water environment and help achieve the objectives for each RBMP. This section of the assessment considers the nature of the measures identified by the Environment Agency for each water body and assesses whether the Proposed Development may prevent such measures being implemented.

8.1.2 The Environment Agency was consulted on water body objectives and Heavily Modified Water Body mitigation measures which are actions that can be implemented by activities to protect and improve the water environment and help achieve the objectives set for each RBMP.

8.1.3 The Proposed Development has been appraised against measures identified for the 'Brant - Lower Water Body' and 'Witham - conf Cringle Bk to conf Brant Water Body', which are the two screened-in surface water bodies. This appraisal is presented in **Table 9**.

Table 9 Appraisal of the Proposed Development against the delivery of measures identified for the waterbodies scoped into this assessment

Water body (ID)	Further detail on measure	Appraisal of the Proposed Development
'Brant - Lower Water Body' (GB105030056770)	Good practice management of in channel and riparian vegetation works carried out in a manner that considers the impacts of the activity upon ecology and hydromorphology.	Construction will take place in accordance with the **Framework CEMP [EN010154/APP/7.6]**. The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. The CEMP will be supported by a WMP (which will be produced post consent) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from
	Ensure good practice is applied when undertaking maintenance works to minimise impacts to the habitat.	

Water body (ID)	Further detail on measure	Appraisal of the Proposed Development
		adverse effects during construction. Length for length enhancement works will be required for all culvert extensions (if required) to tributaries of this water body and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement will be detailed in the WFD Mitigation and Enhancement Strategy to be produced post consent.
'Witham - conf Cringle Bk to conf Brant Water Body' (GB105030056780)	Good practice management of in channel and riparian vegetation works carried out in a manner that considers the impacts of the activity upon ecology and hydromorphology. Ensure good practice is applied when undertaking maintenance works to minimise impacts to the habitat.	Construction will take place in accordance with the **Framework CEMP [EN010154/APP/7.6]**. The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. The CEMP will be supported by a WMP (which will be produced post consent) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. Length for length enhancement works will be required for all culvert extensions (if required) to tributaries of this water body and should be extended beyond the impacted length wherever there is opportunity to do so. This enhancement will be detailed in the WFD Mitigation and

Water body (ID)	Further detail on measure	Appraisal of the Proposed Development
		Enhancement Strategy to be produced post consent.

8.2 Assessment against WFD Objectives

8.2.1 The compliance of the Proposed Development is determined based upon an assessment against the following objectives relating to WFD quality elements, including biological, physico-chemical and hydromorphological quality elements:

a. Whether the Proposed Development will cause deterioration in the Ecological Potential or Status of a water body;

b. Whether the Proposed Development will compromise the ability of a water body to achieve Good Ecological Status or Potential;

c. Whether the Proposed Development will cause a permanent exclusion or compromise achievement of the WFD objectives (e.g., mitigation measures) in other water bodies within the same RBD; and

d. Whether the Proposed Development will contribute to the delivery of the WFD objectives (e.g., mitigation measures).

8.2.2 The WFD compliance assessment for the Proposed Development is summarised in **Table 10**; the Proposed Development is expected to be compliant with the objectives of the WFD.

Table 10 Compliance Assessment of the Proposed Development

Compliance Elements	Water Body Assessment	Groundwater Body Assessment
Deterioration in the status/potential of the water body	The Proposed Development is **not** anticipated to cause a deterioration in potential due to the embedded environmental mitigation.	The Proposed Development is **not** anticipated to cause a deterioration in status due to the embedded environmental mitigation.
Ability of the water body to achieve Good Ecological Potential/Status	The Proposed Development and associated mitigation would **not** cause deterioration in status of the water bodies and would not prevent the water bodies achieving Good Ecological Potential due to the	The Proposed Development and associated mitigation would **not** prevent the water body reaching Good Status due to the embedded environmental mitigation.

Compliance Elements	Water Body Assessment	Groundwater Body Assessment
	embedded environmental mitigation.	
Impact on the WFD objectives of other water bodies within the same RBD	**No** downstream or upstream impacts are anticipated associated with the Proposed Development and the mitigation measures proposed due to the embedded environmental mitigation.	**No** wider impacts are anticipated associated with the Proposed Development and the mitigation measures proposed due to the embedded environmental mitigation.
Ability to contribute to the delivery of the WFD objectives	The Proposed Development **does** contribute to the delivery of WFD objectives within the DCO Site through enhancements at the re-establishment stage.	The Proposed Development **does** contribute to the delivery of WFD objectives.

