Gate Burton Energy Park

Preliminary Environmental Information Report

Volume 3, Appendix 9A: Water Framework Directive Screening Assessment

June 2022

Gate Burton Energy Park Limited

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Quality information

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1 Introduction

1.1 Background

1.1.1 This WFD Screening and Scoping Appendix has been produced in support of the Preliminary Environmental Impact (PEI) Report for Gate Burton Energy Park (hereafter referred to as 'the Scheme'). In particular it relates to **PEI Report Volume 1, Chapter 9: Water Environment**.

1.1.2 The Scheme will comprise the construction, operation, maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility and energy storage facility with a total capacity exceeding 50 megawatts (MW) and export connection to the National Grid. The DCO Site comprises an area of 1,426 ha which straddles the boundary between the counties of Nottinghamshire and Lincolnshire, within the districts of Bassetlaw and West Lindsey. The DCO Site comprises the Solar and Energy Storage Park Site and the Grid Connection Route. Refer to **PEI Report Volume 2: Figure 9-1** which shows the DCO Site boundary in relation to water environment attributes.

1.1.3 Full details of the various Scheme components are provided in **PEI Report Volume 2: Chapter 2 The Scheme**.

1.1.4 The Scheme interacts with eight Water Framework Directive (WFD) water bodies (six surface water and two groundwater bodies, see **PEI Report Volume 2: Figure 9-1**) 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 impact of new solar PV Panels, supporting infrastructure, site drainage and cable crossings of water bodies on the biological, physico-chemical and hydromorphological quality elements that comprise the WFD to ensure no deterioration and no prevention of future improvement in water body status. Both surface and groundwater bodies are considered.

1.1.5 In accordance with the Planning Inspectorate's Advice Note Eighteen (Ref 1), a three-stage approach may be adopted:

- **Stage 1: WFD Screening** - Identification of the proposed activities that are to be assessed and determination of which WFD water bodies could potentially be affected through identification of a Zone of Influence. This step also provides a rationale for any water bodies screened out of the assessment.
- **Stage 2: WFD Scoping** - For each water body identified in Stage 1, an assessment is carried out to identify the effects and potential risks to water quality elements from all activities. The assessment is made taking into consideration embedded mitigation (measures that can reasonably be incorporated into the design of the proposed works) and any additional mitigation that may be identified.
- **Stage 3: WFD Impact Assessment** - A detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages.

1.1.6 This report therefore presents the findings of an initial WFD screening exercise (the first stage in the WFD assessment process) which has been undertaken in relation to the Scheme.

1.1.7 Detailed scoping and full assessment of WFD compliance (if required following scoping) will be undertaken in support of the Environmental Statement that forms part of the Development Consent Order (DCO) submission once further Scheme details have been finalised.

1.2 Study Area

1.2.1 The Scheme is located approximately 4 km south of Gainsborough, within the administrative areas of West Lindsey District Council and the Lincolnshire County Council. The DCO Site boundary is shown in **PEI Report Volume 2: Figure 9-1.**

1.2.2 For the purposes of this assessment, and consistent with **PEI Report Volume 1, Chapter 9: Water Environment**, a general study area (Zone of Influence) of approximately 1km from the DCO Site boundary 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 watercourses flow and 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 the water body. Professional judgement has been applied to identify the extent to which such features are considered. In this case, watercourses across the study area generally drain to the River Trent which is considered the final receiving waterbody that could conceivably be affected, with 1km downstream of the Scheme being a suitable distance given the size of the waterbody.

1.2.3 The study area falls within the following surface water body catchments:

- Trent from Carlton-on-Trent to Laughton Drain (WFD ID: GB104028058480);
- Till (Witham) (WFD ID: GB105030062500);
- Tributary of the Till (WFD ID: GB105030062480);
- Marton Drain Catchment (Trib of Trent) (WFD ID: GB104028057840);
- Seymour Drain Catchment (WFD ID: GB104028058340); and
- Skellingthorpe Main Drain waterbody (WFD ID: GB105030062390).

1.2.4 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.

1.2.5 The study area is also underlain by two WFD groundwater bodies: Lower Trent Erewash – Secondary Combined (WFD ID: GB40402G990300); and Witham Lias (WFD ID: GB40502G401400).

1.2.6 Further baseline details and WFD classifications for each of the WFD waterbodies is given in Annex A. Also refer to **PEI Report Volume 2: Figure 9-1** for WFD waterbody locations in relation to the Scheme.

1.3 Introduction to the Water Framework Directive

1.3.1 The WFD, EC Directive 2000/60/EC, (Ref 2) aims to protect and enhance the quality of the water environment across all European Union (EU) member states. England and Wales have adopted the WFD as national law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 3). Following the departure of the United Kingdom from the European Union these Regulations continue to apply until they are revoked or superseded by new legislation.

1.3.2 The WFD takes a holistic approach to the sustainable management of water by considering the interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem quality is evaluated according to interactions between biological, physico-chemical and hydromorphological elements (or 'Quality Elements').

1.3.3 Under the WFD, 'Water bodies' are the basic management units and are defined as all or part of a river system or aquifer. Water bodies form part of larger River Basin Districts (RBD), for which River Basin Management Plans (RBMPs) are developed and environmental objectives are set. The DCO Site is located between the Witham Management Catchment within the Anglian RBMP and the Lower Trent and Erewash Management Catchment within the Humber RBMP.

1.3.4 RBMPs are produced every six years, in accordance with the river basin management planning cycle. Cycle 2 plans were published in February 2016, and the most recent RBMP data available on the online Catchment Data Explorer is from 2019, which are due to be updated to Cycle 3 plans in 2021 (not yet published at time of writing in May 2022, and due to be submitted to the Secretary of State for approval by September 2022).

1.3.5 The WFD requires water bodies to be classified according to their current condition (i.e. the 'Status' or 'Potential,' depending on whether they are heavily modified or artificial water bodies) and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach Good Status or Potential.

1.3.6 The Environment Agency is under a duty to exercise its relevant functions so as to best secure that the requirements of WFD for the achievement of environmental objectives are co-ordinated. The Planning Inspectorate's Advice Note 18 (Ref. 1) summarises the overall aims and objectives of the WFD as to:

- Enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystems;
- Ensure progressive reduction of groundwater pollution;
- Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants;

- Contribute to mitigating the effects of floods and droughts;
- Promote sustainable water use; and
- Achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (or good ecological potential in the case of artificial or heavily modified water bodies).

1.3.7 As a result, new developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the WFD objectives of the potentially affected water bodies. It must be demonstrated that there is no deterioration or prevention of future improvement against any WFD element for a designated waterbody.

