BEACON FEN ENERGY PARK

Planning Inspectorate Reference: EN010151

Chapter 11 – Water Resources and Flood Risk
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The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017/572) – Regulation 14

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
2	19/12/2025	Updated following Relevant Representative comments from the Environment Agency	AS	RG	Associate Director – Hydrology & Hydrogeology

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11. WATER RESOURCES AND FLOOD RISK

11.1 Introduction

11.1.1 Chapter 11: Water Resources and Flood Risk has been prepared by SLR Consulting Ltd formerly Wardell Armstrong LLP (part of SLR) ('SLR') on behalf of Beacon Fen Energy Park Ltd (the 'Applicant') in support of an application for a Development Consent Order (DCO) for Beacon Fen Energy Park (the 'Proposed Development').

11.1.2 This Chapter reports the assessment of the likely significant effects of the Proposed Development on Water Resources and Flood Risk. In particular it considers the potential for likely significant effects of changes to water quality and the hydrological regime.

11.1.3 This Chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment and reference should be made to the front end of this Environmental Statement (Chapters 1 – 5) and particularly to the description of the Proposed Development in **Chapter 2: Proposed Development (Document Ref: 6.2 ES Vol.1, 6.2.2)**, which includes details about the Site, the design parameters and construction methodology, as well as the final chapter, 'Summary of Significant Environmental Effects' (Chapter 19).

11.1.4 This chapter is accompanied by the following Appendices and Figures:

- **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**
- **Appendix 11.2 Planning Policy and Legislation (Document Ref: 6.3 ES Vol.2, 6.3.82)**
- **Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)**
- **Appendix 11.4 Borehole Logs (Document Ref: 6.3 ES Vol.2, 6.3.84)**
- **Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85)**
- **Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**
- **Figure 11.1 Regional Surface Water Catchments (Document Ref: 6.4 ES Vol.3, 6.4.62)**
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- **Figure 11.4 Bedrock Geology (Document Ref: 6.4 ES Vol.3, 6.4.65)**
- **Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)**

- **Figure 11.6 Watercourse Crossings (Document Ref: 6.4 EA Vol.3, 6.4.67)**

11.1.5 For the purposes of this chapter, the 'Site' is the area shown on **Figure 1.2 Site Boundary Plan (Document Ref: 6.4 ES Vol.3, 6.4.2)** and within the Site are three areas shown on **Figure 1.3 Site Area Plan (Document Ref: 6.4 ES Vol.3, 6.4.3)**: the 'Solar Array Area', where the solar panels, BESS and on site substation are proposed to be located, the 'Bespoke Access Corridor' and the 'Cable Route Corridor', which is the section of the Site where the high voltage electrical cable will connect the Solar Array Area to the Bicker Fen National Grid Substation.

11.1.6 A Flood Risk Assessment (FRA) has been included in this chapter as **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**, and has been referred to throughout this chapter. This chapter should be read in conjunction with the FRA.

11.2 Legislation, Policy and Guidance

11.2.1 The legislation and policy considered relevant to the assessment of water resources and flood risk are listed below, with details provided in **Appendix 11.2 Planning Policy and Legislation (Document Ref: 6.3 ES Vol.2, 6.3.82)**.

Legislative Framework

11.2.2 The applicable legislation includes:

- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, which transpose the Water Framework Directive (WFD) (2000/60/EC);
- The Environmental Permitting (England and Wales) Regulations 2010, which transpose the Groundwater Daughter Directive (2006/118/EC);

The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015, which transpose the Priority Substances Directive (2008/105/EC);
The Environment Act 2021;

- The Environment Protection Act 1990;
- The Land Drainage Act 1991;
- The Water Resources Act 1991; the Water Act 2003; the Water Act 2014;
- The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019;
- The Floods Directive (2007/60/EC);
- The Environmental Permitting (England and Wales) Regulations 2016;
- The Flood and Water Management Act 2010; and
- The Reservoir Act 1975.

Planning Policy

11.2.3 The applicable planning policy includes:

- National Planning Policy Framework (NPPF), December 2024;

- Planning Practice Guidance (PPG): Flood Risk and Coastal Change, September 2025;
- Planning Practice Guidance (PPG): Water supply, wastewater and water quality, July 2019;
- Overarching National Policy Statement for Energy (EN-1), November 2023 (came into force 17 January 2024);
- National Policy Statement for Renewable Energy Infrastructure (EN-3), November 2023 (came into force 17 January 2024);
- National Policy Statement for Electricity Networks Infrastructure (EN-5), November 2023 (came into force 17 January 2024);
- Central Lincolnshire Local Plan 2018 to 2040, adopted in April 2023:
    - Policy S21: Flood Risk and Water Resources;
    - Policy S56: Development on Land Affected by Contamination; and
- South East Lincolnshire Local Plan 2011-2036, adopted March 2019:
    - Policy 3: Design of New Development; and
    - Policy 4: Approach to Flood Risk.

Guidance

11.2.4 The following guidance documents have been taken into account during the preparation of this chapter and in the design work for the Proposed Development:

- Guidance for Pollution Prevention (GPP) GPP1 Understanding your environmental responsibilities - good environmental practices – produced by Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), the Scottish Environment Protection Agency (SEPA) and the Oil Care Campaign;[1]
- GPP2 Above Ground Oil Storage Tanks - produced by NRW, NIEA, and SEPA and the Oil Care Campaign;[1]
- GPP4 Treatment and disposal of wastewater where there is no connection to the public foul sewer - produced by NRW, NIEA, and SEPA;[1]
- GPP5 Works and Maintenance In or Near Water - produced by NRW, NIEA, and SEPA;[1]
- GPP6 Working at Construction and Demolition Sites - produced by NIEA, and SEPA;[1]
- GPP8 Safe Storage and Disposal of Used Oils - produced by NRW, NIEA, and SEPA;[1]
- GPP13 Vehicle washing and cleaning - produced by NRW, NIEA, and SEPA;[1]
- GPP21 Pollution Incident Response Planning - produced by NRW, NIEA, and SEPA;[1]
- GPP22: Dealing with spills - produced by NRW, NIEA, and SEPA;[1]

[1] NetRegs Guidance for Pollution Prevention (GPPs) - Full list [online]. Accessed January 2025. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/

- GPP26 Safe storage - drums and intermediate bulk containers - produced by NRW, NIEA, and SEPA;[1]
- Construction Information Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites;[2]
- CIRIA C811 Environmental good practice on site guide;[3]
- CIRIA C750 Groundwater control - design and practice;[4]
- CIRIA C753 The SuDS manual;[5] and
- CIRIA C786 Culvert, screen, and outfall manual.[6]

11.3 Consultation & Scope of Assessment

Consultation Undertaken to Date

11.3.1 Consultation has been undertaken throughout the preparation of the DCO application; it can broadly be divided into the following key stages:

- EIA Scoping;
- Early Non-Statutory Consultation;
- Statutory Consultation; and
- Direct Topic-Specific Consultation.

