FENWICK SOLAR FARM

Fenwick Solar Farm

EN010152

Environmental Statement

Volume III Appendix 9-2: Water Framework Directive

Document Reference: EN010152/APP/6.3

Regulation 5(2)(a)

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

October 2024
Revision Number: 00

BOOM POWER

BOOM-POWER.CO.UK

Revision History

Revision Number	Date	Details
00	October 2024	DCO application

Prepared for:
Fenwick Solar Project Limited

Prepared by:
AECOM Limited

Table of Contents

Tables

1. Introduction

1.1 Background

1.1.1 This Water Framework Directive (WFD) Assessment has been produced as part of the Environmental Statement (ES) for Fenwick Solar Farm (hereafter referred to as 'the Scheme').

1.1.2 Throughout this appendix the following definitions are used to describe the key areas and elements of the Scheme. These are illustrated in **ES Volume II Figure 1-3: Elements of the Site [EN010152/APP/6.2]**:

a. Solar Photovoltaic (PV) Site – the total area covered by the ground-mounted Solar PV Panels, planting and mitigation areas, Field Stations, Battery Energy Storage System (BESS) Area, On-Site Substation, and associated infrastructure;

b. Grid Connection Corridor – the area outside the Solar PV Site in which the 400 kilovolt (kV) and associated cables (the Grid Connection Cables) would be installed between the On-Site Substation to the Existing National Grid Thorpe Marsh Substation (approximately 6 km south of the Solar PV Site);

c. Existing National Grid Thorpe Marsh Substation – the existing Thorpe Marsh Substation (owned and operated by National Grid) where the 400 kV Grid Connection Cables would connect to the grid; and

d. The Site – the collective term for the Solar PV Site, Grid Connection Corridor, and Existing National Grid Thorpe Marsh Substation. The boundary of the Site is referred to as the Order limits.

1.1.3 The Order limits also include a section of highway at the junction of the A19 and Station Road in the town of Askern to allow for abnormal indivisible load (AIL) vehicle access and escort. Due to the nature of the activities at this location (temporary traffic control measures) this part of the Order limits has been excluded from the assessment.

1.1.4 Due to its proposed generating capacity exceeding 50 megawatts (MW), the Scheme is classified as a Nationally Significant Infrastructure Project (NSIP) and therefore requires consent via a Development Consent Order (DCO) under the Planning Act 2008 (Ref. 1).

1.1.5 Full details of the Scheme components are provided in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

1.1.6 Both surface and groundwater bodies are considered within this assessment. The Scheme interacts with four WFD surface water bodies, as illustrated in **ES Volume II Figure 9-1: Surface Water Features and their Attributes [EN010152/APP/6.2]** and thus it is necessary to consider the activities and constituent parts of the Scheme to determine compliance with WFD objectives. This includes assessing the impacts 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.

1.1.7 The Study Area (see Section 1.2) is also underlain by one WFD groundwater body and thus it is necessary to consider potential impacts on its quality and quantitative status.

1.1.8 This report presents the findings of the WFD screening exercise (the first stage in the WFD assessment process) which has been undertaken in relation to the Scheme. A WFD scoping assessment is also included in this report.

1.1.9 A full impact assessment of WFD compliance has been undertaken in continued consultation with the Environment Agency as part of the Environmental Statement (ES).

1.2 Study Area

1.2.1 For the purposes of this assessment, and consistent with **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**, a general Study Area (Zone of Influence) of approximately 1 km from the Order limits has been considered in order to identify water bodies that are hydrologically connected to the Scheme, and potential works associated with the Scheme, that could cause direct impacts. However, given that water quality impacts may propagate downstream, where relevant the assessment also considers a wider Study Area to as far downstream as a potential impact may influence the quality or quantity of water available for any water features (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. The assessment does not include the part of the Order limits that includes a section of highway at the junction of the A19 and Station Road in the town of Askern due to the nature of the activities at this location (temporary traffic control measures).

1.2.2 The Study Area falls within the following surface water body catchments:

a. Went from Blowell Drain to the River Don (GB104027064260);

b. Don from Mill Dyke to River Ouse (GB104027064243);

c. Bramwith Drain from Source to River Don (GB104027063290); and

d. Ea Beck from the Skell to River Don (GB104027057591).

1.2.3 There are also several tributaries of these water bodies present within the Study Area; these are predominantly unnamed agricultural ditches, drains and springs. It should be noted that WFD requirements apply equally to all watercourses regardless of whether they are Environment Agency reportable reaches or not. Thus, these minor watercourses are assessed as part of the catchment WFD water body.

1.2.4 The Study Area is also underlain by one WFD groundwater body: Aire and Don Sherwood Sandstone (GB40401G701000).

1.2.5 Refer to **ES Volume II Figure 9-1: Surface Water Features and their Attributes [EN010152/APP/6.2]** for water body locations in relation to the Order limits.

1.3 Introduction to the Water Framework Directive

1.3.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 2), hereafter referred to as the Water Framework Directive (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 classes of biological, chemical, physico-chemical and hydromorphological elements known as 'Quality Elements'.

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 Cycle 3 that 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 Internal Drainage Boards (IDBs) are typically responsible for consenting activities that may affect the flow of Ordinary Watercourses. Local planning and highway authorities are typically responsible for highways drains, and landowners are typically responsible for ditches and watercourses within their property including piped watercourses and culverts (i.e. they have riparian ownership). While the Environment Agency is ultimately responsible for enforcing the WFD on any water body, local planning authorities and other regulating bodies are required to consider RBMPs when exercising their statutory functions.

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) (Ref. 3), 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) (i.e. the WFD) 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 Scheme must therefore reflect water body improvement priorities as outlined in the Humber RBMP (Ref. 4).

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 (i.e. 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 (2016). Water Framework Directive risk assessment. How to assess the risk of your activity (Ref. 5);

b. Environment Agency (2016). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers (Ref. 7); and

c. The Planning Inspectorate (2024). Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref. 6)

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 within the guidance issued by the Planning Inspectorate (2024) (Ref. 6) and briefly summarised below.

Stage 1: Screening

2.1.4 Screening identifies the extent to which a proposed development is likely to affect water bodies. Screening should identify the zone of influence based on specific activities and/or characteristics of the proposed development. It is used to identify any specific activities of the proposed development that have been screened out and why, for example where water bodies are not located within the development's zone of influence or where no impact pathway exists.

Stage 2: Scoping

2.1.5 Scoping is used to identify the risks from the proposed development to WFD receptors within the zone of influence, based on the relevant WFD water bodies and their WFD quality elements. Scoping identifies the water bodies where a more detailed assessment is needed. As this WFD assessment is being applied after initial design refinement for the project has already occurred, where impacts have already been addressed through that design (i.e. embedded mitigation) this has been recorded at Stage 2 of the assessment.

Stage 3: Impact Assessment

2.1.6 The impact assessment is a detailed assessment of the WFD water bodies and activities carried forward from WFD screening, in order to identify any areas of WFD non-compliance. It should include identification of water bodies that are potentially affected by the proposed development; baseline characteristics of the water bodies affected; a description of the proposed

development and the aspects of the development considered within the scope of the WFD assessment; the methods used to determine and quantify the scale of WFD impacts; an explanation of any embedded mitigation required and how it is secured; and an explanation of any enhancements and positive contributions to the RBMP WFD objectives proposed.

Mitigation Commitments

2.1.7 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured through DCO requirements or other legally binding methods.

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

2.1.8 WFD Regulation 17 and Regulation 19 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. As explained in the assessment sections below, no derogation has been considered herein because it is assessed that the Scheme will not impede achievement of WFD objectives.

2.1.9 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 WFD 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, WFD 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".*

2.1.10 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 WFD 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 for derogation under WFD Regulation 17 would require detailed further analyses. For WFD context, WFD 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"*.

2.2 Desk Study

2.2.1 A desk-based study was carried out to capture information pertaining to the Scheme and support the understanding of water environment baseline conditions. Review of relevant information relating to the Study Area was undertaken to develop a baseline overview for WFD catchments, water bodies and surrounding areas. The following data sources were used for the desk study:

a. WFD status and objectives from the appropriate RBMP for Cycle 3 data, available from the Catchment Data Explorer (Ref. 8);

b. Defra's Multi Agency Geographical Information for the Countryside (MAGIC) website, including contemporary Ordnance Survey (OS) maps (Ref. 9);

c. Historical maps (Ref. 10);

d. British Geological Survey online maps (Ref. 11);

e. Soilscapes website (Ref. 12);

f. Aerial photography (Ref. 13);

g. Hydrological information (Ref. 14);

h. Climate information (Ref. 15);

i. Environment Agency Fish and Ecology Data Viewer (Ref. 16); and

j. Environment Agency Water Quality Archive website (Ref. 17).

2.2.2 For a full summary of the baseline conditions for the Study Area refer to **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**.

2.3 Field Survey

2.3.1 A qualitative site walkover was undertaken of the Solar PV Site on 27 July and 8 November 2023 and of the Grid Connection Corridor on 20 June 2024 to establish baseline conditions of water bodies local to the Scheme.

2.3.2 The walkover focused on surface water bodies in the Study Area, observing their current character and condition, the presence of existing risks and any potential pathways for construction and operation impacts from the Scheme.

2.4 Assumptions and Limitations

2.4.1 This WFD assessment is based on the baseline and Scheme design information available at the time of writing. It is based on the Scheme design set out in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**. Where there is uncertainty in the design, reasonable assumptions have been made and these are described at relevant points within this assessment,

such as Section 3.3. Revisions to this WFD assessment may therefore be required if there are material changes to the design elements post-planning or if it is determined that proposed embedded mitigation cannot be implemented as currently proposed for whatever reason.