1.3.8 Regulation 33 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (i.e. the WFD) states that, like other public bodies, local authorities have a statutory duty to *"have regard to the River Basin Management Plan"* and *"any supplementary plans"* covering proposed activities when exercising its functions. Local authorities must therefore reflect water body improvement priorities as outlined in RBMPs.

1.3.9 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, the EA and partnering organisations must also consider the conservation objectives of any Protected Areas (i.e. sites within the national site network or water dependent Sites of Special Scientific Interest) and adjacent WFD water bodies, where relevant.

2. Methodology

2.1.1 Guidance on how to undertake WFD assessments can be found in the Environment Agency's 'Water Framework Directive risk assessment - How to assess the risk of your activity' (Ref 4) and Planning Inspectorate's 'The Water Framework Directive - Advice note eighteen: The Water Framework Directive' (Ref 1). These guidance documents have informed the approach taken in this screening exercise.

2.1.2 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 described by The Planning Inspectorate (Ref 1) is the approach taken in this assessment, and is briefly summarised below.

Stage 1: Screening

2.1.3 Screening identifies the zone of influence of a proposed development, and if proposed activities pose a risk to the water environment. It is used to identify if there are activities that do not require further consideration for WFD objectives, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.

Stage 2: Scoping

2.1.4 Scoping is used to identify any potential impacts of the proposed activities to specific WFD receptors and their water quality elements. This involves review of WFD impact pathways, shortlisting which WFD water bodies and quality elements could or could not be affected by proposed activities, and collecting baseline information from the relevant RBMP on the status and objectives for each water body.

Stage 3: Impact Assessment

2.1.5 This involves rationalised assessment of water bodies and quality elements that could be affected by proposed activities, in order to identify any areas of WFD non-compliance. Proposed activities are reviewed in terms of both positive and negative impacts, and the baseline mitigation measures, enhancements, and contributions to the WFD objectives described in the RBMP. Any proposed activities with potentially deleterious impacts are reviewed simultaneously with their corresponding mitigation proposals, to determine a net effect on WFD objectives.

Mitigation Commitments

2.1.6 Proposed mitigation activities that the Scheme relies upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and secured.

Article 4.7 Derogation

2.1.7 Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration or failure to improve can be avoided, the project would need to be assessed in the context of Article 4.7 of the Directive. Where a derogation is necessary, Applicants will need to provide the necessary information to justify their case, bearing in mind that Applicants must always seek to avoid deterioration of the water environment. It is a matter for the Secretary of State to consider whether derogation under Article 4.7 is justified in relation to a proposed development. At this stage a derogation under Article 4.7 is not considered necessary.

2.2 Desk Study

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

- WFD status and objectives from the appropriate River Basin Management Plan for Cycle 2 data, available from the Catchment Data Explorer (Ref 5);
- Defra's Multi-agency geographical information for the countryside website (MAGIC), including contemporary Ordnance Survey (OS) maps (Ref 6);

- Historical maps (Ref 7);
- British Geological Survey maps (Ref 8);
- Soilscapes website (Ref 9);
- Aerial photography (Ref 10);
- Hydrological information (Ref 11);
- Climate information (Ref 12);
- Environment Agency Fish and Ecology Data Viewer (Ref 13); and
- Environment Agency Water Quality Archive website (Ref 14).

2.2.2 A summary of the WFD waterbodies in the study area is provided in Annex A: WFD Waterbodies baseline. For a full summary of the baseline conditions for the study area refer to **PEI Report Volume 1, Chapter 9: Water Environment**.

2.3 Field Survey

2.3.1 An initial site walkover survey was undertaken by a water scientist and hydromorphologist on 22nd September 2021 in fair conditions to assess watercourse connectivity, quality, and condition. An additional walkover of the Grid Connection Route was undertaken on 8th February 2022 in overcast, dry conditions.

2.4 Assumptions and Limitations

2.4.1 This Screening exercise is based on baseline and Scheme design information available at the time of writing in May 2022. It is based on the Scheme design set out in **PEI Report Volume 1, Chapter 2: The Scheme** and further information provided in **PEI Report Volume 1. Chapter 9: Water Environment**.

2.4.2 A request for water resources data (e.g. licensed abstractions, Water Activity Permit locations, pollution incident locations), WFD information (including waterbody mitigation measures) and water quality and flow data was requested from the Environment Agency to inform the desk study in March 2022. A response had not been received at the time of writing in May 2022. Any data received will be considered within the further WFD assessment at the ES stage. Nonetheless, it is considered that sufficient baseline information has been gathered from desk study and site survey to enable a robust screening exercise to be undertaken.

2.4.3 At the time of writing, the full details regarding locations and methodologies of construction and installation of the cable within the Grid Connection Route has not been confirmed. However, the River Trent will be crossed using underground techniques (e.g. horizontal directional drilling techniques that would not disturb the watercourse), with the maximum depth of the cable below the bed being 12m. Construction methods including the size and depths of any launch or receiving pits are yet to be confirmed. Smaller watercourse crossings are currently assumed to require open cut installation techniques. As such, open cut crossings are assumed as a worst-case scenario at this

stage (but will be reviewed for the final WFD assessment at the ES stage). For these crossings it is assumed that water flow would be maintained by damming and over pumping. Several of the ditches within the DCO Site boundary are ephemeral and if works could be carried out in the drier months this would reduce the risk of pollution propagating downstream, although this cannot be guaranteed and thus no weight has been attributed to this at this stage. It will be a requirement that the watercourses are reinstated as found and water quality monitoring will be undertaken prior to, during, and following on from the construction activity.

2.4.4 The PV Panels will be off set from watercourses. The point of measurement will be agreed with the Environment Agency through further consultation, but for the purposes of the assessment it is assumed for all watercourses other than the River Trent to be measured from the centre line of the watercourse as determined from Ordnance Survey mapping. This avoids issues related to determining the watercourse edge in situations where this varies considerably as flow rate changes. This buffer will ensure all construction activities for the installation of PV Panels would be offset from surface watercourses, other than where there is a need for crossing of a watercourse (for cabling installation or possible temporary access) of temporary discharge of treated construction site runoff. Any works to enhance watercourses would require direct works to the channel and banks, although given the aim of these works and their small-scale and 'soft-engineering' nature, construction impacts would be minimal. Overall, the purpose of this buffer reduces the risk of any pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences) should they be required.