11.3.2 Table 11.1 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

[2] Construction Information Research and Information Association (2001) C532 Control of Water Pollution from Construction Sites [online]. Accessed January 2025. Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532.

[3] Construction Information Research and Information Association (202) C811 Environmental good practice on site guide [online]. Accessed January 2025. Available at: https://www.ciria.org/ci/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=C811&Category=BOOK

[4] Construction Information Research and Information Association (2016) C750 Groundwater control - design and practice [online]. Accessed January 2025. Available at: https://www.ciria.org/ItemDetail?iProductCode=C750&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91.

[5] Construction Information Research and Information Association (2015) CIRIA C753 The SuDS Manual [online]. Accessed January 2025. Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753

[6] Construction Information Research and Information Association (2019) C786 Culvert, screen and outfall manual [online]. Accessed January 2025. Available at: https://www.ciria.org/News/Press_centre2/Culvert_screen_and_outfall_manual_C786_press.aspx

Table 11.1 – Summary of Consultation Undertaken to Date

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
EIA Scoping				
Planning Inspectorate (PINS) on behalf of the Secretary of State (SoS)	26/05/2023	Scoping Opinion	Flood Risk Assessment to be provided in the Environmental Statement (ES). Demonstrate that the development will remain operation for a lifespan of 60 years and flood sensitive equipment will remain operational during 1 in 100-year flood.	**Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** provides the Flood Risk Assessment (FRA) for the Proposed Development. All design guidance has been adhered to. It should be noted that, following this correspondence, it was confirmed that the proposed operational lifespan of the Proposed Development is 40 years. Therefore, the flood risk over the 40 year period is considered in the Flood Risk Assessment.
			Confirmation that the solar panels will not increase the rate of runoff from the Site.	The FRA (Section 6.4 of **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**) confirms that solar panels are likely to have a minimal impact on existing overland flow pathways and floodplain storage.
			Consider known 'artesian conditions' in the vicinity of the Site.	This response has been considered in Section 11.5 and the WFD Compliance Assessment (Section 2.4 of **Appendix 11.6 Water Framework Directive Compliance Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**) relating to groundwater bodies.
			2 km study area is accepted and should be shown on a drawing.	See **Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)** for the 2 km study area.
			As Sustainable Drainage System (SuDS) with applicable climate change allowances will be incorporated in the design of the Proposed Development; the design of such mitigation measures should be informed by relevant and up to date climate change allowances for the project's lifespan.	See **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**, which provides details of the outline drainage strategy including the use of SuDS. The drainage design has taken into account relevant climate change allowances, see Section 8 of **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
			As details of proposed watercourse crossings were not provided in the Scoping Report, without this information detail regarding what type of crossings are proposed and the location of these or potential impacts on WFD waterbodies, the Inspectorate cannot agree to scope out the requirements for a WFD assessment.	**Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)** and Figure 11.6 provide a summary of proposed watercourse crossings. A WFD Compliance Assessment has been carried out and presented in **Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**Appendix 11.6. The WFD Compliance Assessment includes assessment of the proposed watercourse crossings in regard to the WFD status and targets of relevant WFD waterbodies.
Environment Agency (EA)	17/05/2023	Scoping Opinion	Essential infrastructure within Flood Zone 3 will require sequential and exception tests.	See **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**, for further details of the sequential and exception tests.
			Aspects of the 'decommissioning statement' may need to be incorporated within the FRA.	See **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**.
			Artesian conditions are known in the vicinity of the Beacon Fen development and should be included in the ES.	This response has been considered in Section 11.5 and the **Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**.
			WFD assessment / screening WFD assessment required to consider watercourse crossings.	**Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)** and Figure 11.6 provide a summary of the proposed watercourse crossings. A WFD Compliance Assessment has been carried out and is presented in **Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**.
			A buffer zone of 8 m from any watercourse or asset would be desirable.	This response has been noted and a buffer of 9 m from any watercourse or asset has been incorporated into the design of the Proposed

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
				Development, see **Figure 1.4 – Indicative Site Layout Plan (Document Ref:6.4 EA Vol 3, 6.4.4)** .
			We welcome the production of a watercourse crossing survey.	See **Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)**.
North Kesteven District Council (NKDC)	18/05/2023	Scoping Opinion	Requesting a full sequential test for a 15 km search area around substations at Bicker, Spalding, Cottam and Ryhall	The request for detailed Sequential Test covering a large search radius around four separate substation is not proportionate to the development proposed and may exceed the scope of a sequential test. Since the Scoping Report was issued the Site boundary has been redefined (smaller) and the substation connection point identified. **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** provides the FRA and commentary on the Sequential Test.
Anglian Water	18/05/2023	Scoping Opinion	The proposed site boundaries extend into land selected by Anglian Water for the Lincolnshire Reservoir, and they state that the southern array within the Site would need to be revised to if the reservoir was to be constructed.	The southern array known as 'Beacon Fen South' is no longer planned as part of the Proposed Development.
			Anglian Water are keen to discuss the project to confirm how the reservoir and development can co-exist.	The southern array known as 'Beacon Fen South' is no longer planned as part of the Proposed Development.
			Water supply, water recycling effects and sewage capacity may need to be assessed. Anglian Water have assumed that these topics are scoped into the assessment.	See Section 11.6 for further details regarding water supply and connections. There is no intent to connect to foul sewers and therefore this assessment has not taken into account sewer supply and capacity.
Lincolnshire County Council (LCC)	16/05/2023	Scoping Opinion	Agrees water resources should be scoped into the ES. A Flood Risk Assessment and drainage strategy are required	Noted and **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** provides an FRA and drainage strategy.