2.4.2 Assessment relies on a combination of published data sources, observations from hydromorphological surveys described in Section 2.3, and aquatic ecology surveys conducted between 2023 and 2024 as presented in **ES Volume III Appendix: 8-7 Aquatic Ecology Report** [**EN010152/APP/6.3]** to define the quality of water environment receptors. Whilst the available data are considered robust for defining receptor importance, there may be inherent uncertainties or gaps in the data. Additionally, groundwater levels are estimated based on published sources and will be confirmed through ground investigation post-consent, introducing a degree of uncertainty regarding the exact groundwater conditions.

3. WFD Screening and Scoping

3.1 WFD Screening Overview

3.1.1 The purpose of the WFD screening stage, as outlined in the Planning Inspectorate's guidance Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref. 6), is to identify a zone of influence of the Scheme 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 below.

3.1.2 A Study Area of 1 km from the Order limits has been considered in order to identify water bodies that are potentially hydrologically connected to the Scheme and potential works associated with the Scheme that could cause direct impacts.

3.1.3 The screening stage also identifies specific activities of the Scheme that could affect receptor water bodies' WFD status, and which should be carried forward to subsequent stages of the assessment process. Justification is provided where water body receptors are screened out and are not carried forward through the assessment.

3.2 Screening of WFD Water Bodies

3.2.1 The Scheme interacts with four WFD surface water bodies, WFD Screening of which is provided in Table 1. Water bodies such as smaller tributaries within each of the WFD water body catchments that may be impacted by the Scheme 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 Scheme and are therefore screened out of further assessment. Water bodies in the Study Area generally drain to the River Don, which is considered the final receiving water feature that could conceivably be significantly affected.

Table 1: Screening of WFD Waterbodies Potentially Impacted by the Scheme

Water Body (ID)	Screening Outcome	Justification
Surface Water Bodies		
Went from Blowell Drain to the River Don (GB104027064260)	In	These WFD water bodies may be directly impacted by the Scheme due to a range of activities that would interact with the local watercourse network during the construction, operation and maintenance, and decommissioning phases of the Scheme.
Don from Mill Dyke to River Ouse (GB104027064243)		
Bramwith Drain from Source to River Don (GB104027063290)		
Ea Beck from the Skell to River Don (GB104027057591)		
New Fleet Drain from source to R Went (GB104027063411)	Out	The Scheme does not interact with this water body, located 940 m to the west of the Solar

Water Body (ID)	Screening Outcome	Justification
		PV Site, and there are unlikely to be impact pathways that would adversely affect it. Therefore, it is screened out of this assessment.
Went from Hoyle Mill Stream to Blowell Drain (GB104027063360)	Out	The Scheme does not interact with this water body, located 750 m to the north of the Solar PV Site, and there are unlikely to be impact pathways that would adversely affect it. Therefore, it is screened out of this assessment.
Groundwater Bodies		
Aire and Don Sherwood Sandstone (GB40401G701000)	In	This WFD groundwater body underlies the Order limits and may be affected by a range of activities during the construction, operation and maintenance, and decommissioning phases of the Scheme.

3.3 Screening of Activities

3.3.1 As described in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**, the Scheme 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 2 together with a screening assessment.

Table 2: Screening of the Scheme Against WFD Quality Elements

Activity/Component	Description	Screening Outcome	Justification
Solar PV Panels and mounting structures	Each Solar PV Panel would be mounted on a metal rack, known as a Solar PV Mounting Structure. Solar Panels will clear the ground by no less than 0.8 m and will reach a maximum height of 3.5 m to the top of the Solar PV Panel. The mounting structures will be pile driven directly into the ground with an indicative installation depth of 1.8 m to 3.0 m depending upon ground conditions. In areas of archaeological mitigation, Solar PV Panels will be mounted on pre-cast concrete blocks. For the purposes of the assessment up to 4,000 1-tonne blocks measuring approximately 4 m by 0.5 m in plan footprint each. Areas of archaeological mitigation are defined within the **Draft Archaeological Mitigation Strategy (AMS) [EN010152/APP/7.19].** Further details are provided in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.	Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and e. Aire and Don Sherwood Sandstone (GB40401G701000).	Solar PV Panels and mounting structures would not be installed within 10 m of watercourses; therefore there are unlikely to be any direct hydromorphological impacts to these water bodies. The pollution risk from this runoff is minimal as Solar PV Panels do not contain any liquid (hazardous or not) that could contaminate rainwater. Solar PV Panels are estimated to be cleaned every two years and it is assumed at this stage that a tractor mounted cleaning system utilising clean water without cleaning products/chemicals would be used. The Solar PV Panels would be held above ground typically on narrow (<100 mm) diameter piled legs. This prevents sealing the ground with an impermeable surface and would allow any rainwater to infiltrate into the ground. In areas of archaeological mitigation (as defined within the **Draft AMS [EN010152/APP/7.19]**) where required – the Solar PV Mounting Structures will be mounted on pre-cast concrete blocks avoiding disturbance of any below ground features with impacts to the ground no deeper than 0.1m (see **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). 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 would be planted with native grassland. This planting would intercept and absorb rainfall running

Activity/Component	Description	Screening Outcome	Justification
			off the panels, preventing it from concentrating and potentially forming channels in the ground. The land will no longer require any fertilisation or other treatments for crop growing, therefore the current pollution associated with agriculture will be removed. Groundwater across most of the Order limits is anticipated to be generally below 3 m, with some areas along the eastern and southern edge of the Solar PV Site potentially shallower at 0.6 m. However, as there are no continuous foundations within the design, the shallow, regularly spaced discrete strut PV panel foundations are considered to have a negligible impact on groundwater flow and quality on a water body scale. In areas of archaeological mitigation (as defined within the **Draft AMS [EN010152/APP/7.19]**) where required – the Solar PV Mounting Structures will be mounted on pre-cast concrete blocks avoiding disturbance of any below ground features with impacts to the ground no deeper than 0.1m (see **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). Therefore, this element is screened out of further assessment.
Supporting infrastructure: inverters, transformers, and switchgear	Field Stations are areas of hardstanding up to 20 m by 20 m that would comprise inverters, transformers, and switchgear. Each Field Station may have up to four Field Station Units housing central inverters, transformers and switchgear, or	Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243);	Supporting infrastructure would not be located within close proximity (<10 m) of surface water bodies so there is no mechanism for direct hydromorphological or water quality impacts to surface water bodies. Transformers would be installed with suitable bunds to contain any oil spillage in case of an oil leakage event. Bunds would be designed to contain at least

Activity/Component	Description	Screening Outcome	Justification
	infrastructure may be standalone but within the Field Station area. The dimensions of the individual Field Station Units are up to 12.5 m by 2.5 m footprint and up to 3.5 m height. If string inverters are used, these will be either mounted parallel to the array or more likely at the end of the array frame. If transformers are supplied standalone, they will be external (not in cabins or enclosures) and will have a footprint of up to 4 m x 4 m and a height of up to 3.5 m. Standalone switchgears would be housed in a cabin of up to 2.5 m by 6 m in plan and up to 3.5 m in height. Standalone transformers and switchgear will be located within the 20 m by 20 m Field Station hardstanding area.	c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); and d. Ea Beck from the Skell to River Don (GB104027057591). In: e. Aire and Don Sherwood Sandstone (GB40401G701000).	110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. An FRA and Framework Drainage Strategy are provided as **ES Volume III Appendix 9-3: Flood Risk Assessment [EN010152/APP/6.3]** and **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**, to provide for the attenuation of surface water runoff from areas of hardstanding associated with the BESS Area and the On-Site Substation. In accordance with planning policy guidance (Ref. 19), runoff from the Scheme would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. Field Stations would be mounted on concrete foundations which would increase impermeable surfaces within the Order limits leading to potential impacts on underlying groundwater bodies. It is assumed that up to 28 Field Stations may be required across the Solar PV Site, subject to detailed design, therefore, this activity is screened in for further assessment.
On-Site Cables	Cabling between Solar PV Panels and string inverters is typically above ground level (along a row of racks fixed to the mounting structure or fixed to other parts of nearby	In: a. Went from Blowell Drain to the River Don (GB104027064260);	Indicative trench depths for the On-Site Cables specify a maximum depth of 1.4 m, although trench depths would increase at crossings or to avoid obstacles. Groundwater data available on the Geoindex website (Ref. 11) indicates water table depths of around 3 m across most of the Solar PV

Activity/Component	Description	Screening Outcome	Justification
	components), and then underground if required (between racks and in the inverter's input) whilst central inverters would require underground cabling. All other on-site electrical cabling will be underground unless there are obstacles such as archaeology in which case an above ground method such as concrete trough or cable tray would be used in these limited scenarios. The dimension of the trenches for On-Site Cables vary depending on the number of cables or ducts they contain, but would typically be up to 2 m in width and up to 1.4 m in depth. Trench depths would increase at crossings, for example at or on the approach to open trenched watercourse crossings, or if utilities or obstacles such as buried utilities are encountered in which case trenches would be deeper to avoid the obstacle by set clearance limits.	b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); and d. Ea Beck from the Skell to River Don (GB104027057591). Out: e. Aire and Don Sherwood Sandstone (GB40401G701000).	Site, with some areas where it may be shallower. However, there would likely be negligible or no impact to the groundwater body when considering the large scale of the WFD groundwater bodies, and so they are screened out at this level of assessment. Smaller watercourse crossings will be crossed using open cut installation techniques. Therefore, this activity is screened in for further assessment. Water quality impacts related to construction or decommissioning runoff or spillages that have potential to enter watercourses would be adequately mitigated by measures to be detailed in the **Framework Construction Environmental Management Plan (CEMP) [EN010152/APP/7.7]**, which will include a Water Management Plan (WMP), and **Framework Decommissioning Environmental Management Plan (DEMP) [EN010152/APP/7.9]**, which are secured as a Requirement of the DCO.
Battery Energy Storage System (BESS)	The Scheme would include the provision of BESS. Batteries would be contained in shipping-	Out:	The BESS Area is located more than 25 m from the nearest surface water body, and so there are no mechanisms for hydromorphological impacts to