2.4.5 The risk from surface water runoff to surface or groundwater bodies has been provisionally considered qualitatively on the basis of design principles that will be presented in an outline drainage strategy at the ES stage, and delivery of this will be a requirement under the DCO. As part of the full environmental impact assessment and WFD assessment, the risk from surface water runoff from new hard standing to surface or groundwater bodies will be assessed according to the Simple Index Approach presented in the C753 The SuDS Manual. It is expected on the basis of professional judgement that the pollutant risk will not be very high from runoff given that it will predominantly consist of runoff from panels for the majority of the Solar and Energy Storage Park Site, and so only one layer of treatment may be required. It is also expected that there will be sufficient space within the Solar and Energy Storage Park Site for a treatment solution following SuDS principles. However, there is also potential to use proprietary measures where there is a greater risk around certain infrastructure or there are localised constraints.

2.4.6 Removal of productive arable farmland within the DCO Site to accommodate the Scheme will reduce water quality risk to watercourses associated with diffuse agricultural chemicals and possibly reduce soil erosion and need for local abstractions for irrigation, thereby providing a beneficial impact. However, there is limited data on the existing conditions and activities, therefore no further consideration has been given to this potential benefit at this stage.

2.4.7 There will be welfare facilities associated with the Scheme for up to four permanent FTE members of staff. Given the low daily occupancy only small volumes of foul drainage will be generated. At the time of writing it is not known how any wastewater from permanent welfare facilities will be managed. However, this is anticipated to consist of a self-contained independent non-mains domestic storage and/or treatment system. An alternative where this is not possible, would be for a self-contained foul drainage system to a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

3. WFD Screening

3.1.1 The purpose of the WFD screening stage as outlined in PINS Advice Note 18 (Ref. 1) 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 in this section.

3.1.2 A study area of approximately 1 km from the DCO Site 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 at the ES stage. Justification is provided where water body receptors are screened out and are not carried forward through the assessment. Water bodies or activities screened 'out' of the assessment will therefore not be considered further at the impact assessment stage, subject to agreement being obtained from the Environment Agency.

3.1 Screening of WFD Water Bodies

3.1.1 The Scheme interacts with eight WFD water bodies. WFD Screening of these water bodies is provided in Table 3 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.

Table 3-1 Screening of WFD waterbodies potentially impacted by the Scheme

Waterbody (ID)	Screening Outcome	Justification
Trent from Carlton-on-Trent to Laughton Drain (GB104028058480)	In	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 construction, operation and decommissioning phases of the Scheme.
Tributary of the Till (GB105030062480)		
Marton Drain Catchment (Trib of Trent) (GB104028057840)		
Seymour Drain Catchment (WFD ID: GB104028058340)		
Lower Trent Erewash – Secondary Combined (GB40402G990300)	In	Activities relating to the construction and operation of the Scheme have been assessed in terms of their potential impact upon these groundwater water bodies. There are potential anticipated impacts at the water body scale, therefore assessment of impacts to groundwater is scoped in.
Witham Lias (GB40502G401400)		
Till (Witham) (GB105030062500)	Out	The River Till is located at the far eastern extent of the study area, and would not be directly impacted by the Scheme. However, it is hydrologically connected to the Scheme via the 'Tributary of the Till' WFD waterbody. The Tributary of the Till's confluence with the River Till is 1.4 km downstream of the Scheme boundary. The Skellingthorpe Main Drain is approximately 10km south of the DCO Site and flows south-east from near Saxilby towards Lincoln. Given its distance from the Scheme there would be no direct physical interaction between Scheme activities and the drain. The wider WFD catchment for the waterbody covers much of the Solar and Energy Storage Park and so there is potential for hydrological connectivity to the watercourse via the drains and tributaries that extend into the Solar and Energy Storage Park. Despite hydrological connectivity to these WFD designated watercourses it is anticipated that any water quality impacts related to construction runoff or spillages that have potential to enter these tributaries will be adequately mitigated by the Construction Environmental Management Plan (CEMP), which will be secured under the DCO, and Water Management Plan (WMP). The CEMP will be standard procedure for the Scheme and will describe the principles for the protection of the water environment during construction. The CEMP will be supported by the WMP appendix, that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during
Skellingthorpe Main Drain waterbody (WFD ID: GB105030062390)		
Witham Lias (GB40502G401400)		

Waterbody (ID)	Screening Outcome	Justification
		construction including requirements for water quality monitoring. A Framework CEMP will be prepared and will accompany the ES. Given this mitigation and the lack of any direct works to these waterbodies, it is considered that they can be screened out of further assessment.

3.2 Screening of Activities

3.2.1 As described in Section 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 3-2 together with a screening assessment. The WFD screening assessment will be kept under review as more detailed Scheme information becomes available.

Table 3-2 Screening of the Scheme's development activities against WFD quality elements

Activity	Description	Screening Outcome	Justification
Solar PV Panels and PV Mounting Structures which combine to form PV tables	Solar PV Panels will be mounted 0.8m above ground level on PV Mounting Structures (except in higher flood risk areas where they will be 1.1m above ground level). This will avoid creation of an impermeable surface on the ground or the need for extensive earthworks. PV Panels will also not be located within close proximity of watercourses within the Solar and Energy Storage Park. Mounting poles will generally be driven or screwed into the ground to an indicative depth of 2m. Concrete pad foundations will be used in areas identified for no beneath ground intrusion. (**see PEI Report Volume 1, Chapter 2 The Scheme**).	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340) – due to location west of the Trent and not related to the Solar and Energy Storage Park.	There are no direct hydromorphological impacts to watercourses given the buffer from panel tables. An Outline Surface Water Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from the operational Solar and Energy Storage Park. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Use of mounting structures for PV Panels will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the DCO Site's impermeable area will remain largely consistent with its pre-development state. However, runoff from the PV Panels will alter the existing routing of runoff. To prevent ponding occurring around the PV Panels, a series of boundary and routing swales will be constructed to convey surface water runoff away from the PV Panels and towards receiving watercourses. However, these will be grassed and will have the minimum gradient to provide conveyance but not to encourage scour and soil erosion. Additional attenuation in the form of SuDS will be incorporated to control any increase in the rate of flow towards receiving watercourses, and to provide treatment for any contaminants collected on areas of hardstanding. The rate of runoff from each development location within the whole Solar and Energy Storage Park would ensure nil detriment in terms of no increase in runoff rate from the Site to receiving watercourses. In addition, the risk of agricultural diffuse pollution would be reduced from the change in land use as the application of agro-chemicals, inorganic and organic fertilisers to crops. On the basis of existing borehole scans available on the Geoindex website (Ref 8), groundwater levels are variable across the area, with some groundwater encountered at relatively shallow levels less than