Early Non-Statutory Consultation

Not applicable

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
Statutory Consultation				
Anglian Water	28/02/2024	PEIR Response	AWS would like confirmation that the cable route and construction works would not affect the Bicker North Dove Sewer Pumping Station	This Chapter includes details of intended water supply and connections in Section 11.6. The Bicker North Dove Sewer Pumping Station is unlikely to be affected by the Proposed Development due to standoff distance from watercourses and the location of the Pumping Station which is outside of the Proposed Development footprint.
			AWS would like confirmation that the red line area will be amended to exclude the location of the water mains pipes or that the standoff distance will be applied as a starting point to protect water supplies for local communities.	The Applicant has included a set of protective provisions for the benefit of Anglian Water in Schedule 11 to the **Draft DCO (Document Ref: 3.1)** whilst engagement is ongoing. See **Chapter 2: Proposed Development (Document Ref: 6.2 ES Vol.1, 6.2.2)** for further details regarding redline boundary, the Proposed Development's layout and standoff distances. Additional details can be seen in Chapter 17 'Other Environmental Topics' and Section 11.8 Mitigation in relation to the **Appendix 2.4: Outline Construction Environmental Management Plan (Document Ref: 6.3 ES Vol.2, 6.3.7).**
			AWS would welcome discussions on water and foul water connection requirements for this project.	This Chapter includes details of intended water supply and connections in Section 11.6. There is no intent to connect to foul sewers and therefore this assessment has not taken into account sewer supply and capacity
			AWS would like confirmation that the firewater tanks will be supplied from rainwater collected on site.	See **Chapter 2: Proposed Development (Document Ref: 6.2 ES Vol.1, 6.2.2)** for information regarding firewater tanks onsite. Section 11.6 details the potential sources of water for the Proposed Development, which will be determined during the detailed design phase.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
NKDC	1/03/2024	PEIR Response	Limited reference to sequential and exception tests within the chapter	See **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** for the sequential and exception tests.
			FRA concludes that the sequential test has been passed for the Solar Array area, although the council cannot agree as there is insufficient evidence to support it.	See **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** for the sequential and exception tests.
			Cumulative Schemes should be expanded to consider applications 16/0498/OUT Sleaford West SUE, application 20/1475/FUL (Sleaford Moor Enterprise park) and the TCPA 1990 solar energy application reference 23/1419/FUL (Mareham Lane Sleaford)	As set out in **Chapter 4: Scope and Methodology (Document Ref: 6.2 ES Vol.1, 6.2.4)** the cumulative schemes have been agreed with NKDC. An assessment regarding the cumulative schemes has been set out in Section 11.10 of this Chapter.
EA	01/03/2024	PEIR Response	The environmental impacts for each of the listed abstractions have not been fully considered.	This has been addressed in Section 11.6 "Conceptual Site Hydrogeological Model".
			It is not clear whether the option for an onsite reservoir is for a new reservoir or use of an existing one. In either case, there are potential permitting implications. A new or varied permit, if granted, may include certain restrictions that will need to be taken into account when selecting the appropriate strategy, so we recommend that you engage with the EA.	The onsite reservoir is existing. All required permits and licences would be applied for once sufficient information is available at the detailed design phase (prior to start of the construction phase of work). **See Other Consents and Licences Statement (Document Ref: 5.4)**. Engagement with the Environment Agency specific to these aspects will be undertaken during this time.
			You should give consideration to whether you will seek to disapply the Environmental Permitting (England and Wales) Regulations 2016 through the DCO process. Should you decide to pursue this, you should provide a request to us in writing, clearly setting out the permits/consents that you would require	This comment has been noted by the Applicant. Post DCO determination and prior to any affecting works commencing onsite, all appropriate permits would be secured from the Environment Agency.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
			for the project. This should be done as soon as possible to allow us sufficient time to consider the request (minimum 6 months) and depending on the outcome this will have implications on the content of the DCO.	
			The criteria for determining "Medium" and "High" magnitude of change will only consider post-development characteristics, so temporary effects which only occur during construction will be considered to have a "Low" or "Negligible" magnitude of change. Temporary impacts during construction may have been underestimated. The current approach risks potentially significant effects during construction being underestimated and inappropriate mitigation being proposed, which increased the risk to the environment and protected species from pollution. The solution is that activities associated with temporary works should be reassessed to ensure they reflect the appropriate level of risk to the environment.	Table 11.3 Criteria for Determining the Magnitude of Change has been amended to provide clarity around the criteria of magnitude of change and when they apply. In particular the amendments confirm that the magnitude of change categories apply to all phases of the development. Table 11.3 Criteria for Determining the Magnitude of Change details the magnitude of change (from baseline) criteria, which takes onboard embedded mitigation and tertiary mitigation such as the OCEMP (Appendix 2.2). In addition, it is generally accepted that mitigation measures proposed in an ES would be implemented as per their description and in accordance with industry good practice. Therefore, this assessment assumes that mitigation measures are effectively implemented. For this reason, the "Low" or "Negligible" magnitude of change criteria for construction effects is appropriate.
			Wider impacts of climate change on water quality and resources are not fully understood so appropriate mitigation may not be secured. If mitigation measures are not secured under an appropriate mechanism within the DCO then there is a risk that they will not be implemented. There is therefore an increased risk to	This has been addressed in Sections 11.5 Baseline Conditions, 11.6 Conceptual Site Hydrogeological Model, 11.7 Assessment of Effects and 11.8 Mitigation Measures. Additional information can be found in the FRA in **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
			water quality and protected species via pollution. There is risk that the potential impacts during construction have not been fully assessed, and appropriate mitigation measures may not be developed as a result. This poses an increased risk to the water environment and protected species. There is risk that the possible effects during operation have not been fully assessed, and appropriate mitigation measures may not be developed as a result. This poses an increased risk to the water environment and protected species.	
Direct Topic-Specific Consultation				
LCC	Data request issued to LCC by email 21 June 2023. Final email Response received on 01 August 2023.	Email	Information on private water supply source type, source location, volumes and associated property name and coordinates are not held by LCC	Not Applicable
	Data request issued to LCC by email 27 November 2024. Final email response received on 19 December 2024.	Email	Information on private water supply source type, source location, volumes and associated property name and coordinates are not held by LCC.	Not Applicable
EA	Data request issued to the EA by email 17 June 2023. Final email Response received on 25 August 2023.	Email	Information on consented surface water and groundwater abstractions, discharges and their quantities and receiving bodies, groundwater levels and groundwater contours has been provided by the EA.	Information on local discharges and abstractions has been discussed in Section 11.5.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTEE RESPONSE	HOW THIS HAS BEEN ADDRESSED
	Data request issued to the EA by email 29 November 2024. Final email Response received on 08 January 2025.	Email	Information on consented surface water and groundwater abstractions, discharges and their quantities and receiving bodies, groundwater levels and groundwater contours has been provided by the EA.	Information on local discharges and abstractions has been discussed in Section 11.5.
NKDC	Data request issued to NKDC by email 30 August 2023. Final email Response received on 22 September 2023.	Email	Information on private water supply source type, source location, volumes and associated property name and coordinates are held by NKDC.	Information on local private water supplies has been discussed in Section 11.5.
	Data request issued to NKDC by email 3 January 2025. Final email Response received on 6 January 2025.	Email	Information on private water supply source type, source location, volumes and associated property name and coordinates are held by NKDC.	Information on local private water supplies has been discussed in Section 11.5.
Black Sluice Internal Drainage Board (IDB)	Meeting on 15 August 2023 attended by Black Sluice IDB and Low Carbon	Virtual Meeting	Black Sluice IDB sent shapefiles of IDB drains, culvert and IDB area. Black Sluice IDB confirmed development standoff buffers: 9 m Black Sluice IDB's access to onsite access tracks to be retained. Beacon Fen Energy Park provided cable route red line boundary drawing and example culvert design, to IDB.	The Black Sluice IDB area can be seen on **Figure 11.1 Regional Surface Water Catchments (Document Ref: 6.4 ES Vol.3, 6.4.62)**, and has been discussed in Section 11.5.