Activity/Component	Description	Screening Outcome	Justification
	type containers, with a maximum footprint of up to 12.5 m by 2.5 m and a height of up to 3.5 m. Battery containers would have built-in gas, heat and smoke detection and an explosion protection system. The footprint of the BESS Area would be up to 250 m by 200 m and includes impermeable lining. The BESS Containers would require heating, ventilation, and cooling. The BESS will also include inverters, transformers, switchgear and Control units.	a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and e. Aire and Don Sherwood Sandstone (GB40401G701000).	surface water bodies. Therefore, this element is screened out of further assessment. An FRA and Framework Drainage Strategy are provided as **ES Volume III Appendix 9-3: Flood Risk Assessment [EN010152/APP/6.3]** and **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**, to provide for the attenuation of surface water runoff from areas of hardstanding associated with the BESS Area. In accordance with planning water supply, wastewater and water quality guidance (Ref. 19), runoff from the Order limits would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. In the unlikely event of a malfunction to one of the BESS Containers, there is a range of integrated controls that would activate depending on the extent and severity of the event. In case the malfunction progresses to a catastrophic fire event and so long as there are no lives under threat, the fire brigade would ensure surrounding elements and structures (intact BESS Containers nearby, other electrical equipment, trees etc.) are kept adequately wet and cool to prevent the fire from expanding any further but the battery infrastructure would be allowed to burn within the controlled area. Water will be stored on the site for this purpose. The design of the BESS includes impermeable lining beneath the footprint of the entire BESS Area, and within swale to capture any attenuated water captured within this area. Any

Activity/Component	Description	Screening Outcome	Justification
			potentially contaminated fire water would be captured and temporarily stored in gravel filled attenuation basins before testing and being released or pumped out for off-site disposal if required. BESS Containers will also have an internal and sealed fire suppression system to prevent chemicals from escaping. Consultation with the emergency services is being undertaken as part of the Applicant's pre-application work. Further details regarding management of firewater is outlined in the **Framework Battery Safety Management Plan (BSMP) [EN010152/APP/7.16]**. A Framework Drainage Strategy is provided as **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**. On the basis of these controls, impacts from firewater can be screened out of further assessment.
On-Site Substation	One 400 kV/33 kV On-Site Substation within the Solar PV Site would receive the electricity from the Field Stations and BESS. The On-Site Substation would step up the voltage ready to be exported to the National Grid. The footprint of the On-Site Substation compound will be up to 100 m by 200 m based upon the maximum design parameters of similar facilities.	Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480);	The On-Site Substation would not be located within close proximity of surface water bodies (it is located 200 m from the nearest watercourse), therefore there are no mechanisms for hydromorphological impacts to surface water bodies and this element is screened out of further assessment. An FRA and Framework Drainage Strategy are provided as **ES Volume III Appendix 9-3: Flood Risk Assessment [EN010152/APP/6.3]** and **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**, respectively, to provide for the attenuation of surface water runoff from areas of hardstanding. In accordance with

Activity/Component	Description	Screening Outcome	Justification
	The electrical infrastructure (transformer, lines, and structures) would be outside (i.e. not contained within a building) and would comprise separate infrastructure and lines.	d. Ea Beck from the Skell to River Don (GB104027057591); and e. Aire and Don Sherwood Sandstone (GB40401G701000).	planning water supply, wastewater and water quality guidance (Ref. 19), runoff from the Scheme would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. It is anticipated that foundations for the substations would be above the water table, based on groundwater data available on the Geoindex website (Ref. 11). As such, there would be negligible or no impact to the groundwater bodies, particularly given the large scale of the WFD groundwater bodies.
Operations and Maintenance Hub with welfare facilities within the Solar PV Site	An Operations and Maintenance Hub would be established by constructing a containerised welfare unit (maximum footprint up to 12.5 m by 2.5 m, up to 6.5 m in height) adjacent to an existing barn within Field NW08 of the Solar PV Site. This would provide welfare, office accommodation and facilities for maintenance throughout the operation and maintenance phase of the Scheme. The existing agricultural building would be used for storage and would not require modification.	Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and	New structures of the Operations and Maintenance Hub would not be located within close proximity (130 m) of surface water bodies, therefore there are no mechanisms for hydromorphological impacts to surface water bodies. Using existing buildings would not impart additional impacts over and above baseline conditions. Therefore, this element is screened out of further assessment. There will be welfare facilities associated with the Scheme for two permanent (full time equivalent) member of staff, with some part time day attendance as required, during the operation and maintenance phase. Given the low daily occupancy only small volumes of foul drainage will be generated. The water supply for the Operations and Maintenance Hub will come from an existing water supply of mains

Activity/Component	Description	Screening Outcome	Justification
	During the operation and maintenance phase, portable welfare facilities would be provided at additional sites further from the Operations and Maintenance Hub on an ad hoc basis (e.g. if required by maintenance crews). During construction, portable welfare facilities would be provided within the Solar PV Site.	e. Aire and Don Sherwood Sandstone (GB40401G701000).	water. Foul water and grey water will be captured within a sealed cess pit and/or temporary facilities (e.g. portable welfare units) and would be treated off-site.
Fencing and security measures	A security fence would enclose the operational areas of the Solar PV Site. Solar PV Site Perimeter Fencing would be stock proof mesh-type security fence with wooden posts, up to 2.2 m high, with pole mounted internal facing closed circuit television (CCTV) systems deployed around the perimeter. The On-Site Substation and the BESS Area would be securely fenced with galvanised palisade security fencing up to 2.5 m in height.	Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and	Fencing will not be located within close proximity of surface water bodies (at least 10m away), therefore there are no mechanisms for hydromorphological impacts to surface water bodies and this element is screened out of further assessment. No other runoff or pollutant impacts to surface water bodies, or impacts to groundwater are considered possible from the fencing and security measures.

Activity/Component	Description	Screening Outcome	Justification
		e. Aire and Don Sherwood Sandstone (GB40401G701000).	
Access tracks	Access tracks would be constructed across the Solar PV Site. These would typically be 4 m up to 8.0 m wide for BESS Area access tracks) wide compacted stone tracks with 1:2 gradient slopes on either side (where required). Access tracks will be routed to avoid sensitive receptors and have been designed to minimise vegetation removal as far as practicable. Where drainage is required, a ditch may be cut into the slope next to the road. Where a requirement for trenchless crossing (i.e. over sensitive receptors) has been identified no temporary track crossing would be installed over these features.	In: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and e. Aire and Don Sherwood Sandstone (GB40401G701000).	Access tracks would cross surface water bodies by open span bridge or extension/modification of culverts (where required) within the Order limits, providing a source of fine material and other contaminants which may have impacts on WFD water quality and hydromorphology element receptors. Open span bridge will be considered when access tracks cross watercourses within the Order limits, with the type of crossing selected based on site-specific factors and in consultation with the relevant authority (generally the IDB/lead local flood authority). Extensions or modifications of existing culverts will be designed to maintain connectivity along watercourses for aquatic species and riparian mammals, where these are shown to be present. All culverts to convey watercourses will be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity for aquatic fauna. Therefore, this element is screened in for further assessment.
Landscaping and biodiversity enhancement	The Scheme would involve field boundary enhancement and planting of seed mixes within the Solar PV Site. Enhancements	Out: a. Went from Blowell Drain to the River Don (GB104027064260);	Landscape and biodiversity enhancements would not impart direct impacts to WFD quality element receptors. Replacing existing impactful land use practices such as arable and cattle farming with

Activity/Component	Description	Screening Outcome	Justification
	would increase biodiversity and contribute to the Scheme's Biodiversity Net Gain (BNG) requirements.	b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and e. Aire and Don Sherwood Sandstone (GB40401G701000).	native grasses would have indirect benefits to WFD receptors; therefore, this element is screened out of further assessment.
Surface water drainage and outfalls	**ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]** covers the BESS Area and the On-Site Substation. The detailed operational drainage design in accordance with this Framework Drainage Strategy will be carried out pre-construction with the objective of ensuring that drainage of the land to the present level is maintained. It will follow either the design of a new drainage system taking into account the proposed new	In a. Don from Mill Dyke to River Ouse (GB104027064243). Out: a. Went from Blowell Drain to the River Don (GB104027064260); b. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); and	Where practicable, surface water will drain from the Scheme's swale based drainage system to local receiving watercourses via a new outlet. Therefore, this element is screened in for further assessment. A flow control device at the outlet of the swale of the BESS Area will limit the discharge to the greenfield runoff rate for the site. The design has also considered the management of fire water and the likely contaminants associated with it. This means that infiltration is not allowed from the gravelled sections of the drainage system. To prevent potential contamination to the surrounding ground, the gravel basins will be non-infiltrating, underlain with an impermeable liner.