Activity	Description	Screening Outcome	Justification
			2m below the ground, for instance towards Kexby and Cottam. Alluvium deposits may also carry water at relatively shallow depths, although these are predominantly around watercourses where there will be no construction aside from the crossings for access tracks and cable routes. As no continuous foundations are in the design and given that groundwater is anticipated to be largely below 2m across the majority of the DCO Site, the shallow, regularly spaced discrete strut PV Panel foundations are considered to have a negligible impact on groundwater flow. The DCO Site 1km study area is not known to have a significant history of potentially contaminating land uses such as landfill, although there are areas of infilled land and made ground associated with historic quarries and pits. The installation of the module structures to a maximum depth of 2m below ground, are not considered to create a significant risk of mobilising contaminants,
Power Conversion Station (for transformers, switchgear and metering equipment)	The Power Conversion Station will comprise of inverters, transformers, and switchgear, which can be grouped together or distributed throughout the Solar and Energy Storage Park. The Power Conversion Station can sometimes be enclosed in a single container. Indicative foundations will be at a depth of around 1.6m.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340) – due to location west of the Trent	Infrastructure will not be located within close proximity of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. An Outline Surface Water Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from the operational Solar and Energy Storage Park including areas of hardstanding associated with on-site substations. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. Indicative foundations for the Power Conversion Station a maximum depth of 1.6m, which will likely be above the water table across the majority of the site, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no

Activity	Description	Screening Outcome	Justification
		and not related to the Solar and Energy Storage Park.	impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
Battery Energy Storage Systems (BESS) Compound(s)	The compound will include battery storage containers, battery inverters, transformers and switchgear and access tracks. Access tracks are considered separately below. The BESS compound has a footprint up to 210m x 290m. It will have a concrete base or monolith plinth. Maximum depth of 1m.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340); Witham Lias (GB40502G401400).	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. An Outline Surface Water Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from areas of hardstanding associated with the BESS Compound. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Transformers will be installed with suitable bunds to contain any oil spillage in case of an oil-leakage event. Bunds will be designed to contain at least 110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. Under normal conditions any rainwater collected within the bund will be removed by use of special pump, which automatically switches off if it detects the smallest presence of oil in the water. Pumps will be linked to control and monitoring equipment to raise alarms if oil is detected. In the unlikely event of a malfunction to one of the battery arrays, there is a range of integrated controls that will 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 battery arrays 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. Consultation with the emergency services will be undertaken as part of the applicant's pre-application work. Further details regarding management of firewater will be outlined in the Outline Drainage Strategy.

Activity	Description	Screening Outcome	Justification
			Given the above mitigation which will be secured through the DCO, there are considered no mechanisms for impacts to surface water bodies. Indicative foundations for the BESS Compound specify that it will have a maximum depth of 1m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
On-Site Cabling	Low voltage on-site electrical cabling is required to connect the PV modules and battery energy storage system(s) to inverters (typically via 1.5/1.8kV cables), and the inverters to the transformers on-site (typically via 0.4/1 kV cables). The dimension of the trenches will vary depending on the number of ducts they contain but could typically be up to 1.2m in width and 0.8m to 1.2m in depth. Medium voltage cables (around 33kV) are then required between the transformers and the switchgear and from switchgear to the on-site electrical infrastructure. The dimension of the trenches will vary depending on the number of circuits they contain but could be typically up to 1.2m in width and up to 1.2m in depth. Where possible, the higher voltage cables will share trenches with the lower voltage cables on the same route.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	Indicative trench depths for the On-Site cabling specify that it will have a maximum depth of 1.2m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. There are not known to be any watercourse crossings required for on-site cabling, but this will be reviewed at the ES stage to confirm that this is the case. Water quality impacts related to construction runoff or spillages that have potential to enter watercourses will be adequately mitigated by the Construction Environmental Management Plan (CEMP), which will be secured under the DCO, and Water Management Plan (WMP) which would be an appendix to the final CEMP.
On-Site Substation	On-site substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate the export of electricity	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Trent from Carlton-on-Trent to	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies.

Activity	Description	Screening Outcome	Justification
	from the Site to the National Grid. There are a number of different designs being explored but the most likely scenario is a single on-site substation with a footprint of up to 250m x 160m in plan. At this stage foundations depths are not expected to be greater than those indicated for the Power Conversion Station (i.e. maximum 1.6 m depth).	Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340); Witham Lias (GB40502G401400).	An Outline Surface Water Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from areas of hardstanding associated with the On-Site Substation. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Transformers will be installed with suitable bunds to contain any oil spillage in case of an oil-leakage event. Bunds will be designed to contain at least 110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. Under normal conditions any rainwater collected within the bund will be removed by use of special pump, which automatically switches off if it detects the smallest presence of oil in the water. Pumps will be linked to control and monitoring equipment to raise alarms if oil is detected. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. It is anticipated that foundations for the On-Site Substation will not exceed 1.6m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. However, as foundation depths have not been finalised, this will be reviewed at the ES stage.
New buildings – Control building and office building	Electrical compound control building has maximum parameters of 20m by 20m footprint and 6m in height, adjacent to the BESS Compound. The office/warehouse building has maximum parameters of 36m by 15m and 7.2m in height. For the purposes of the screening the foundations are assumed to be similar to the	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480);	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. An Outline Surface Water Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from areas of hardstanding associated with new buildings. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality

Activity	Description	Screening Outcome	Justification
	BESS Compound and Power Conversion Station, with a maximum depth of 1.6m. This will be confirmed at the full ES stage.	Marton Drain Catchment (Trib of Trent) (GB104028057840).	treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies.
		Not applicable - Seymour Drain Catchment (WFD ID: GB104028058340).	It is anticipated that foundations for the On-Site Substation will not exceed 1.6m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. However, as foundation depths have not been finalised, this will be reviewed at the ES stage.
Foul Drainage	At this point in time it is not confirmed how any wastewater will be managed but it is expected that the low volumes of foul drainage generated (related to four operational staff) will be self-contained in independent non-mains domestic storage and / or a treatment system. These would be regularly emptied under contract with a registered recycling and waste management contractor. Should a connection to a foul sewer be required as an alternative option, Anglian Water would be consulted at the appropriate time. A third option may involve a direct discharge of treated effluent to a watercourse, but this would require a much more detailed assessment and a permit from the Environment Agency. At this point in time, it is considered that this option is not viable, and it is not considered any further. Should it be required in the future it would be considered by the Environment Agency	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840); Seymour Drain Catchment (WFD ID: GB104028058340).	As there would be no discharge of foul water to a waterbody, and only small volumes would either be discharged to a foul sewer indirectly via a suitable waste management contractor, or directly with Anglian Water consent, no further WFD assessment of foul waste from the Scheme is proposed.