Scope of the Assessment

11.3.3 The aims of the assessment are to:

- establish the water environment baseline condition;
- identify water environment sensitive receptors;
- identify potential likely impacts as a result of the Proposed Development and arrive at a conclusion about the likely effect of these;
- discuss embedded design mitigation and good industry practice that will be implemented as part of the Proposed Development;
- determine the scale of any potential effects, assuming design mitigation and good industry practise, by assessing the degree of sensitivity of the hydrological and hydrogeological receptors and the potential magnitude of change from the baseline condition;
- establish if the scale of the effect is considered to be 'Significant' (in EIA terms);
- identify specific mitigation measures (if/where required);
- identify the residual effects; and
- identify any cumulative effects.

11.3.4 In addition to the EIA assessment, an FRA (Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)) and WFD Compliance Assessment (Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)) have been prepared and are appended to this chapter.

Effects not considered within the Scope

11.3.5 The Scoping and PEIR process did not identify any effects to be scoped out of the assessment on the water environment.

Limitations & Exclusions

11.3.6 The following matters have been encountered:

- Watercourse Crossing (WX) 49 and WX79 could not be surveyed due to accessibility issues (e.g., fencing blocking access and watercourses blocking access to larger watercourses creating health and safety issues).
- The provision of footbridges over watercourse as part of the Proposed Development has been added to the assessment to provide a more robust assessment. However, as further site data becomes available (e.g. topographic survey of watercourses at indicative watercourse crossing locations) the design and micro-sited location of footbridges may change during the detailed design phase.

11.3.7 It should be noted that the aforementioned limitations do not affect the conclusion and validity of the assessment.

11.4 Assessment Methodology & Significance Criteria

Extent of the Study Area

11.4.1 The desktop study has been undertaken to establish the baseline water environment and other relevant features up to 2 km from the boundary of the Site. The 2 km study area can be found on **Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)**.

Assessment Methodology

11.4.2 The sensitivity of receptors to hydrological and hydrogeological impacts has been determined using the criteria in Table 11.2, which documents a hierarchy of factors related to the water environment. Examples of the environmental criteria contained within Table 11.2 are based on international and national designations, work undertaken by the EA and the professional judgement of the assessment team. When a receptor meets multiple criteria or there is an absence of verified published data, the highest applicable sensitivity category is assigned to allow an assessment of the worst-case scenario.

Table 11.2 – Criteria for Determining Receptor Sensitivity

SENSITIVITY	CRITERIA	TYPICAL EXAMPLES
Very High	Receptor has a high quality and rarity on a national or regional scale and limited potential for substitution. Receptor is highly vulnerable to impacts that may arise from the Proposed Development and recoverability is long-term or not possible.	Groundwater: Source Protection Zone 1. Abstractions: Abstractions for public drinking water supply.
High	Receptor has a high quality and rarity on a local scale and limited potential for substitution. Receptor is generally vulnerable to impacts that may arise from the Proposed Development and recoverability is slow and/or costly.	Groundwater: Principal Aquifer providing a regionally important resource or supporting a site protected under EU and UK habitat legislation (i.e. Groundwater Dependent terrestrial ecosystems GWDTEs). Source Protection Zone 2 or 3. Surface Water: Protected under EU or UK habitat legislation (e.g. Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Ramsar Site). Designated Salmonid/Cyprinid Waters and/or fishery present. Surface water providing a regionally important resource or supporting a site protected under EU and UK habitat legislation (i.e. water dependent ecological receptors). Abstractions: Private Water Supplies (potable water). Abstractions for non-potable use >20 m^3/d (e.g. industry / process water, spray irrigation, river augmentation). Hydro-ecological receptors: Nationally and internationally designated sites where hydrology / hydrogeology is a key factor in designation (e.g. Ramsar, SSSI, SAC, Special Protection Areas (SPA) sites).
Medium	Receptor has a medium quality and rarity, local scale and limited potential	Groundwater: Secondary A Aquifer. Secondary B Aquifer providing water supply to private abstractions. Groundwater in peat deposits.

SENSITIVITY	CRITERIA	TYPICAL EXAMPLES
	for substitution or replacement. Receptor is somewhat vulnerable to impacts that may arise from the Proposed Development and/or has moderate to high recoverability.	Surface Water: Classified as a main river with no further designations. Large lakes and non-potable reservoirs. Abstractions: Abstractions for non-potable use <20 m^3/d (e.g. industry/process water, spray irrigation, river augmentation). Hydro-ecological Receptors: Statutory designated sites where hydrology/hydrogeology is a key factor in designation (National Nature Reserves (NNR), Local Nature Reserves (LNR)).
Low	Receptor with a low quality and rarity, local scale, and limited potential for substitution. Receptor is not generally vulnerable to impacts that may arise from the Proposed Development and/or has high recoverability.	Groundwater: Secondary B Aquifer. Secondary Undifferentiated Aquifer. Aquifers supporting potentially water dependent ecosystems (i.e. Local Wildlife Sites (LWS) wetland). Surface Water: Ordinary watercourse and no designated features. Small lakes and ponds (e.g. non-EA/WFD classified / low ecological importance). Man-made feature not in hydraulic continuity (i.e. canal). Abstractions: Abstractions for industrial use (e.g. dust suppression/washing machinery). Hydro-ecological Receptors: Non-statutory designated sites where hydrology/hydrogeology is a key factor in designation. (Sites of Importance for Nature Conservation (SINC), LWS)
Very Low	Attribute has a very low environmental importance and/or rarity on local scale. Receptor is of negligible value, not vulnerable to impacts that may arise from the Proposed Development and/or has high recoverability.	Surface Water: Man-made feature with no ecological importance (i.e. land drains)

Note
Professional judgement based on the baseline condition of the receptor should be used to determine a receptor's sensitivity.

11.4.3 Table 11.3 describes the guideline criteria used to assess the magnitude of change (i.e. impact) from the baseline condition that may result from the Proposed Development.

Table 11.3 – Criteria for Determining the Magnitude of Change

MAGNITUDE OF CHANGE	TYPICAL EXAMPLE*
High	Total loss of, or alteration to, the baseline resource such that characteristics or quality of the baseline resource is fundamentally and irreversibly changed due to the development.
Medium	Loss of or alteration to the baseline resource such that characteristics or quality of the baseline resource is partially changed due to the development.
Low	Small changes to the baseline resource due to the development, which are detectable, but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions.
Negligible	A very slight change to the baseline conditions due to the development, which is barely distinguishable, and approximates to the 'no change' situation.