Activity/Component	Description	Screening Outcome	Justification
	infrastructure (structure foundations) to be constructed or, if during the construction of any of the infrastructure there is any interruption to existing schemes of land drainage, new sections of drainage will be constructed.	c. Ea Beck from the Skell to River Don (GB104027057591). d. Aire and Don Sherwood Sandstone (GB40401G701000).	Penstocks will also be in place at the outlets from the gravelled areas to hold any fire water in that cell of the system. This allows the stored water to be tested before release or, if necessary, removed by tanker and treated offsite.
Grid Connection Corridor	The On-Site Substation and the Existing National Grid Thorpe Marsh Substation would be connected via three 400 kV single core AC cables, as well as a bare copper earth cable, fibre optic cable, and low voltage control cable. The cable trench would be up to approximately 0.75 m wide. Grid Connection Cables will be installed to a minimum depth of 1 m (to top of cable). To accommodate this, trench depth will be up to 1.495 m. Where horizontal directional drilling (HDD) is used to install the Grid Connection Cables beneath surface water bodies, installation would be a minimum of 1.5 m below the bed of the watercourse except for Mill Dike, Wrancarr Drain, Engine Dike and	In: a. Went from Blowell Drain to the River Don (GB104027064260); b. Don from Mill Dyke to River Ouse (GB104027064243); c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); d. Ea Beck from the Skell to River Don (GB104027057591); and Out e. Aire and Don Sherwood Sandstone (GB40401G701000).	There is potential for excavations and channel crossings to generate impacts upon WFD surface water and groundwater receptors. All WFD monitored water bodies will be crossed by trenchless techniques, and direct impacts will be further avoided with launch and receive pits at least 10 m from the channel margins. However, smaller watercourse crossings will be crossed using open cut installation techniques. Therefore, this activity is screened in for further assessment. As the launch and receive pits would not be located within close proximity (<10 m) of surface water bodies, there will be no mechanism for indirect impacts to all watercourses from uncontrolled release of construction site runoff that may include high levels of fine sediment, oils and drilling muds (water based). There are potential impacts from groundwater ingress to excavations (e.g. launch, receiving and jointing pits) and the risk of ‘break out’ of drilling muds into watercourses associated with trenchless crossings. The potential for drilling fluids to break out

Activity/Component	Description	Screening Outcome	Justification
	Thorpe Marsh Drain where the minimum installation depth would be 5.0 m below the lowest surveyed point of the riverbed within the route corridor (due to the connectivity of these watercourses to the River Don). The Grid Connection Corridor allows for necessary spatial flexibility in the routing of the Grid Connection Cables. The working area for installation of the Grid Connection Cables is anticipated to be a 30 m wide corridor. This may be widened in places to accommodate required operations and narrowed in others, for example to minimise removal of hedgerows or at open cut watercourse crossings. The minimum width is anticipated to be 5.0 m.		into the watercourse would be mitigated by a site-specific hydraulic breakout risk assessment in line with the **Framework CEMP [EN010152/APP/7.7]** submitted with the DCO Application, and therefore can be screened out.

3.3.2 Per the assessment outlined in Table 2, the following components are deemed to not present a risk to the WFD status of any water bodies that interact with the Scheme and therefore are screened out:

a. Solar PV Panels and Mounting Structures;
b. Supporting infrastructure: inverters, transformers, and switchgear;
c. BESS;
d. On-Site Substation;
e. Operations and Maintenance Hub with welfare facilities within the Solar PV Site;
f. Fencing and security measures; and
g. Landscaping and biodiversity enhancement.

3.3.3 Four components were deemed to present a risk to the WFD status of some water bodies that interact with the Scheme and require scoping.

a. Above and below ground On-Site Cables;
b. Grid Connection Cables;
c. Access tracks; and
d. Surface water drainage and outfalls.

3.3.4 The On-Site Cables are screened in for the following water bodies:

a. Went from Blowell Drain to the River Don (GB104027064260);
b. Don from Mill Dyke to River Ouse (GB104027064243);
c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); and
d. Ea Beck from the Skell to River Don (GB104027057591).

3.3.5 The Grid Connection Cables are screened in for the following water bodies:

a. Went from Blowell Drain to the River Don (GB104027064260);
b. Don from Mill Dyke to River Ouse (GB104027064243);
c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480); and
d. Ea Beck from the Skell to River Don (GB104027057591).

3.3.6 The access tracks are screened in for the following water bodies:

a. Went from Blowell Drain to the River Don (GB104027064260);
b. Don from Mill Dyke to River Ouse (GB104027064243);
c. Bramwith Drain from Source to River Don (GB104027063290) Tributary of the Till (GB105030062480);
d. Ea Beck from the Skell to River Don (GB104027057591); and
e. Aire and Don Sherwood Sandstone (GB40401G701000).

3.3.7 Surface water drainage and outfalls are screened in for the following water body:

a. Don from Mill Dyke to River Ouse (GB104027064243).

3.4 WFD Scoping

3.4.1 The WFD scoping stage defines the level of detail required for further WFD assessment. This includes identifying risks to the WFD receptors from the Scheme's components that were screened in, in Table 2. The scoping stage assessment is presented in Table 3.

Table 3: WFD scoping of the Scheme's Components and Activities Against WFD Quality Elements

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Scoping Outcome	Justification
Biological Quality Elements			
Fish	Yes	In	Temporary blockages in longitudinal connectivity from watercourse crossings. Potential direct impact on fish populations from disturbance of the bed and/or release of contaminated construction site runoff.
Invertebrates	Yes	In	Crossings of water bodies may cause direct mortality of invertebrates or the smothering of habitat with fine sediment and may interrupt continuity of invertebrate communities.
Macrophytes and phytobenthos	Yes	In	Crossings of water bodies may cause the removal of macrophytes, and removal of the bed or macrophytes supporting phytobenthos.
Physico-chemical Quality Elements			
Thermal Conditions	No	Out	Intrusive crossing may alter the level of shading to water bodies following potential riparian vegetation removal, watercourse crossings for site access will also locally cause shading. However this will be at a very local scale and would not alter the water body temperature.
Oxygenation Conditions	Yes	In	Crossings of water bodies may increase loads of fine sediment and organic material to water bodies and decrease levels of dissolved oxygen.
Salinity	No	Out	During operation, surface water runoff from the Scheme may contain pollutants derived from impermeable surfaces (e.g. inert particulates, litter, hydrocarbons, metals, nutrients and de-icing salts) that may alter the salinity of water bodies.

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Scoping Outcome	Justification
			However, the **Framework CEMP [EN010152/APP/7.7]** prescribes measures for controlling potentially polluting materials during construction.
Acidification Status	No	Out	No materials that may alter the pH of water bodies are proposed for use in the Scheme. The **Framework CEMP [EN010152/APP/7.7]** prescribes measures for controlling potentially polluting materials during construction.
Nutrient Conditions	No	Out	Crossings of water bodies may increase sediment loads to watercourses and organic material from site clearance works. However, the impact will be localised, short term and temporary. Overall, the Scheme will likely reduce the flux of agricultural diffuse pollutants (sediment and excess nutrients) into watercourses as they flow through the Order limits. Water quality impacts related to construction or decommissioning runoff or spillages that have potential to enter watercourses would be adequately mitigated by measures detailed in the **Framework CEMP [EN010152/APP/7.7]** and **Framework DEMP [EN010152/APP/7.9]**.
Hydromorphological Quality Elements			
Quantity and Dynamics of Water Flow	No	Out	There is no mechanism for non-intrusive cable crossing to impact this element. Intrusive crossings will preferably be carried out during periods of low flow. Where this is not possible, water flow will be maintained by installation of a pipe or flume or by over-pumping the flow for the relatively short duration of the works. It is unlikely that there would be impacts beyond the short duration of the works and would be mitigated by measures detailed in the **Framework CEMP [EN010152/APP/7.7]**. Localised flow disturbance from engineered outlets would be mitigated by appropriate micro-siting.

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Scoping Outcome	Justification
Connection to Groundwater Bodies	No	Out	Cables will cross beneath water bodies and other infrastructure but this should not impact connectivity to groundwater bodies due to the small scale of activity compared to groundwater body size. Watercourse crossings for site access may also present a barrier to connection with groundwater bodies, but this will be extremely localised and would not present an impact at the water body scale.
River Continuity	Yes	In	Crossings will present a temporary blockage to continuity whilst excavation takes place. Watercourse crossings for site access can also interrupt river continuity. There is no mechanism for non-intrusive crossings to affect this quality element.
River Depth and Width Variation	Yes	In	Crossings may lead to local changes in channel profile to impact this element. Watercourse crossings for site access and outlet construction would also impact this element locally by their uniform, unchangeable nature.
Structure and Substrate of the River Bed	Yes	In	Crossings may lead to local changes in bed substrate to impact this element. Watercourse crossings for site access can present an interruption to the natural bed substrate. Construction of outlets would result in some temporary disturbance to the bed and banks.

4. Desk Study

4.1 General Characteristics

4.1.1 The topography of the Order limits and its 1 km Study Area is relatively flat, with existing ground levels under 10 m Above Ordnance Datum (AOD) according to online Ordnance Survey mapping.

4.1.2 The area is currently used mainly for agriculture, with a mosaic of mixed agricultural fields. There are several small villages, hamlets and farms located throughout the Study Area.