Activity	Description	Screening Outcome	Justification
	under the water discharge activity regime in accordance with the Environmental Permitting (England and Wales) Regulations 2016 which ensures the effects of any such discharge would be appropriately regulated.		
Access Tracks	Access tracks will be constructed across the Solar and Energy Storage Park which will typically be 3.5m to 6m wide compacted stone tracks with 1:2 gradient slopes on either side. The internal road layout has been designed to avoid drainage ditch and watercourse crossings wherever possible. As a design principle, culverts will be avoided wherever possible. Where a drainage ditch crossing is required, an open span bridge will be used with the abutments set back from the top of the bank surrounding the watercourse. Open span bridges will use non-intrusive pad foundations. The expected locations of these crossings (13 identified at this stage) are shown in **PEI Report Volume 2, Figure 9-1** and are found at NGRs SK 85469 84096, SK 84954 83943 (existing farm crossing), SK 85133 83137 (existing farm crossing), SK 85524 82977 (existing farm crossing), SK 86064 83350, SK 84059 85163 (existing crossing), SK 84980 82590, SK 85274 82877, SK 86331 83492, SK 86526 83464, SK 86856 83350, SK 86994 83337, and SK 86654 83227. Locations will be reviewed and updated within the ES, with further details on the	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	No WFD designated watercourses are directly impacted but works would be to existing agricultural ditches which may have some connectivity to these watercourses. The affected agricultural ditches are ephemeral/intermittently flowing and when visited on site in September 2021 they were generally dry or had ponded standing water that was not flowing at the crossing locations. Nevertheless, when flowing the potential for adverse water quality impacts exists from runoff containing fine sediments and chemical spillages relating to use of plant adjacent to the watercourses, and structural works to install crossings in the riparian margins and over the watercourses. Given the limited potential for conveyance in these generally dry watercourses, any impact would be expected to remain very localised. In addition, where possible works would be timed to coincide with drier periods. In addition, best practice measures as outlined in the CEMP and WMP would minimise any adverse water quality impacts to these ditches. At the WFD waterbody scale, there is not considered any potential for non-compliance with WFD objectives based on the installation of open span crossings. There is no anticipated mechanism for impacts to the groundwater body, as no significant changes in runoff patterns compared to existing are expected from the internal access tracks.

Activity	Description	Screening Outcome	Justification
	crossing design provided as the design evolves. The intention is to use open span crossings and not introduce any new culverts for temporary or permanent access routes. Tracks should be permeable, and localised SuDS, such as swales and infiltration trenches, should be used to control runoff. Should there be any need for culverts identified that is unavoidable, then equivalent watercourse improvement would be provided (i.e. on a length for length basis) although no culverting is expected to be required at this stage.		
Surface Water Outfalls	The Outline Drainage Strategy for the Scheme is still under development. It is expected that the Scheme will require new surface water outfalls to watercourses for drainage purposes. This will require review at the ES stage. It is proposed that the location, position and orientation of any new drainage outfalls required by the drainage strategy will be carefully determined and informed by a hydromorphological survey to minimise any adverse local impacts on river processes. Appropriate micro-siting of the outfall will minimise loss of bank habitat, the need for bed scour or hard bank protection, and localised flow disturbance or disruption to sediment transport processes. It will also avoid the creation of 'dead' spaces with sedimentation and vegetation blockage risks and to that effect it is not proposed that outfalls are recessed into the bank.	**In** - Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	Surface water outfalls can impact the hydromorphological quality and water quality of the surface water bodies. This could affect upstream tributaries within WFD surface waterbody catchments, and the Tributary of the Till also has the potential to be directly affected. While hydromorphologically sensitive design is intended, this will need to be reviewed when further Scheme detail is available, and so is screened in. No anticipated mechanism for impacts to the groundwater body from surface water outfalls.

Activity	Description	Screening Outcome	Justification
Grid Connection Route - the below ground Grid Connection Cables	The proposed Grid Connection Route comprises an area within which the high voltage cables will be laid within the DCO Site, connecting the Solar and Energy Storage Park to Cottam Substation. The cables will be buried underground along with Jointing Pits, which are buried structures installed at regular intervals to facilitate the installation and jointing of cables. At the time of writing, the Grid Connection Route watercourse crossings aside from the River Trent are assumed to use intrusive using open-cut techniques. In total, there are expected to be in the order of ten watercourse crossings other than the Trent. Three of these are WFD designated, namely Marton Drain (approximate NGR of crossing SK 8399 8105) and Seymour Drain (approximate NGR SK 8199 8049), which is crossed twice. The remaining seven would be crossings of unnamed ditches. The Grid Connection Route for PEI Report purposes is necessarily wide to allow further option analysis and it is expected it will be constrained at the ES stage, when a more definite route for the Grid Connection Route will be defined, and at which point the number of required crossings will be re-appraised.	**In** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Marton Drain Catchment (Trib of Trent) (GB104028057840); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Seymour Drain Catchment (WFD ID: GB104028058340. **Not applicable** - Tributary of the Till (GB105030062480); Witham Lias (GB40502G401400).	There is potential for direct hydromorphological impacts to the channel and riparian zone where intrusive open cut installation methods are proposed. This may directly impact Marton Drain and Seymour Drain WFD waterbodies, and ditches which are tributaries of the River Trent. The River Trent itself will be crossed by horizontal directional drilling (HDD), or similar non-intrusive technique, but would not be directly impacted with launch and receive pits at least 10m from the channel margins. There is potential for indirect impacts to all watercourses to be crossed from uncontrolled release of construction site runoff that may include high levels of fine sediment, oils and drilling muds (water based) if this runoff is not carefully managed. 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 HDD. Mitigation for the intrusive crossings is proposed to include a pre-works morphology survey of the channel of each watercourse to be crossed prior to construction. This is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works. The survey is a precautionary measure so that should there be any unforeseen adverse impacts there is a record against which any remedial action can be determined. Water flow would be maintained by damming and over pumping during cable installation. Works should be carried out in the drier months where possible as this would reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales should be used initially to capture mobilised sediments until the watercourse has returned to a settled state. it will be a requirement that the watercourses are reinstated as found and water quality monitoring will be undertaken prior to, during, and following on from the construction activity. Regular observations of the watercourses will also be required post-works during vegetation re-establishment of the banks, especially following wet weather, to ensure that no adverse

Activity	Description	Screening Outcome	Justification
			impacts have occurred. These requirements will be described in the WMP. As the exact crossing locations are still to be finalised and details of the construction methodology still to be confirmed, this activity is screened in for further consideration in terms of the WFD compliance.
Grid Connection Route – Cottam Substation Modification	The Cottam Substation Site is located to the south west of the DCO site. The Scheme includes upgrade and modification works to the Cottam Substation which will be carried out within the existing operational site.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Seymour Drain Catchment (WFD ID: GB104028058340. **Not applicable** - Tributary of the Till (GB105030062480); Witham Lias (GB40502G401400); Marton Drain Catchment (Trib of Trent) (GB104028057840); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480).	The proposed modifications are within the existing operational site and so will not interact with any surface waterbodies. As such, there is no mechanism for hydromorphological impact to surface waterbodies. Any works that may generate runoff or spillages during construction of the modifications are anticipated to be adequately addressed through measures to be outlined in the CEMP and WMP in order to avoid adverse impacts on water quality to watercourses receiving drainage from the site (assumed to be Seymour Drain Catchment). No infrastructure is anticipated to be below the water table, and so there is expected to be negligible or no impact to the groundwater body.