Note
* The examples given apply to all phases of development considered in the assessment.

11.4.4 The scale or level of effects is determined in relation to the sensitivity of the receptor and the potential magnitude of change from baseline conditions, using the matrix shown in Table 11.4.

Table 11.4 – Matrix for Determining Scale of Potential Effects

		RECEPTOR SENSITIVITY				
		Very High	High	Medium	Low	Very Low
MAGNITUDE OF CHANGE FROM BASELINE CONDITION	High	Major	Major	Moderate	Moderate	Minor
	Medium	Major	Moderate	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

11.4.5 Guideline criteria for categories of significant effects are included in Table 11.5. Effects that have been determined to be Major or Moderate are considered to be 'Significant' in EIA terms. Effects that are identified as Minor or Negligible are considered to be 'Not Significant.'

Table 11.5 – Guideline Criteria for Categories of Significant Effect

SCALE OF EFFECT	SIGNIFICANT EFFECT?	DEFINITION	GUIDELINE CRITERIA
Major	Yes	A fundamental change to the environment	Changes in water quality or quantity affecting widespread catchment or groundwater resources of strategic significance or changes resulting in substantial loss of conservation value to aquatic habitats and designations.
Moderate	Yes	A large, but non-fundamental change to the environment	Changes in water quality or quantity affecting part of a catchment or groundwaters of moderate vulnerability, or changes resulting in loss of conservation value to aquatic habitats or designated areas.
Minor	No	A small but detectable change to the environment	Localised changes in drainage patterns or groundwater flow, or changes resulting in minor and reversible impacts on surface and groundwater quality or aquatic habitats.
Negligible	No	No detectable change to the environment	No impact on drainage patterns, surface and groundwater quality or aquatic habitat.

11.5 Baseline Conditions

Current Baseline Conditions

Climate

11.5.1 Average rainfall data has been obtained from the nearest Meteorological Office climate station to the Site (located at RAF Coningsby[7], approximately 10 km northeast of the Site at National Grid Reference (NGR) TF 22767 56686) for the stand period 1991-2020, as shown in Table 11.6. The UK Climate Projection (UKCP18) are available on the Met Office website.[8]

11.5.2 The Site experiences a wet period during the autumn and a dry period in the winter. This follows a similar pattern to the overall UK average monthly rainfall.

[7] Met Office (2025) Coningsby [online]. Accessed January 2025. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcryh17qz

[8] Met Office (2025) Land Projections Maps: Probabilistic Projections [online]. Accessed January 2025. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/summaries/climate-change-projections-over-land.

However, overall, the region is drier than the UK monthly rainfall averages and the east and northeast of England averages.

11.5.3 Table 11.6 presents the percentage change in precipitation for the 90th percentiles for the four emission scenarios for winter and summer periods for the available time slices, referred to in the note in Table 11.6 as Representative Concentration Pathways (RCP). The UKCP18 for the majority of the emission scenarios and time slices predicts wetter winter and summer conditions.

Table 11.6 – Average Rainfall and Climate Change Projections

PROJECTIVE CHANGE IN PRECIPITATION (%) FOR EAST MIDLANDS BASIN WINTER AND SUMMER PERIODS						
Season:	**Winter**			**Summer**		
Time Slice:	2020-2039	2040-2059	2060-2079	2020-2039	2040-2059	2060-2079
RCP2.6*	+10 to +20 %	+10 to +20 %	+10 to +20 %	+10 to +20 %	0 to +10 %	0 to +10 %
RCP4.5*	+10 to +20 %	+10 to +20 %	+20 to +30 %	+10 to +20 %	+10 to +20 %	0 to +10 %
RCP6.0*	+10 to +20 %	+10 to +20 %	+20 to +30 %	+10 to +20 %	+10 to +20 %	0 to +10 %
RCP8.5*	+10 to +20 %	+20 to +30 %	+30 to +40 %	+10 to +20 %	0 to +10 %	0 to +10 %

Month	**Average Rainfall (mm)**	**Average Rainfall (mm) With Projective Change in Precipitation**			
		+10 %	**+20 %**	**+30 %**	**+40 %**
January	47.61	52.37	57.13	61.89	66.65
February	37.78	41.56	45.34	49.11	52.89
March	34.79	38.27	41.75	45.23	48.71
April	40.23	44.25	48.28	52.30	56.32
May	45.80	50.38	54.96	59.54	64.12
June	57.05	62.76	68.46	74.17	79.87
July	54.77	60.25	65.72	71.20	76.68
August	58.72	64.59	70.46	76.34	82.21
September	51.37	56.51	61.64	66.78	71.92
October	59.47	65.42	71.36	77.31	83.26
November	56.04	61.64	67.25	72.85	78.46
December	50.44	55.48	60.53	65.57	70.62
Annual Total	594.07	653.48	712.88	772.29	831.70

Note
Average rainfall does not include provision for evaporation and evapotranspiration.
Emission Scenarios: RCPs (Representative Concentration Pathways) are scenarios of future concentrations of greenhouse gases and other forcings.
RCP2.6 = 1.6°C (0.9-2.3°C) change in global temperature by 2081-2100.
RCP4.5 = 2.4°C (1.7-3.2°C) change in global temperature by 2081-2100.
RCP6.0 = 2.8°C (2.0-3.7°C) change in global temperature by 2081-2100.
RCP8.5 = 4.3°C (3.2-5.4°C) change in global temperature by 2081-2100.
* 90th Percentile selected -the three percentiles (10th 50th and 90th reflect the likelihood of those temperatures occurring under that emissions scenario.

11.5.4 Average temperature data has been obtained from RAF Coningsby Climate station[7] for the standard period 1991-2020, as shown in Table 11.7. The UKCP18 are available on the Met Office website.

11.5.5 Table 11.7 presents the temperature change in temperature for the 90th percentiles for the four emission scenarios for winter and summer periods for the available time slices. The UKCP18[8] for the majority of emission scenarios and time slices predict warmer winters and warmer summers.