4.2 Catchment Geology and Soils

4.2.1 The bedrock and superficial geology for the Study Area is identified by the BGS GeoIndex online mapping (Ref. 11). The Solar PV Site and the northern part of the Grid Connection Corridor is underlain by the Sherwood Sandstone Group, while the southern part of the Grid Connection Corridor is underlain by the Chester Formation.

4.2.2 Overlying the bedrock geology, there are several superficial strata identified. The majority of the Solar PV Site and Grid Connection Corridor is underlain by the Hemingbrough Glaciolacustrine Formation comprising laminated clays, silts and sands. Pockets of Breighton Sand Formation (typically consisting of yellowish brown clayey silty sand) are present across the Order limits. Alluvial deposits are present along the alignment of the River Went at the northern Order limits of the Solar PV Site and through the River Don valley in the eastern part of the Grid Connection Corridor.

4.2.3 The Soilscape Map viewer (Ref. 12) describes the soils beneath the Order limits as slowly permeable seasonally wet, loamy and clayey soils with naturally high groundwater and poor drainage characteristics.

4.3 Catchment Hydrology

4.3.1 Based on the Meteorological Office website (Ref. 15), the nearest weather station is located in Robin Hood Doncaster Sheffield Airport, approximately 17 km southeast of Fenwick. Using data from this weather station, for the period 1991 to 2020, it is estimated that the Study Area experiences approximately 582 mm of rainfall per year, with it raining more than 1 mm on approximately 113 days per year, which are both low in the UK context. This is relevant to the whole Study Area.

4.3.2 The nearest gauging station to the Solar PV Site is located on the River Went at Walden Stubbs, approximately 3.5 km upstream of the Study Area (Ref. 14). The catchment area upstream of this gauging station is 83.7 km^2.The daily mean flow is 0.575 cubic metres per second (m^3/sec), with a flow that is exceeded 95% of the time (Q95) of 0.164 m^3/sec Flow in the area of the Order limits would be expected to be higher than the flow measured at Walden Stubbs because the Order limits is downstream of the gauging station.

4.3.3 The nearest gauging station to the Grid Connection Corridor is located on the River Don, approximately 8 km upstream of the Existing National Grid Thorpe Marsh Substation to the south of the Order limits at Doncaster (Ref.

14). At this location the daily mean flow is 16.488 m^3/sec, with a flow that is exceeded 95% of the time (Q95) of 4.95 m^3/sec. Flow in the area of the Order limits would be expected to be higher than the flow measured at Doncaster because the Order limits is downstream of the gauging station.

4.4 Historical Channel Change

4.4.1 In general, the watercourses within the Study Area have experienced little change over time. The majority of watercourses in the Study Area are straightened channels which have likely been modified for agricultural purposes. There has been little to no change in these channels since the first OS maps published in the early 1900s, therefore it is assumed that these channels would have been modified prior to this. Further detail on the historical channel change of individual watercourses is available in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**.

4.5 WFD Status – Surface Water

4.5.1 The Study Area falls within four WFD surface water bodies. There are also several tributaries of these water bodies present within the Study area which are predominantly unnamed agricultural ditches, drains, and springs. Further details regarding the WFD classifications of these four water bodies are given in Table 4 (Ref. 8).

Table 4: WFD Status Summary for Surface Water Bodies

WFD Parameter	Status/Summary			
Water Body ID	GB104027057591	GB104027064243	GB104027063290	GB104027064260
Water Body Name	Ea Beck from the Skell to River Don	Don from Mill Dyke to River Ouse Water Body	Bramwith Drain from Source to River Don	Went from Blowell Drain to the River Don
Water Body Type	River	River	River	River
Water Body Area (km^2)	28.006	77.913	32.611	18.706
Water Body Length (km)	13.964	38.409	4.48	10.156
Hydromorphological Designation	Heavily modified	Artificial	Artificial	Heavily modified
Ecological Status or Potential	Moderate	Moderate	Moderate	Moderate
Current Overall Status	Moderate	Moderate	Moderate	Moderate
Status Objective	Good by 2027	Moderate by 2015	Good by 2027	Good by 2027

WFD Parameter	Status/Summary			
Biological Quality Elements	Poor	Poor	Good	Poor
Physico-chemical Quality Elements	High	Moderate	Moderate	Moderate
Hydromorphological Quality Elements	Supports Good	Supports Good	Supports Good	Supports Good
Chemical	Fail/Does not require assessment	Fail/Does not require assessment	Fail/does not require assessment	Fail/Does not require assessment

4.6 WFD Status – Groundwater

4.6.1 The Study Area also falls within one WFD groundwater body boundary. Further details regarding the WFD classifications of this groundwater body are given in Table 5 (Ref. 8).

Table 5: WFD Status Summary for Groundwater Body

WFD Parameter	Status/Summary
Water Body ID	GB40401G701000
Water Body Name	Aire and Don Sherwood Sandstone.
Water Body Type	Groundwater Body
Overall Water Body	Poor
Chemical (GW)	**Poor**
Chemical Dependent Surface Water Body Status	Good
Chemical Drinking Water Protected Area	Poor
Chemical GWDTEs test	Good
Chemical Saline Intrusion	Good
Chemical Status element	Poor
General Chemical Test	Poor
Prevent and Limit Objective	Active
Quantitative	**Poor**
Quantitative Dependent Surface Water Body Status	Good
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Poor

WFD Parameter	Status/Summary
Quantitative Status element	Poor
Quantitative Water Balance	Poor

4.7 Baseline Characteristics Against WFD Quality Elements

Biological Quality Elements

4.7.1 Surveys have been carried out by the Environment Agency for fish, invertebrates and macrophytes within the Study Area over the last 20 years (Ref. 16).

4.7.2 Notable fish species recorded in the Study Area include Bullhead *(Cottus gobio)* and European eel *(Anguilla Anguilla*). There have been no protected or notable aquatic invertebrate species recorded within the Study Area. There are two records of the protected aquatic macrophyte *Callitriche obtusangula* within the Study Area.

4.7.3 Further details of aquatic ecology surveys are provided in **ES Volume III Appendix 8-6: Aquatic Ecology Report [EN010152/APP/6.3]**.

Physico-Chemical Quality Elements

4.7.4 There is one water quality sampling point within the Study Area (Ref. 18): Ea Beck at Thorpe Marsh.

4.7.5 The most recent sampling was conducted on 17 July 2024 with results shown in Table 6.

Table 6: Summary of physico-chemical parameters for Ea Beck at Thorpe Marsh (Ref. 18)

Physico-chemical quality element	Value	WFD classification
pH	7.72	High
Temperature	15	High
Ammonia un-ionised as N (mg/l)	0.0011	Good
Oxygen, Dissolved as O2	6.33	Bad

Hydromorphological Quality Elements

4.7.6 Site walkovers were conducted by AECOM in 2023 and 2024 to assess the hydromorphological condition and quality of watercourses set to be crossed by the Scheme. The findings of this are summarised in Table 7.

Table 7: Summary of the Hydromorphological Characteristic of Watercourses

Photo	National Grid Reference	Hydromorphological Description
	SE 60327 08889 Engine Dike Ea Beck from the Skell to River Don	The watercourse within the Study Area follows a straight, uniform course between a road and agricultural fields. The channel has some buffer habitat of grasses and riparian trees which would help to limit ingress of fines.
	SE 60235 10882 Thorpe Marsh Drain Ea Beck from the Skell to River Don	The channel is uniform with glide flow, approximately 5 m wide. Thorpe Marsh Drain is embanked on both banks throughout the Study Area suggesting that there is limited connection between the channel and the floodplain. Within the channel, the water is clear, showing the presence of macrophytes. There is a moderate buffer zone however during the site visit there were large amounts of Himalayan Balsam which is an invasive non-native species (INNS).
	SE 60032 11075 Wilsick House Drain Bramwith Drain from Source to River Don	The channel banks are overgrown with vegetation. The water in the channel is slow flowing and stagnant in places and there is ochre present.
	SE 60432 11844 Engine Dike Bramwith Drain from Source to River Don	Engine Dike demonstrates a small degree of sinuosity, aligned along a field boundary. The channel has a riparian buffer zone, limiting potential ingress of fines from neighbouring fields. Macrophytes are present within the channel.
	SE 60280 12355 Wrancarr Drain Bramwith Drain from Source to River Don	Wrancarr Drain exhibits a better quality than other watercourses surveyed in the Study Area. There is a moderate flow, with some diversity in flow types. However the channel is incised with steep, vegetated banks of 3 m.

Photo	National Grid Reference	Hydromorphological Description
	SE 60044 12663 Mill Dike Bramwith Drain from Source to River Don	Mill Dike within the Study Area had very little to no flow within the channel. The watercourse is straight and is mostly over-grown with vegetation within the stretch visited.
	SE 59828 13341 Hawkehouse Green Dike Bramwith Drain from Source to River Don	Hawkehouse Green Dike is approximately 1.5 m wide and follows a modified and straight course in between two fields. There was very little flow over a silty bed. There is a buffer habitat of scrub on the left bank and trees on the right bank.
	SE 59722 13724 Brick Kiln Lane Bramwith Drain from Source to River Don	This watercourse was dry during the site visit.
	SE 60238 14483 Unnamed drain at Moss Road Don from Mill Dyke to River Ouse Water Body	This watercourse appeared to be dry during the site visit and the channel was largely overgrown
	SE 61964 17380 River Went Went from Blowell Drain to the River Don	The Went throughout the Study Area has a small degree of sinuosity and is approximately 10 m wide. Some sections appear overly straight and have likely been modified. The riparian zone is scrub with occasional trees, providing some buffer from surrounding arable fields.