4. Summary

4.1.1 A WFD screening exercise has been undertaken following guidance in the PINS Advice Note 18 (Ref 1). Proposed work activities that could influence water bodies have been outlined and the WFD water bodies that could potentially be affected have been identified through consideration of the 1km study area (Zone of Influence).

4.1.2 The following water bodies have been identified within the study area and screened in for further consideration as the DCO application is advanced:

- Trent from Carlton-on-Trent to Laughton Drain (WFD ID: GB104028058480);
- Tributary of the Till (WFD ID: GB105030062480);
- Marton Drain Catchment (Trib of Trent) (WFD ID: GB104028057840);
- Seymour Drain Catchment (WFD ID: GB104028058340);
- Lower Trent Erewash – Secondary Combined (GB40402G990300); and
- Witham Lias (GB40502G401400).

4.1.3 The WFD baseline status of these water bodies has been presented in Annex A. The Scheme will have to demonstrate that there is no deterioration in any of the identified baseline classifications, and no prevention of future improvement for these classifications. If this cannot be achieved, an Article 4.7 derogation would be required.

4.1.4 As design details for the Scheme are finalised for assessment within the ES, the following WFD assessment stages will be advanced, for inclusion within a full WFD Assessment to accompany the DCO application:

- **Stage 2: WFD Scoping** - For each water body identified in Stage 1, a qualitative assessment informed by readily available data and the site walkover survey will be carried out to identify the effects and potential risks to quality elements from all relevant activities. The assessment is made taking into consideration embedded mitigation (measures that can reasonably be incorporated into the design of the proposed works) and good practice mitigation (measures that would occur with or without input from the WFD assessment process); and
- **Stage 3: WFD Impact Assessment** - A detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages.

4.1.5 These stages of assessment will be undertaken in consultation with the Environment Agency and Internal Drainage Boards, to ensure an appropriate level of assessment.

5. References

Ref 1 The Planning Inspectorate (2017) The Water Framework Directive - Advice note eighteen: The Water Framework Directive.

Ref 2 Official Journal of the European Communities (2000) Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

Ref 3 The Water Environment (Water Framework Directive) (England Wales) Regulations (2016).

Ref 4 Environment Agency (2016) Water Framework Directive risk assessment: How to assess the risk of your activity.

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

Ref 6 Defra's Multi Agency Geographical Information for the Countryside website. Available at: https://magic.defra.gov.uk/magicmap.aspx

Ref 7 Historic mapping: National Library of Scotland. Available at: https://maps.nls.uk/

Ref 8 British Geological Survey Borehole and online mapping. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

Ref 9 Soilscapes website. Available at: http://www.landis.org.uk/soilscapes/

Ref 10 Bing Maps. Available at: https://www.bing.com/maps

Ref 11 National River Flow Archive website. Available at: https://nrfa.ceh.ac.uk/

Ref 12 Met Office website. Available at: https://www.metoffice.gov.uk/

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

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

Annex A: WFD Waterbodies Baseline

Topography and Land Use of the Study Area

The topography of the study area is generally flat. The elevation ranges from 30m above ordnance datum (AOD) to <10m AOD. The topographical highs (~30m AOD) are found within the north of the study area (north of Knaith Park) and the topographical lows are associated with the River Trent waterbody and its floodplain, resulting in a gentle slope from north-east to south-west across the DCO Site. Land rises very gently away from the River Trent on its western bank along the Grid Connection Route, with the majority of the study area on this western side of the river being <10m AOD.

The land use within the study area is generally a mosaic of arable farmland and, with patches of woodland, drains and ponds scattered across the area. The River Trent bisects the study area, with the Solar and Energy Storage Park located east of this river. There is a large, decommissioned power station (Cottam Power Station) adjacent to the southern extent of the Grid Connection Route, next to Cottam Substation, which is the proposed connection point to the National Grid. The study area also includes several small villages such as Gate Burton, Willingham by Stow, and Knaith Park. The A156 (Gainsborough Road) runs almost parallel to the River Trent waterbody through the study area, and a railway line passes across the Solar and Energy Storage Park in an approximately north-south orientation. Lincoln Golf Course lies within the study area to the south east of the DCO Site.

WFD Surface Waterbodies

The study area falls within six WFD surface water body catchments:

- Trent from Carlton-on-Trent to Laughton Drain;
- Till (Witham) waterbody;
- Tributary of the Till waterbody
- Skellingthorpe Main Drain;
- Marton Drain Catchment (trib of Trent); and
- Seymour Drain Catchment (trib of Trent).

Further details regarding these WFD surface waterbodies are given in Table A1, and WFD classifications given in Table A2.

There are also several tributaries of these water bodies present within the study area; these are predominantly unnamed agricultural ditches, drains and springs.

WFD Groundwater Bodies

The Environment Agency Catchment Data Explorer website (Ref 5) indicates that the study area falls within two WFD groundwater bodies. The far north and east extents of the study area fall within the Witham Lias groundwater body (GB40502G401400) within the Anglian RBMP, while the remainder of the Scheme is covered by the Lower Trent Erewash – Secondary Combined groundwater body (GB40402G990300) within the Humber RBMP (see **PEI Report Volume 2: Figure 9-1**).

The Witham Lias groundwater body (WFD ID: GB40502G401400) covers a total area of 683.57 km^2 and under the WFD Cycle 2 classifications (2019), was classified as being at Good Status, overall, quantitatively and chemically. The Lower Trent Erewash – Secondary Combined groundwater body (WFD ID: GB40402G990300) covers a total area of 1924.4 km^2 and during 2019 Cycle 2, was given Good Status, overall, quantitatively and chemically (Ref. 9-43).