Table 11.7 – Average Temperature and Climate Change Projections

PROJECTIVE CHANGE IN TEMPERATURE (°C) FOR EAST MIDLANDS BASIN WINTER AND SUMMER PERIODS						
Season:	**Winter**			**Summer**		
Time Slice:	2020-2039	2040-2059	2060-2079	2020-2039	2040-2059	2060-2079
RCP2.6*	+1 °C - +2 °C	+2 °C - +3 °C	+2 °C - +3 °C	+2 °C - +3 °C	+2 °C - +3 °C	+2 °C - +3 °C
RCP4.5*	+1 °C - +2 °C	+2 °C - +3 °C	+2 °C - +3 °C	+1 °C - +2 °C	+2 °C - +3 °C	+3C - +4°C
RCP6.0*	+1 °C - +2 °C	+2 °C - +3 °C	+2 °C - +3 °C	+1 °C - +2 °C	+2 °C - +3 °C	+4°C - +5°C
RCP8.5*	+1 °C - +2 °C	+2 °C - +3 °C	+4°C - +5°C	+2 °C - +3 °C	+3C - +4°C	+5°C - +6°C

Month	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Maximum and Minimum Temperature (°C) With Projective Change in Temperature									
			+1°C		+2°C		+3°C		+4°C		+5°C	
			Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
January	7.27	1.24	8.27	2.24	9.27	3.24	10.27	4.24	11.27	5.24	12.27	6.24
February	8.13	1.31	9.13	2.31	10.13	3.31	11.13	4.31	12.13	5.31	13.13	6.31
March	10.66	2.69	11.66	3.69	12.66	4.69	13.66	5.69	14.66	6.69	15.66	7.69
April	13.63	4.66	14.63	5.66	15.63	6.66	16.63	7.66	17.63	8.66	18.63	9.66
May	16.77	7.55	17.77	8.55	18.77	9.55	19.77	10.55	20.77	11.55	21.77	12.55
June	19.65	10.43	20.65	11.43	21.65	12.43	22.65	13.43	23.65	14.43	24.65	15.43
July	22.20	12.45	23.20	13.45	24.20	14.45	25.20	15.45	26.20	16.45	27.20	17.45
August	22.06	12.32	23.06	13.32	24.06	14.32	25.06	15.32	26.06	16.32	27.06	17.32
September	19.00	10.15	20.00	11.15	21.00	12.15	22.00	13.15	23.00	14.15	24.00	15.15
October	14.71	7.36	15.71	8.36	16.71	9.36	17.71	10.36	18.71	11.36	19.71	12.36
November	10.34	3.79	11.34	4.79	12.34	5.79	13.34	6.79	14.34	7.79	15.34	8.79
December	7.46	1.49	8.46	2.49	9.46	3.49	10.46	4.49	11.46	5.49	12.46	6.49
Annual Total	14.36	6.31	15.36	7.31	16.36	8.31	17.36	9.31	18.36	10.31	19.36	11.31

Note

Emission Scenarios: RCPs (Representative Concentration Pathways) are scenarios of future concentrations of greenhouse gases and other forcings.
RCP2.6 = 1.6°C (0.9-2.3°C) change in global temperature by 2081-2100.
RCP4.5 = 2.4°C (1.7-3.2°C) change in global temperature by 2081-2100.
RCP6.0 = 2.8°C (2.0-3.7°C) change in global temperature by 2081-2100.
RCP8.5 = 4.3°C (3.2-5.4°C) change in global temperature by 2081-2100.
* 90th Percentile selected -the three percentiles (10th 50th and 90th reflect the likelihood of those temperatures occurring under that emissions scenario.

Surface Water

11.5.6 As shown on **Figure 11.1 Regional Surface Water Catchments (Document Ref: 6.4 ES Vol.3, 6.4.62)**, the majority of the Site is located within the EA's 'Black Sluice IDB draining to the South Forty Foot Drain' surface water catchment.[9] This waterbody is monitored by the EA under the WFD and it was assigned an overall 'moderate ecological status' in 2019 and falling to an overall 'poor ecological status' in 2022.[9]

11.5.7 The majority of the Site is located within the Black Sluice IDB area. Only the west of the Solar Array Area is not located within the Black Sluice IDB area. 77.2 % of the Site is within the Black Sluice IDB area.

11.5.8 The IDB's Ewerby Fen Pumping Station is located adjacent to the eastern boundary of the Solar Array Area, which controls the flows within the Midfodder Dike and by extension the downstream section of the Hodge Dike.

11.5.9 On the local scale, as shown on **Figure 11.2 Local Surface Water Catchments (Document Ref: 6.4 ES Vol.3, 6.4.63)**, the Solar Array Area, Bespoke Access Corridor and northern portion of the Cable Route Corridor are located within the Heckington Eau Surface Water Catchment. The rest of the Cable Route Corridor is situated within the South Forty Foot Drain Surface Water Catchment. Table 11.8 shows the proportion of the Site within each catchment.

Table 11.8 - Percentage of the Site within Surface Water Catchment

CATCHMENT	CATCHMENT AREA (HA)	PERCENTAGE OF SITE WITHIN CATCHMENT (%)
Heckington Eau	1781	81.3
South Forty Foot Drain	2137	18.7

11.5.10 Hydrological walkover surveys (see Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83) and Figure 11.6 Watercourse Crossings (Document Ref: 6.4 EA Vol.3, 6.4.67)) were undertaken in July 2023, March 2024 and December 2024 to record the hydrological characteristics of the watercourses within the Site and the study area.

11.5.11 There are a number of named watercourses located onsite, including:

- Hodge Dike (Main River);
- Heckington Eau (Main River);
- South Forty Foot Drain (Main River / Local Wildlife Site (LWS));
- Midfodder Dyke (Ordinary Watercourse);
- Catchwater Drain (Ordinary Watercourse);
- Twelve Drain (Ordinary Watercourse);
- Great Hele Eau (Ordinary Watercourse / LWS); and
- Old Sixteen Foot Drain (Ordinary Watercourse).

11.5.12 The Site also comprises a vast network of unnamed drains (ordinary watercourses), which are either IDB drains, private drains where the IDB takes

[9] Environment Agency (2025) Catchment Data Explorer: Black Sluice IDB draining to the South Forty Foot Drain Water Body [online]. Accessed January 2025. Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB205030051515.

a supervisory role or those outside of the IDB's area and so where the Lead Local Flood Authority (LLFA) is the supervisor. There is also likely the presence of field underdrainage throughout the Site.

11.5.13 Within the areas surrounding the Site, there are a number of named and unnamed watercourses, including the River Slea (also adjacent the northeastern corner of the Solar Array Area) and Hammond Beck (adjacent to the southwest of the southern section of the Cable Route Corridor, within the South Forty Foot Drain Surface Water Catchment). Head Dyke is located approximately 650 m to the east of the northern section of the Cable Route Corridor and is formed from the confluence between the Heckington Eau and the Hodge Dike, situated within the Heckington Eau Surface Water Catchment.