Photo	National Grid Reference	Hydromorphological Description
	SE 61505 17003 North tributary of Fleet Drain Don from Mill Dyke to River Ouse Water Body	This channel is an artificially straight drainage channel. Through the majority of the Study Area the channel is dry or has no flow with water pooled and stagnant. The lack of flow observed in the channel may be explained due to the dry weather during the survey visit in summer. The banks are grassy with regularly spaced trees acting to engineer the bank into its straightened planform. In the upstream extent there is evidence of cattle poaching of the banks, resulting in fine material entering the channel.
	SE 61668 16942 Fleet Drain Don from Mill Dyke to River Ouse Water Body	Fleet Drain displays some natural sinuosity in places but is generally straight, over deep and disconnected from the adjacent floodplain. The channel is heavily silted, which is likely a result of the general lack of a buffer from agricultural run-off through most of the Study Area, although there are some localised areas which have a larger buffer habitat.
	SE 61150 16463 South tributary of Fleet Drain Don from Mill Dyke to River Ouse Water Body	This is an artificially straight drainage channel, which is over-deep and disconnected from its floodplain. Woody material in the channel acts to provide some flow and geomorphic diversity, although there was little flow present in the channel at the time of survey during a dry period in summer. Additionally, riparian habitat is provided by scrub vegetation, acting as a buffer to nutrients and fines from adjacent agricultural land use.
	SE 60833 15855 Fenwick Common Drain Don from Mill Dyke to River Ouse Water Body	Fenwick Common Drain is highly modified with a trapezoidal channel, which has moderate sinuosity through the Study Area, although straightened sections indicate historical modification. The channel is over-deep with approximately 2 m bank height, with little flow in the channel at the time of the survey. The channel has a narrow riparian habitat of grasses, scrub vegetation, and trees, providing a limited buffer from fines and nutrient ingress from adjacent fields.

Photo	National Grid Reference	Hydromorphological Description
	SE 60032 14934 Ell Wood and Fenwick Grange Drain Don from Mill Dyke to River Ouse Water Body	The watercourse has a straightened, trapezoidal channel as it flows through agricultural fields in the Study Area. The channel has likely been modified for agricultural drainage. The channel generally has a buffer of scrub and grass vegetation, potentially limiting ingress of fines and nutrients from surrounding arable land.

5. WFD Impact Assessment

5.1 Site Specific Assessment of the Scheme Against WFD Quality Elements

5.1.1 Components of the Scheme and their potential impacts have been introduced along with mitigation measures in Table 8. The purpose of this table is to introduce the key sources of potential impacts and associated mitigation; the compliance assessment which follows considers impacts on WFD quality elements of each water body.

5.1.2 There is a range of mitigation for the water environment provided within the Scheme. These mitigation measures are secured in the **Framework CEMP [EN010152/APP/7.7]** and/or **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]** which are secured by Requirements of the **Draft DCO [EN010152/APP/3.1]**. Where relevant, these were referred to in the screening of the Scheme's activities and components (Table 2) and within the impact assessment presented in Table 8. Details can also be found in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1].**

5.1.3 Site specific impacts of the Scheme on the biological, physico-chemical and hydromorphological quality elements of the screened-in water bodies are provided in Table 9. 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: Scheme Components, Potential Impacts, and Associated Mitigation Measures for Proposed Works to Water Bodies Scoped into This Assessment

Scheme Component	Potential Impacts	Mitigation Measures
Trenchless (e.g. HDD) 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.	A **Framework CEMP [EN010152/APP/7.7]** has been prepared which is secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]**. Mitigation measures described below have been secured within the Framework CEMP.
	Impacts to biological and physico-chemical quality elements from spillages of drill fluids or pollutants.	Site specific risk assessment will be required at each crossing location in order to minimise groundwater interactions where practicable.
	Potential impacts from groundwater ingress to excavations.	Where practicable, construction activity will avoid flood defence embankments.
		A site-specific hydraulic fracture risk assessment would be developed prior to construction following further investigation of specific ground conditions at the crossing locations, and appropriate mitigation developed in line with best construction practice. Drilling muds and wastewater will be managed so that this would not be spilt into the channel when working close to the banks of a watercourse.
		Any wastewater/drilling products that are not recycled will be stored and removed from the Order limits by a suitable waste management contractor and disposed of at a licensed wastewater facility.
		The send and receive pit excavations for drilling/boring will be located at least 10 m from the watercourse edge under which they would be directional drilled.

Scheme Component	Potential Impacts	Mitigation Measures
		The exact dimensions of the send and receive pits would be determined by site and ground conditions but will be kept to a safe minimum in terms of length, width and depth. A shoring system appropriate to the ground conditions will be used as appropriate to minimise water ingress into the pits. This may be timbers, sheet piling, or a modular system and would be chosen based on suitability for the site conditions. The ingress of any groundwater will be carefully managed through design of the send or receive pit, shoring method, and a pumping and treatment system where required. Excessive ingress of water would make the pit unsafe and thus it is important that ingress is minimised and that a suitable system of managing that water is implemented. Once the cable is installed beneath the watercourse the pits and any cable trenches will be backfilled to the original ground level and seeded to reduce the risk of runoff and fine sediments entering the watercourse. The water column above the drill path must be continuously monitored during drilling. Should drill fluid leak into a watercourse, the drilling/boring operation would be suspended, remediation action implemented, and subsequently the methodology for that crossing re-evaluated.
Trenched 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.	A **Framework CEMP [EN010152/APP/7.7]** has been prepared which is secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]**. Mitigation measures described below have been secured within the Framework CEMP. Where underground techniques are not feasible, crossings will be installed using open-cut, or intrusive, techniques. In such

Scheme Component	Potential Impacts	Mitigation Measures
	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. Short-term impediment to downstream sediment continuity. 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.	cases, water flow would be maintained by damming and over pumping or fluming. Works will be carried out in the drier months where practicable as this would reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. A pre-works morphology survey of the channel of each watercourse to be crossed will be undertaken prior to construction. The pre-works survey is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works to install cables beneath the channel. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales should be used initially to capture mobilised sediments until the watercourse has returned to a settled state. Watercourses will be 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 be undertaken post-works during vegetation re-establishment of the banks, especially following wet weather, to ensure that no adverse impacts have occurred.
Site access and access tracks – long-term disturbance of watercourses within the Solar PV Site from watercourse crossings	Localised loss of riparian habitat. Impediment to fish passage and ecological connectivity from impact to river continuity.	A **Framework CEMP [EN010152/APP/7.7]** has been prepared which is secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]**. Mitigation measures described below have been secured within the Framework CEMP.

Scheme Component	Potential Impacts	Mitigation Measures
	Potential removal of macrophytes and mortality of invertebrates.	The internal road layout will be designed to avoid drainage ditch and watercourse crossings wherever possible.
	Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, and chemical spillage risk.	Existing watercourse crossing locations have been utilised to avoid the need for new crossing locations where practicable. The access track design around the Order limits utilises an existing culvert over the north tributary to Fleet Drain to cross from field NE6 to NE8. There are three areas labelled in **ES Volume II Figure 2-3: Indicative Site Layout Plan [EN010152/APP/6.2]** as Bridge Options where the access track will cross Fenwick Common Drain (two No.) and south tributary to Fleet Drain, west of Riddings Farm. The second Fenwick Common Drain Bridge Option is in the area of the confluence with Fleet Drain.
	Loss of morphological diversity; change in structure of riverbed.	
	Impediment to downstream sediment transport.	
	Impact on flow dynamics due to impounding and/or constricting influence of crossing structures.	If existing culverts require widening, compensatory mitigation may be necessary through enhancement of the watercourse upstream and downstream of the culvert for a commensurate length. This would be determined in consultation with the Environment Agency, City of Doncaster Council and Danvm Internal Drainage Board, as appropriate.
		As part of the Scheme, a section of the culverted Fleet Drain would have the culvert removed. This current culvert is located on Fleet Drain east of Fenwick Hall.
		Depending on the design of any watercourse crossings, floodplain compensation may be required on a ‘like for like’ and ‘level for level’ basis. Alterations to surface water flow pathways will be considered and, if necessary, mitigated. In the event that

Scheme Component	Potential Impacts	Mitigation Measures
		open span crossings are installed, these will be designed to ensure no increase in flood risk.
Surface water drainage and outfalls	Loss of morphological diversity; change in structure of riverbed	A **Framework CEMP [EN010152/APP/7.7]** has been prepared which are secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]**. Mitigation measures described below have been secured within the Framework CEMP. The final location, position and orientation of any new outlet will be carefully determined and informed by a hydromorphological survey to minimise any adverse local impacts on river processes. If headwalls are required, appropriate micro-siting of the outfalls 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.

Table 9: Impact Assessment on the WFD Quality Elements of the Surface Water Bodies Screened-In for This Assessment

Scheme Component	Potential Impacts	Mitigation Measures
Biological Quality Elements		
Fish	**Trenched crossings** Temporary blockages in longitudinal connectivity from watercourse crossings. Potential direct impact on fish populations from disturbance of the bed and/or release of contaminated construction site runoff. **Watercourse crossings for Site 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 watercourse crossings for Site access. **Trenchless (HDD) crossing** 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).	The **Framework CEMP [EN010152/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. The **Framework CEMP [EN010152/APP/7.7]** also outlines measures to reduce the risk of spillages. It is proposed to carry out the works for trenched crossings 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. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20 m from watercourses on flat lying land. Send and receive pits for trenchless crossings will be located at least 10 m away from the watercourse to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. Water-based drilling fluids will be used.