9. Conclusion

9.1.1 This assessment has considered the potential impacts and associated mitigation of the Proposed Development in relation to the WFD quality elements of the following surface and groundwater water bodies:

a. Witham from Cringle Brook to Brant Lower Water Body (GB105030056780);
b. Brant Lower Water Body (GB105030056770);
c. South Hykeham Catchwater Water Body (GB105030062460);
d. Dunston Beck Water Body (GB105030056230);
e. Metheringham Beck Water Body (GB105030056210);
f. Fleet Lower Catchment (trib of Trent) (GB104028058250);
g. Boultham Catchwater Drain Water Body (GB105030062380).
h. Witham Lias Water Body (GB40502G401400);
i. Witham Limestone Unit A Water Body (GB40501G444800); and
j. Lower Trent Erewash – Secondary Combined Water Body (GB40402G990300).

9.1.2 The assessment demonstrates that the Proposed Development is compliant with the objectives of the WFD: it would not cause deterioration in status of

the water bodies and would not prevent the water bodies achieving Good Ecological Status and Good Ecological Potential.

9.1.3 Some localised impacts to aquatic habitat networks are unavoidable during the construction and operation phase, but impacts would not be deleterious with suitable environmental construction management and operational mitigation. It is also worth noting that there will be benefits to the water environment through reduced use of agricultural fertilisers and other chemicals. In addition, taking land out of arable production may also reduce the risk of soil erosion and the need for local water abstraction for crop irrigation.

9.1.4 The risks surrounding the Proposed Development can primarily be managed through the **Framework CEMP [EN010154/APP/7.6]**, **Framework Surface Water Drainage Strategy (Appendix 9-D [EN010154/APP/6.3]),** and **Framework DEMP [EN010154/APP/7.9]**

9.1.5 The Proposed Development would not prevent the achievement of the wider WFD objectives in the Anglian RBMP or Humber RBMP and is not predicted to have an impact on any other water body within the Humber or Anglian RBD or mitigation measures developed to achieve Good status.

9.1.6 In terms of compliance with WFD Objectives, the following key consenting questions can be answered as follows:

a. Does the proposed development cause deterioration in the Ecological Potential or Status of a body of surface or ground water?
   - No (the proposals are WFD Compliant)

b. Does the proposed development compromise the ability of the water body to achieve Good Ecological Status or Potential?
   - No (the proposals are WFD Compliant)

c. Does the proposed development cause a permanent exclusion or compromise achievement of the WFD objectives (e.g. mitigation measures) in other water bodies within the same RBD?
   - No (the proposals are WFD Compliant)

d. Does the proposed development contribute to the delivery of the WFD objectives (e.g. mitigation measures)?
   - Yes (the proposals are WFD Compliant)

References

Ref 1 Planning Inspectorate (2024): Advice on the Water Framework Directive. Available at: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive

Ref 2 HMSO (2017). Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/407/pdfs/uksi_20170407_en.pdf.

Ref 3 Environment Agency (2016a). Water Framework Directive risk assessment: How to assess the risk of your activity. Available at: https://www.gov.uk/government/publications/water-framework-directive-how-to-assess-the-risk-of-your-activity

Ref 4 Environment Agency (2016b). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers.

Ref 5 Environment Agency Catchment Data Explorer website. Available at: https://environment.data.gov.uk/catchment-planning/.

Ref 6 Defra (n.d.) Magic Map Application. Available at: https://magic.defra.gov.uk/magicmap.aspx.

Ref 7 National Library of Scotland (n.d.) Historic Imagery. Available at: https://maps.nls.uk/

Ref 8 British Geological Survey (n.d.) Geology of Britain viewer. Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/

Ref 9 Cranfield University (n.d.) Land Information System Soilscapes (1:250,000). Available at: https://www.landis.org.uk/soilscapes/

Ref 10 Bing (2019) Maps. Available at: https://www.bing.com/maps?cc=gb

Ref 11 National River Flow Archive (n.d.) Available at: https://nrfa.ceh.ac.uk/data/search

Ref 12 Meteorological Office (n.d.) UK Climate Averages. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages

Ref 13 Environment Agency Fish and Ecology Data Explorer. Available at: https://environment.data.gov.uk/ecology/explorer/.

Ref 14 Environment Agency Water Quality Archive. Available at: https://environment.data.gov.uk/water-quality/view/landing.

Ref 15 Ordnance Survey (2018); Open Data.