WFD classifications for these groundwater bodies are given in Table A3.

Table A1: WFD Surface Waterbodies in the Study Area

Waterbody	Ecological Status / Potential	Chemical Status	Overall Target Objective	Hydromorphological Designation	Designated Reach	Reasons for Not Achieving Good Status
Trent from Carlton-on-Trent to Laughton waterbody (GB104028058480)	Moderate Ecological Potential (note that Biological Status is Bad due to a Bad classification for invertebrates)	Fail	Good (2027)	Artificial	The designation extends from the town of Carlton-on-Trent (approximately 18km south of Gate Burton as the crow flies) from where it flows predominantly north-north east for 58.6km to Laughton where the waterbody is then designated as the 'Humber Upper' WFD waterbody. The catchment has an area of 153 km^2.	Physical modifications relating to navigation and agriculture, continuous sewage discharges, diffuse agricultural pollution, poor soil management in the catchment and transport drainage
Till (Witham) waterbody (GB105030062500)	Moderate Ecological Potential (on the basis of Moderate physico-chemical quality	Fail	Moderate (2015)	Heavily Modified	The watercourse designation extends from where it rises to the south of Gainsborough east of Warren Wood and continues east	Trade/industry discharges, sewage discharge (continuous) and poor

Relation to Scheme: The River Trent is located to the west of the Solar and Energy Storage Park but would be crossed by the Grid Connection Route to Cottam Substation at approximate NGR SK 83100 80866 (see **PEI Report Volume 2: Figure 9-1**).

Site Observations: The River Trent was observed between Cottam and Littleborough during the site visit, where it flows from south to north and is approximately 90m wide. The watercourse is tidal with the National Tidal Limit (NTL) being approximately 28km upstream of the DCO Site. The river occupies an expansive floodplain which is flanked by successions of terrace deposits that indicate the river's former dynamic character. However, the Trent has a long history of anthropogenic modification, resulting in a single-thread, passively meandering and morphologically homogenous river that is disconnected from its floodplain by extensive embankments. Flow within the channel was noted to be uniform and laminar, owing to the over-deep form maintained by artificial confinement; with no apparent hydraulic variance present. It was not possible to view the substrate character of the channel during the site visit; however, it is assumed to consist of fine gravels, sands and silts (the latter of which is derived predominantly from catchment-wide intensive agriculture and urbanisation). The adjacent riparian zone is severely depleted with only a thin yet fragmented strip adjoining the channel. However, the aforementioned embankments, which are maintained for the purposes of flood management, limit potential for development of a high-functioning riparian zone.

The river is used for navigation and is managed by the Canal and River Trust within the study area. The nearest moorings indicated on the Canal and River Trust website are at the confluence of the Fossdyke Canal and River Trent at Torksey Lock, approximately 2.5km upstream of the DCO Site. There are 55 leisure berths at this mooring facility. The Torksey Yacht Club is also based at this location. There is also a fishery of 365m length on the left bank of the River Trent, within the study area, immediately north of the DCO Site at the River Trent crossing for the Grid Connection Route.

Further details regarding hydrology, tides and water quality are provided later **PEI Report Volume 1, Chapter 9: Water Environment.**

Waterbody	Ecological Status / Potential	Chemical Status	Overall Target Objective	Hydromorphological Designation	Designated Reach	Reasons for Not Achieving Good Status
	elements, notably phosphates which are at Poor status)				and south past Upton, Kexby and Willingham-on-Stow, to its confluence with the 'Lower Till' waterbody between Stow and Coates-on-Stow. The watercourse is 14.1km length and drains an area of around 35.2km^2.	nutrient management from agriculture.
Relation to Scheme: The River Till is located at the eastern extent of the study area, and would not be directly impacted by the Scheme. However, it is hydrologically connected to the Scheme via the 'Tributary of the Till' WFD waterbody. The Tributary of the Till's confluence with the River Till is 1.4 km downstream of the DCO Site (see **PEI Report Volume 2: Figure 9-1**).						
Site Observations: This watercourse was not observed given that there would be no direct physical impact to it.						
Tributary of the Till waterbody (GB105030062480)	Poor Ecological Status (on the basis of Poor macrophytes and phytobenthos combined)	Fail	Moderate (2027)	Not Artificial or Heavily Modified	Designated from its source east of the Solar and Energy Storage Park, just north of Kexby Lane, and continues south along the eastern margin of the Solar and Energy Storage Park, and then continues south to meet the River Till at Tilby Dale. The watercourse is 4.9km length and drains an area of around 17.1km^2.	Diffuse pollution from poor soil management and physical modification relating to land drainage
Relation to Scheme: The Tributary of the Till forms the eastern extent of the Scheme boundary for approximately 1km to the west of Willingham by Stow. It also has tributaries (drains) that extend into the DCO Site (see **PEI Report Volume 2: Figure 9-1**).						
Site Observations: This watercourse was observed between Marton Road and Park Farm and is agricultural in character. It is highly modified, with extensive straightened sections with signs of recent dredging. The channel is trapezoidal with steep incised banks and the wetted width was approximately 1m at the time of the visit. It is conveyed beneath Marton Road through a box culvert of approximately 1.5m width. Flow is impounded upstream of the culvert to create a pool with a water depth at the time of the walkover of around 30cm. Arable agriculture extends to the channel margins on both banks in this stretch with no riparian buffer, and so would be expected to suffer from agricultural pollution. The watercourse was covered in extensive duck weed and *Calamagrostis* spp. grasses. Bed substrate, where visible, was dominated by fine sediments. Water was generally standing in pools at the time of the site visit (low flow conditions) with no observable flow.						