Scheme Component	Potential Impacts	Mitigation Measures
		Impacts to biological continuity are not considered to be significant given the localised, small scale, and short-term nature of the works, and the small nature of most of the watercourses at the crossing locations which are heavily silted with generally low flows that are unlikely to provide preferable habitat for fish. With the proposed mitigation in place, it is not expected that there would be a significant impact to WFD quality elements.
Invertebrates	**Trenched crossings** Crossings of water bodies may cause direct mortality of invertebrates or the smothering of habitat with fine sediment and may interrupt continuity of invertebrate communities. **Watercourse crossings for Site access** Harm or direct mortality to invertebrates through excavation of the channel bed and bank. **Trenchless (HDD) crossings** Possible harm to invertebrates from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction (e.g. fuel and hydraulic oil)	The **Framework CEMP [EN010152/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. The **Framework CEMP [EN010152/APP/7.7]** also outlines measures to reduce the risk of spillages. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20 m from watercourses on flat lying land. Send and receive pits for open-cut crossings will be located at least 10 m away from the watercourse (bank top) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. Water based drilling fluids will be used.

Scheme Component	Potential Impacts	Mitigation Measures
		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 WFD quality elements.
Macrophytes and Phytobenthos	**Trenched crossings** Crossings of water bodies may cause the removal of macrophytes, and removal of the bed or macrophytes supporting phytobenthos. **Trenchless (HDD) crossings** 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 Order limits, and through disturbance when trenched techniques are used. **Watercourse crossings for site access** Possible removal of macrophytes and phytobenthos from excavation of the channel bed and bank.	The **Framework CEMP [EN010152/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. The **Framework CEMP [EN010152/APP/7.7]** also outlines measures to reduce the risk of spillages. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20 m from watercourses on flat lying land. Send and receive pits for trenchless crossings will be located at least 10 m away from the watercourse (bank top) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. Water based drilling fluids will be used. Before installation of the cable by the open-cut 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

Scheme Component	Potential Impacts	Mitigation Measures
		macrophytes cannot be retained, they will be replaced like for like. 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 WFD quality elements.
Physico-chemical Quality Elements		
Oxygenation conditions	**Trenched Crossings** Crossings of water bodies may increase loads of fine sediment and organic material to water bodies and decrease levels of dissolved oxygen. **Watercourse crossings for Site access** Possible reduction in levels of dissolved oxygen from excavation activities for launch and receive pits, and trenched crossing excavation activities which may create a source and pathway for the delivery of fine sediments and organic material to the water body.	The **Framework CEMP [EN010152/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. The **Framework CEMP [EN010152/APP/7.7]** also outlines measures to reduce the risk of spillages. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20 m from watercourses on flat lying land. Open-cut crossings and watercourse crossings for Site access will be carried out in dry weather when flow is at its lowest. Send and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of

Scheme Component	Potential Impacts	Mitigation Measures
		normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. With the proposed mitigation in place, it is not expected that there would not be a significant impact to oxygenation conditions.
Nutrient conditions	**Trenched crossings** Crossings of water bodies may increase sediment loads to watercourses and organic material from site clearance works. **Trenchless (HDD) crossings** Possible increase in nutrient levels from excavation activities for launch and receive pits, and trenched crossing excavation activities which may create a source and pathway for the delivery of fine sediments and organic material to the water body. **Watercourse crossings for Site access** Construction during culvert modification may increase sediment loads to watercourses and increase nutrient levels.	The **Framework CEMP [EN010152/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. The **Framework CEMP [EN010152/APP/7.7]** outlines measures to reduce the risk of spillages. Trenched crossings and watercourse crossings for Site access will be carried out in dry weather when flow is at its lowest. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20 m from watercourses on flat lying land. Send and receive pits for trenchless crossings will be located at least 10 m away from the watercourse (bank top) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. Water-based drilling fluids will be used.

Scheme Component	Potential Impacts	Mitigation Measures
		However, the impact will be localised, short term and temporary. Overall, the Scheme will likely reduce the flux of agricultural diffuse pollutants (sediment and excess nutrients) into watercourses as they flow through the Order limits. With the proposed mitigation in place, it is not expected that there would not be a significant impact to nutrient conditions.
Hydromorphological Quality Elements		
River continuity	**Trenched Crossings** Crossings will present a temporary blockage to continuity while excavation takes place. Watercourse crossings for site access can also interrupt river continuity. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches. There is no mechanism for non-intrusive crossings to affect this quality element. **Watercourse crossings for Site access** There will be some unavoidable short-term interruption to river continuity during the construction phase from modification of culverts for site access. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches.	The **Framework CEMP [EN010152/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 maintain flow continuity and channel form. Open-cut crossings will be carried out in dry weather when flow is at its lowest. 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 form. Modifications to culvert crossings for site access will be designed to maintain connectivity along watercourses for aquatic species and riparian mammals, where these are shown to be present. All culverts to convey watercourses will be set 150 mm below bed level to allow sedimentation

Scheme Component	Potential Impacts	Mitigation Measures
	Construction of outlet Outfall construction will result in some local disturbance to the continuity of the channel including flow and sediment transport processes	and a naturalised bed to form, which will maintain longitudinal connectivity. The final location, position and orientation of any new outlet will be carefully determined and informed by a hydromorphological survey to minimise any adverse local impacts on river processes. If headwalls are required, appropriate micro-siting of the outfalls 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. With the proposed mitigation in place for culvert crossings for site access, and the ephemeral or artificial nature of the majority of water bodies subject to trenched crossings, it is not expected that there would be a significant impact to river continuity.
River depth and width variation	**Trenched Crossing** Crossings may lead to local changes in channel profile to impact this element. **Watercourse Crossings for Site Access** Watercourse crossings for site access would also impact this element locally by their uniform, unchangeable nature. **Construction of outlet**	The **Framework CEMP [EN010152/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 maintain or improve channel form. 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 for watercourse crossings.

Scheme Component	Potential Impacts	Mitigation Measures
	Outfall construction will result in some local changes to the channel profile.	Reinstatement would aim to provide an improved channel form. Modifications to culvert crossings for site access will be designed to maintain connectivity along watercourses for aquatic species and riparian mammals, where these are shown to be present. All culverts to convey watercourses will be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity. The final location, position and orientation of any new outlet will be carefully determined and informed by a hydromorphological survey to minimise any adverse local impacts on river processes. If headwalls are required, appropriate micro-siting of the outfalls 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. 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	**Trenched crossings** Crossings may lead to local changes in bed substrate to impact this element. Watercourse crossings for site access can present an interruption to the natural bed substrate.	The **Framework CEMP [EN010152/APP/7.7]** will be followed for the installation of cables and watercourse crossings for Site access. 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

Scheme Component	Potential Impacts	Mitigation Measures
	There are possible changes to bed substrate upon reinstatement of the channel from trenched crossings. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches. **Watercourse crossings for site access** There will be some unavoidable changes to bed substrate during the construction phase from modification of culverts for site access. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches. **Construction of outlet** Outfall construction will result in some local disturbance to the bed substrate.	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. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing to ensure the reinstated improved structure and substrate of the river bed merges into the existing structure and substrate of the river bed. For sensitive water crossings, the working width will be reduced to 10 m. Modifications to culvert crossings for site access will be designed to maintain connectivity along watercourses for aquatic species and riparian mammals, where these are shown to be present. All culverts to convey watercourses will be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity. The final location, position and orientation of any new outlet will be carefully determined and informed by a hydromorphological survey to minimise any adverse local impacts on river processes. If headwalls are required, appropriate micro-siting of the outfalls 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.

Scheme Component	Potential Impacts	Mitigation Measures
		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.

6. Construction, Operation and Decommissioning Impacts

6.1 Potential Construction Impacts

6.1.1 There are a number of adverse impacts to the water environment which may occur from construction activity for the Scheme, 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 or temporary vehicle access as may be required;

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 potential culvert extension/modification works) and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches; and

e. Changes in flood risk due to the construction of Solar PV Panels, which may alter runoff from the Solar PV Site.

6.1.2 Further details are provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**.

6.2 Construction Mitigation

6.2.1 A **Framework CEMP [EN010152/APP/7.7]** has been prepared as part of the DCO Application and sets out the mitigation measures that would be undertaken during construction. The **Framework CEMP [EN010152/APP/7.7]** will be used as the basis for the contractor to prepare a detailed CEMP prior to construction and following the detailed design of the Scheme. The detailed CEMP is required to be substantially in accordance with the Framework CEMP under Requirement 11 within Schedule 2 of the **Draft DCO [EN010152/APP/3.1]**. The detailed CEMP would be a live document updated throughout the construction phase as required, for example, to reflect changes in legislation or contact details.

6.2.2 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.

6.2.3 It is anticipated that all WFD construction risks detailed in Section 3 and Section 5 could be adequately mitigated with the measures included in the **Framework CEMP [EN010152/APP/7.7]**. Therefore, there would be no detrimental impact to WFD water bodies during construction.

6.3 Potential Operational Impacts

6.3.1 There are a number of 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 on surface or groundwater quality as a result of the use of firewater in the event of a fire in the BESS Area;

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

d. Permanent hydromorphological impacts to watercourses;

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

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

6.3.2 Further details on the operation and maintenance activities are provided in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

6.4 Operational Mitigation

6.4.1 The operation will take place in accordance with the **Framework OEMP [EN010152/APP/7.8]** submitted with the DCO Application. This sets out the general environmental principles to be followed during the operation of the Scheme. The Framework OEMP will be used as the basis for a detailed OEMP to be prepared prior to commencement of operation.