11.5.14 In general, the local watercourses drain to the east to south-east, towards The Wash (North Sea).

11.5.15 The Site is located within the Black Sluice IDB draining to the South Forty Foot Drain surface water Nitrate Vulnerable Zone (NVZ).[10] The Site is not located within a surface water Drinking Water Protective Area or a surface water Drinking Water Safeguard Zone.[10]

11.5.16 A summary of the watercourses and waterbodies in relation to each part of the Site is provided below.

Bespoke Access Corridor

11.5.17 For the Bespoke Access Corridor there are a few unnamed watercourses and small ponds located within this area.

11.5.18 Results from the hydrological walkover surveys identified that the watercourses surveyed along the Bespoke Access Corridor typically had channel widths between 0.8 to 2.4 m and the bank height was typically 1.2 m. Where water was encountered, this was around 0.4 m in depth but the depth depended on the time of year with lower water levels recorded during the July 2023 and March 2024 surveys. The drains tended to be uniform in height and material (soils / earth) for both banks. The banks also appeared to be fairly stable with limited signs of erosion and instability most likely due to the presence of vegetation and their straight channel. The drains also formed field boundaries and often hedgerows were present within the channels.

Solar Array Area

11.5.19 The Solar Array Area comprises of numerous drains varying in dimensions. Typically, the drains have channel widths of around 2 m with approximately 1 m bank heights. The named watercourses located within the Solar Array Area consist of the Catchwater Drain, Hodge Dike, Midfodder Dyke, and the Twelve Drain. The Catchwater Drain is typical of drains in the Solar Array Area, with bank height of 1.5 m and channel width of 2 m. The water depth in December 2024 was recorded as being 0.3 m. During the summer months, the drains typically have little to no water present with overgrown vegetation within the

[10] MAGIC Partnership (2025) MAGIC [online]. Accessed January 2025. Available at: https://magic.defra.gov.uk/MagicMap.aspx.

channel, however in the winter months water depths are between 0.04 to 0.4 m.

11.5.20 The Solar Array Area is bordered by various waterbodies, both onsite and nearby. Relative to the Solar Array Area, the following waterbodies can be found:

- A reservoir situated in the southern central section of the Solar Array Area;
- Small ponds located onsite, south of the Hodge Dike within the Solar Array Area;
- Small ponds at Hall Farm, located approximately 0.02 km south;
- A reservoir, located approximately 0.12 km northwest;
- Unnamed pond located north of the River Slea, approximately 0.20 km northeast;
- Unnamed pond located south of the River Slea, approximately 0.65 km north; and
- Haverholme Park Lake located approximately 1.80 km northwest.

Cable Route Corridor

11.5.21 The Cable Route Corridor crosses named watercourses including Heckington Eau, Great Hale Eau and South Forty Foot Drain. The Great Hale Eau has a channel width of approximately 6.0 m and 3.0 m bank heights. The water depth sat at around 1.2 m during the March 2024 survey with the channel composed of a silty substrate. The South Forty Foot Drain is considerably the largest watercourse with a width of approximately 10 m and bank heights of 6 m. Generally, drains within the Cable Route Corridor are 1 m to 2 m in width with banks heights of 1 to 1.5 m.

11.5.22 For the Cable Route Corridor, there is one pond located onsite at the Bicker Fen National Grid Substation. There are also several offsite waterbodies, including in the vicinity of the Cable Route Corridor:

- Six unnamed ponds associated with Ewerby Sewage Treatment Works, located approximately 0.75 km west;
- A reservoir located at Walks Farm, located approximately 0.14 km west;
- Unnamed pond at Holme House, located approximately 0.49 km east;
- An unnamed pond, located approximately 0.18 m west at Hall Farm;
- The Great Hale Fen Irrigation Reservoir, located approximately 0.4 km south; and.
- An unnamed pond located approximately 0.70 km southwest.

11.5.23 Heckington Eau headwaters begin in the high points to the west and north-west of the Site. The water drains east and south-east along Head Dyke and Skreth Drain into the South Forty Foot Drain at NGR TF22887 43138. Subsequently draining the Haven and out to the Wash at NGR TF 40430 39699.

11.5.24 The South Forty Foot Drain headwaters begin to the south of the Site, draining northwards along the South Forty Foot Drain, where the Great Hale Eau connects with the South Forty Foot Drain at NGR TF 20718 42624. The South

Forty Foot Drain catchment also drains out into the Haven and subsequently the Wash at NGR TF 40430 39699.

Geology and Hydrogeology

11.5.25 Soils across the Site belong to the following Soil Survey of England & Wales (1984) soils associations (see Chapter 14 Soils and Agriculture for further details):

- Wallasea 2 (813g)[11] - stoneless clayey soils, calcareous in places found in the Solar Array Area and the Cable Route Corridor;
- Beccles 3 (711t)[12] - slowly permeable seasonally waterlogged fine loamy over clayey soils, associated with similar clayey soils found in the Solar Array Area and the Cable Route Corridor;
- Ruskington (512c)[13] - deep permeable calcareous coarse and fine loamy and sandy soils affected by groundwater found in the Solar Array Area and the Cable Route Corridor; and
- Agney (812c)[14] - deep stoneless calcareous fine and coarse silty soils found in the Cable Route Corridor.

11.5.26 The British Geological Survey (BGS) published mapping, **Figure 11.3 Superficial Geology (Document Ref: 6.4 ES Vol.3, 6.4.64)**, shows the superficial deposits underlie the majority of the Site. The Bespoke Access Corridor is predominantly underlain by Till (diamicton) that extends into the Solar Array Area. There is an area of Sleaford Sand and Gravel at the southwestern end of the Bespoke Access Corridor and an area of Glaciofluvial Deposits towards the southern part of the Bespoke Access Corridor. Borehole records from the BGS[15] (BGS reference TF14NW9 and TF14NW4, included in **Appendix 11.4 Borehole Logs (Document Ref: 6.3 ES Vol.2, 6.3.84)**) record the Glaciofluvial Deposits to be 6 m thick and to be underlain by 2 m of Till.

11.5.27 The superficial deposits within the Solar Array area comprise of Tidal Flat Deposits, Till, Alluvium and Glaciofluvial Sheet Deposits.

11.5.28 The Cable Route Corridor is underlain by Till with small areas of Sleaford Sand and Gravel, Glaciofluvial Ice Contact Deposits, Glaciofluvial Sheet Deposits, and Tidal Flat Deposits. According to BGS boreholes[15] (BGS reference: TF14NE8, TF14NE9, TF14NE10, TF14NE14, TF14NE15, TF14NE17, TF14SE5, and TF14SE45), located along the Heckington Eau, groundwater was encountered in the Sleaford Sand and Gravel at 2.4 m to 2.6 m below ground level (bgl).