Waterbody	Ecological Status / Potential	Chemical Status	Overall Target Objective	Hydromorphological Designation	Designated Reach	Reasons for Not Achieving Good Status
Marton Drain Catchment (tributary of Trent) waterbody (GB104028057840)	Moderate Ecological Status (on the basis of dissolved oxygen which is at Moderate status)	Fail	Good (2027)	Heavily Modified	The watercourse is designated from Torksey Village Green and flows north to meet the River Trent west of Marton. It is 3.14km in length and drains a total area of 5.04 km^2.	Physical modifications, sewage discharge pollution and poor livestock management
Relation to Scheme: Marton Drain would be crossed by the Grid Connection Route at approximate NGR SK 83715 81113.						
Site Observations: Marton Drain was visited at its crossing of the A156 south of Marton. It has a straightened, trapezoidal channel and was approximately 5m in width. It has steep incised banks rising approximately 5m from the bed on the left bank, and 3m on the right bank. At the time of the site visit the water within the channel was extremely turbid and so the depth could not be ascertained. The margins showed extensive fine sediment deposition and a brown scum indicative of poor water quality. There was rough grassland on the left bank for approximately 5m to provide a buffer from the adjacent arable field. No macrophytes were observed at the time of the site visit.						
Seymour Drain Catchment (tributary of Trent) (GB104028058340)	Moderate Ecological Potential	Fail	Good (2027)	Heavily Modified	The watercourse rises in an agricultural region, south of the village of Rampton where it flows in a step-like fashion in a north easterly direction for 6.5km before reaching the confluence with Trent from Carlton-on-Trent to Laughton waterbody (River Trent). It is 6.5 km in length and drains a catchment of 19.6km^2.	Physical modifications, sewage discharge pollution, poor soil management and transport drainage.
Relation to Scheme: Seymour Drain would be crossed by the Grid Connection Route at approximate NGRs SK 81532 78691 and SK 82080 80728.						
Site Observations: Seymour Drain to the south of the Cottam Power station is a straightened, and artificial channel. It is approximately 1.5m wide, with banks rising 2-3m from the bed. Water depth at the time of the site visit was approximately 0.3m. Along the left bank there is deciduous hedgerow vegetation which will provide a degree of shading and a buffer from the adjacent arable fields. The left bank lacks any riparian vegetation between the channel and the adjacent field. The bed is dominated by fine sediment and there were no macrophytes present in the watercourse at this point. The watercourse flows along Torksey Ferry Road, under which it is then culverted before entering another culvert beneath the Cottam Power Station. The watercourse was also visited off Headstead Bank, downstream of the Cottam Power Station. Here it exhibited a small degree of sinuosity, albeit in a sharply defined and over deep channel. The channel width was approximately 4m wide at this point, with banks rising 3m from the bed. Depth was around 0.5m. There is no significant riparian vegetation to provide a buffer from the adjacent fields. The water is relatively clear and noticeably less turbid compared to adjacent watercourses surveyed although the bed is dominated by fine sediment, and there were some submerged macrophytes present.						

Waterbody	Ecological Status / Potential	Chemical Status	Overall Target Objective	Hydromorphological Designation	Designated Reach	Reasons for Not Achieving Good Status
Skellingthorpe Main Drain (GB105030062390)	Moderate Ecological Potential	Fail	Moderate (2015)	Heavily Modified	The designated waterbody rises south of Broadholme and flows southeast to meet the River Witham in Lincoln. It is 10.2km in length and drains a large catchment of 98.3km^2. It is this wider catchment that extends into the study area for the Scheme.	Contaminated land, sewage discharge pollution, land drainage and urbanisation.

Relation to Scheme: The Skellingthorpe Main Drain is approximately 10km south of the DCO Site and flows south-east from near Saxilby towards Lincoln. However, its WFD catchment covers much of the Solar and Energy Storage Park and there may be hydrological connectivity to the watercourse via the drains and tributaries that extend into the Solar and Energy Storage Park.

Site Observations: Given that there would be no direct physical impact to this waterbody and that it is approximately 10km south of the DCO Site it was not visited during the walkover.

Table A2: WFD Surface Waterbody Classifications. Classification listed is for 2019, unless otherwise stated.

WFD Parameter	Trent from Carlton-on-Trent to Laughton Drain (GB105028058480)	Till (Witham) (GB105030062500)	Tributary of the Till (GB105030062480)	Skellingthorpe Main Drain (GB105030062390)	Marton Drain Catchment (trib of Trent) (GB104028057840)	Seymour Drain Catchment (trib of Trent) (GB104028058340)
Ecological	**Moderate**	**Moderate**	**Poor**	**Moderate**	**Moderate**	**Moderate**
Biological Quality Elements	**Bad**	**Good**	**Poor**	**Moderate**	**Good**	**Moderate**
Invertebrates	*Bad*	*Good*	*Moderate*	*Moderate*	*Good*	*Moderate*
Macrophytes and Phytobenthos Combined	*Good*	-	*Poor*	-	-	*Moderate (2015)*
Hydromorphological Supporting Elements	**Supports good**	**Supports good**	**Supports good**	**Supports good**	**Supports good**	**Supports good**
Hydrological Regime	*Supports good*	*Supports good*	*High*	*Supports good*	*Supports good*	*Supports good*
Physico-chemical Quality Elements	**Moderate**	**Moderate**	**High**	**Moderate**	**Moderate**	**Moderate**
Ammonia (Phys-Chem)	*High*	*High*	*High*	*High*	*High*	*High*
Dissolved oxygen	*High*	*High*	*High*	*Bad*	*Moderate*	*Poor*
pH	*High*	*Poor*	*High*	*High*	*High*	*High*
Phosphate	*Poor*	*High*	*High*	*High*	*Good*	*Poor*
Temperature	*High*	*High*	*High*	*High*	*High*	*High*
Specific pollutants	**High**	**High (2014)**	**High (2014)**	**High (2014)**	**High (2014)**	**High**
Chemical	**Fail, Good (2016)**	**Fail, Good (2016)**	**Fail, Good (2016)**	**Fail, Good (2016)**	**Fail, Good (2016)**	**Fail, Good (2016)**
Priority hazardous substances	**Fail, Good (2016)**	**Fail, Good (2014)**	**Fail, Good (2014)**	**Fail, Good (2014)**	**Fail, Good (2014)**	**Fail, Good (2016)**
Priority substances	**Good**	**Fail, Good (2014)**	**Good**	**Good**	**Good**	**Good**

Table A3: WFD Groundwater Classifications. All classifications are from 2019.

Classification Item	Witham Lias (GB40502G401400)	Lower Trent Erewash – Secondary Combined (GB40402G990300)
Chemical Dependent Surface Water Body Status	Good	Good
Chemical Drinking Water Protected Area	Good	Good
Chemical Saline Intrusion	Good	Good
General Chemical Test	Good	Good
Overall Water Body	Good	Good
Quantitative	Good	Good
Quantitative Status element	Good	Good
Quantitative Dependent Surface Water Body Status	Good	Good
Quantitative GWDTEs test	Good	Good
Quantitative Saline Intrusion	Good	Good
Quantitative Water Balance	Good	Good
Chemical (GW)	Good	Good
Chemical Status element	Good	Good
Chemical Dependent Surface Water Body Status	Good	Good
Chemical Drinking Water Protected Area	Good	Good
Chemical GWDTEs test	Good	Good
Chemical Saline Intrusion	Good	Good
General Chemical Test	Good	Good
Supporting elements (Groundwater)	Good	Good
Trend Assessment	Good	Good