6.4.2 The **Framework OEMP [EN010152/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.

6.4.3 The key elements of the Framework OEMP include:

a. An overview of the Scheme 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.

6.4.4 It is anticipated that all WFD operation risks detailed in Section 3 and Section 5 could be adequately mitigated with the measures contained within the **Framework OEMP [EN010152/APP/7.8]**. Therefore there would be no detrimental impact to WFD water bodies during operation.

6.5 Potential Decommissioning Impacts

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

6.5.2 When the operation and maintenance phase ends, the Solar PV Site would be decommissioned. All Solar PV Panels, mounting piles and concrete blocks, cabling, inverters, transformers, switchgear, BESS and the containerised unit of the Operations and Maintenance Hub would be removed from the Solar PV Site and recycled or disposed of in accordance with good practice and market conditions at that time.

6.5.3 Should the Grid Connection Cables be decommissioned, the mode of their decommissioning would be dependent upon government policy and good practice at that time. Currently, the most environmentally acceptable option is leaving the cables in situ, as this avoids disturbance to overlying land and habitats and to neighbouring communities. Alternatively, the cables can be removed by opening up the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the cable route.

6.5.4 As such, decommissioning impacts would be less than those during construction and would be mitigated by measures set out within the **Framework DEMP [EN010152/APP/7.9]**.

6.5.5 Further details are provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**.

6.6 Decommissioning Mitigation

6.6.1 The decommissioning will take place in accordance with the **Framework DEMP [EN010152/APP/7.9]** submitted with the DCO Application. The **Framework DEMP [EN010152/APP/7.9]** details the measures that would be undertaken during decommissioning to mitigate the temporary effects on the water environment.

6.6.2 The key elements of the Framework DEMP include:

a. An overview of the Scheme and associated decommissioning programme;

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

c. Reduction of potential adverse impacts through mitigation measures;

d. Monitoring of effectiveness of mitigation measures;

e. Corrective action procedure; and

f. Links to other complementary plans and procedures.

7. Assessment of the Scheme Against WFD Objectives

7.1.1 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 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 Scheme may prevent such measures being implemented.

7.1.2 The Environment Agency was consulted on water body objectives and HMWB 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.

7.1.3 Therefore, this section only assesses whether the Scheme aligns with the measures which are actions that can be implemented. However, due to the outlined activity and construction mitigation measures being undertaken by the Scheme as set out in Section 3.3 and Section 5.1, it is unlikely that the Scheme would not align with HMWB mitigation measures.

7.1.4 The Scheme has been appraised against measures for screened-in WFD water bodies in Table 10.

Table 10: Appraisal of the Scheme against the delivery of measures identified for the waterbodies screened into this assessment

WFD Water body	Measure Theme	Further Detail on Measure	Appraisal of the Scheme
Went from Blowell Drain to the River Don (GB104027064260)	To control or manage rural diffuse pollution	Ensure safe storage of on-farm pollutants including slurry, silage, fuel oils, pesticides	Removal of operational farmland within the Order limits to accommodate the Scheme may reduce water quality risk to watercourses associated with diffuse agricultural chemicals and possibly reduce soil erosion and the need for local abstractions for irrigation, thereby providing a beneficial impact.
		Limit fertiliser and chemical application	
	To control or manage point source inputs	Install nutrient reduction	Activities related to the Scheme would not be expected to have an impact on these measures.
		Improve Sewage Treatment Works to meet an amended permit limit	
Don from Mill Dyke to River Ouse	To improve modified habitat	Improve floodplain connectivity	Extension/modification of culverts for access track crossings over watercourses would be small scale and

WFD Water body	Measure Theme	Further Detail on Measure	Appraisal of the Scheme
			would be unlikely to have an impact on this measure
	To control or manage point source inputs	Install nutrient reduction	Activities related to the Scheme would not be expected to have an impact on these measures.
Ea Beck from the Skell to River Don	To improve modified habitat	Improvement to condition of channel/bed and or banks/shoreline	There will be some unavoidable temporary disturbance during the construction phase of open-cut crossings, but this will be over a relatively short timeframe. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches and not thought to be sensitive to such works. Therefore, the Scheme would not impact the implementation of these measures.
Bramwith Drain from Source to River Don	To control or manage diffuse source inputs	Reduce diffuse pollution at source	Removal of operational farmland within the Order limits to accommodate the Scheme may reduce water quality risk to watercourses associated with diffuse agricultural chemicals and possibly reduce soil erosion and the need for local abstractions for irrigation, thereby providing a beneficial impact.

Assessment Against WFD Objectives

7.1.5 The compliance of the Scheme 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 Scheme will cause deterioration in the Ecological Potential or Status of a water body;

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

c. Whether the Scheme 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 Scheme will contribute to the delivery of the WFD objectives (e.g. mitigation measures).

7.1.6 The WFD compliance assessment for the Scheme is summarised in Table 11; which concludes the Scheme is expected to be compliant with the objectives of the WFD.

Table 11: Compliance assessment of the Scheme

Compliance Elements	Water Body Assessment	Groundwater Body Assessment
Deterioration in the status/potential of the water body	The Scheme is not anticipated to cause a deterioration in potential due to the embedded environmental mitigation.	The Scheme 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 Scheme 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 embedded environmental mitigation.	The Scheme and associated mitigation would not prevent the water body reaching Good Status due to the 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 Scheme and the mitigation measures proposed due to the embedded environmental mitigation.	No wider impacts are anticipated associated with the Scheme and the mitigation measures proposed due to the embedded environmental mitigation.
Ability to contribute to the delivery of the WFD objectives	The Scheme does contribute to the delivery of WFD objectives within the Order limits through enhancements at the re-establishment stage as outlined in Section 5.1.	The Scheme does contribute to the delivery of WFD objectives.

8. Conclusion

8.1.1 This assessment has considered the potential impacts and associated mitigation of the Scheme in relation to the WFD quality elements of the following surface and groundwater bodies

a. Went from Blowell Drain to the River Don (GB104027064260);

b. Don from Mill Dyke to River Ouse (GB104027064243);

c. Bramwith Drain from Source to River Don (GB104027063290);

d. Ea Beck from the Skell to River Don (GB104027057591); and

e. Aire and Don Sherwood Sandstone (GB40401G701000).

8.1.2 The assessment demonstrates that the Scheme is compliant with the objectives of the WFD.

8.1.3 Following mitigation as described in Section 5 and Section 6 it is concluded that the Scheme would not cause deterioration in the existing conditions of any surface or groundwater water bodies, and would not jeopardise any surface or groundwater bodies attaining Good Ecological Status or Potential in the future.

8.1.4 Some local impacts to aquatic habitat networks are unavoidable during the construction and operation and maintenance phase, but impacts would not be destructive with suitable environmental construction management and operational management measures in place. Those impacts would be temporary and would not prevent the self-recovery of local habitats once construction is complete.

9. References

Ref. 1 His Majesty's Stationery Office (HMSO) (2008). The Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Accessed 1 August 2024]

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. [Accessed 1 August 2024].

Ref. 3 HMSO (2016) The Environmental Permitting (England and Wales) Regulations 2016 Available at: https://www.legislation.gov.uk/uksi/2016/1154/regulation/12/2018-04-18 [Accessed 1 August 2024].

Ref. 4 Environment Agency (2022) Humber river basin district river management plan: updated 2022. Available at https://www.gov.uk/guidance/humber-river-basin-district-river-management-plan-updated-2022. [Accessed 1 August 2024].

Ref. 5 Environment Agency (2016). 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. [Accessed 1 August 2024].

Ref. 6 The Planning Inspectorate (2024) Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive Available at: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive. [Accessed 24 September 2024].

Ref. 7 Environment Agency (2016). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers. [Accessed 1 August 2024].

Ref. 8 Environment Agency Catchment Data Explorer website. Available at: https://environment.data.gov.uk/catchment-planning/. [Accessed 1 August 2024].

Ref. 9 The Department for Environment, Food and Rural Affairs (Defra)'s Multi Agency Geographical Information for the Countryside website. Available at: https://magic.defra.gov.uk/magicmap.aspx. [Accessed 1 August 2024].

Ref. 10 Historic mapping: National Library of Scotland.

Ref. 11 British Geological Survey Borehole and online mapping.

Ref. 12 Cranfield Environment Centre. Land Information System (LandIS). Soilscapes viewer.

Ref. 13 Bing Maps.

Ref. 14 National River Flow Archive website.

Ref. 15 Met Office website (2023), Robin Hood Doncaster Sheffield Airport. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcx21p9fr [Accessed 1 August 2024].

Ref. 16 Environment Agency Fish and Ecology Data Explorer. Available at: https://environment.data.gov.uk/ecology/explorer/. [Accessed 1 August 2024].

Ref. 17 Environment Agency Water Quality Archive. Available at: https://environment.data.gov.uk/water-quality/view/landing. [Accessed 1 August 2024].

Ref. 18 Woods Ballard B, Wilson S, Udale-Clarke H et al (2015) The SuDS manual. CIRIA, London.

Ref. 19 Gov.uk (2019) Water supply, wastewater and water quality Guidance. Available at: https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality. [Accessed 1 August 2024].

BOOM
POWER

BUILD | OWN | OPERATE | MAINTAIN

BOOM-POWER.CO.UK