11.5.29 The Southern half of the Cable Route Corridor is entirely underlain by Tidal Flat Deposits.

[11] Landls (2025) Soil Association: 0813g WALLASEA 2 [online]. Accessed January 2025. Available at:https://www.landis.org.uk/soilsguide/mapunit.cfm?mu=81307&sorttype_association=map_unit_name.
[12] Landls (2025) Soil Association: 0711t BECCLES 3 [online]. Accessed January 2025. Available at: https://www.landis.org.uk/soilsguide/mapunit.cfm?mu=71120&sorttype_association=map_unit_name.
[13] Landls (2025) Soil Association: 0512c RUSKINGTON [online]. Accessed January 2025. Available at: https://www.landis.org.uk/soilsguide/mapunit.cfm?mu=51203&sorttype_association=map_unit_name.
[14] Landls (2025) Soil Association: 0812c AGNEY [online]. Accessed January 2025. Available at: https://www.landis.org.uk/soilsguide/mapunit.cfm?mu=81203&sorttype_association=map_unit_name.
[15] British Geological Survey (2025) GeoIndex Onshore [online]. Accessed February 2025. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html

11.5.30 The Bicker Fen National Grid Substation also lies entirely on Tidal Flat Deposits. BGS borehole records[15] (TF13NE11, TF13NE10 and TF13NE21) to the west of the substation identified groundwater levels in the Tidal Flat Deposits of 2.5 to 2.7 mbgl.

11.5.31 According to the EA's Aquifer Designation Map[10] the superficial deposits have the following aquifer designations:

- Tidal Flat Deposits – Unproductive Strata;[16]
- Till – Secondary Undifferentiated;[17]
- Glaciofluvial Ice Contact Deposits – Secondary A;[18]
- Glaciofluvial Sheet Deposits – Secondary A; and
- Sleaford Sand and Gravel - Secondary A.

11.5.32 According to BGS mapping, the only recorded made ground onsite relates to the reservoir within the Solar Array Area as shown on **Figure 11.3 Superficial Geology (Document Ref: 6.4 ES Vol.3, 6.4.64)**.

11.5.33 The bedrock geology underlaying the majority of the Site belongs to the Oxford Clay Formation – mudstone, as shown on **Figure 11.4 Bedrock Geology (Document Ref: 6.4 ES Vol.3, 6.4.65).** The east of the Solar Array Area, the northern part of the Cable Route Corridor and the northeastern area of the Cable Route Corridor are underlain by the West Walton Formation – mudstone and siltstone. Both the Oxford Clay Formation and the West Walton Formation are classed by the EA are unproductive strata. According the BGS 1:625,000 scale Hydrogeology Map, both bedrock formations are classed as "*rocks with essentially no groundwater*." According to the EA Catchment Data Explorer,[19] the Site is not located within groundwater catchment.

11.5.34 The Lincolnshire Limestone Formation, a Principal Aquifer, is present at depths of around 100 m beneath the Site. On a regional scale groundwater flow in the Lincolnshire Limestone Formation is towards the east.[20] Artesian conditions are known from the Lincolnshire Limestone Formation where the aquifer is confined by the Oxford Clay Formation and West Walton Formation.[21]

[16] Defined as "*Unproductive strata are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them*." Taken from Environment Agency (2025) Guidance: Protect groundwater and prevent groundwater pollution [online]. Accessed January 2025. Available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution#groundwater-definition

[17] Defined as "*aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value*." Taken from Environment Agency (2025) Guidance: Protect groundwater and prevent groundwater pollution [online]. Accessed January 2025... Available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution#groundwater-definition

[18] Defined as "*comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers*." Taken from Environment Agency (2025) Guidance: Protect groundwater and prevent groundwater pollution [online]. Accessed January 2025. Available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution#groundwater-definition

[19] Environment Agency (2025) Catchment Data Explorer: Anglian GW Management Catchment [online]. Accessed January 2025. Available at: https://environment.data.gov.uk/catchment-planning/ManagementCatchment/1000

[20] Institute of Geological Sciences (1967) Hydrogeological Map of North and East Lincolnshire [online]. Accessed January 2025. Available at: https://largeimages.bgs.ac.uk/iip/hydromaps.html?id=north-east-lincolnshire.jp2

[21] Environment Agency (2006) Baseline Report Series: 23. The Lincolnshire Limestone [online]. Accessed January 2025. Available at: https://nora.nerc.ac.uk/id/eprint/3557/1/CR06060N.pdf

11.5.35 The Site is not located within a groundwater NVZ, a groundwater drinking water safeguard zone or a groundwater Source Protection Zone (SPZ).[10]

Flood Risk

11.5.36 **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)** is the FRA, which includes a detailed description of the baseline from a flood risk perspective which is summarised in the following paragraphs.

11.5.37 The EA Flood Map for Planning shows that eastern areas of the Solar Array Area are located within fluvial Flood Zone 2 (medium probability – land defined as having a 1 % and 0.1 % chance of flooding each year) and fluvial Flood Zone 3 (high probability – land defined as having a greater than 1 % chance of flooding each year). Southern and western areas of the Site (including the entirety of the Bespoke Access Corridor and western portion of the Solar Array Area) are largely located within Flood Zone 1. Southern sections of the Cable Route Corridor and the Bicker Fen National Grid Substation are also located within Flood Zone 3.

11.5.38 The majority of Site areas are shown to be at a very low risk of surface water flooding (a less than 0.1 % annual probability of flooding) and any flooding would generally be less than 300 mm. Three significant overland flow routes extend through the Solar Array Area. The risk of groundwater flooding is considered to be low to medium and the risk of flooding from sewers and artificial sources is considered to be very low.

Private Water Supply, Discharges, and Abstractions

11.5.39 A request was made to NKDC (see Table 11.1) to provide information on private water supplies within 5 km of the Site. According to NKDC‘s records, there are no registered private water supplies onsite or within 2 km of the Site. Lincolnshire County Council has also been contacted (see Table 11.1) and has confirmed that it does not hold records of private water supplies.

11.5.40 The EA have provided data on abstractions within the Site and within the 2 km study area, which are presented in Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85) and shown on Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66). There are 23 licensed abstractions (although there are more abstraction points) within the study area, the predominant water use being spray and trickle irrigation. There are three licences for general agriculture (water transfer). Abstraction A7 is for groundwater but is located approximately 1 km up to the west of the Site and is likely to be an abstraction from deep Lincolnshire Limestone Formation (limestone) aquifer, which is likely to confined under the Oxford Clay Formation (mudstone) and the West Walton Formation (mudstone and siltstone), as seen on BGS Hydrogeological 1:126,720 scale map.[22]

11.5.41 The EA also provided data on permitted discharges to water and groundwater onsite and within 2 km of the Site, as shown on **Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)**. The EA identified 25 discharge consents, all the discharges relate to domestic or water company

[22] British Geological Society (2025) North East Lincolnshire Sheet 2: Hydrogeological Map of North and East Lincolnshire (1:126,720) – 1967. Accessed January 2025. Available at: https://largeimages.bgs.ac.uk/iip/hydromaps.html?id=north-east-lincolnshire.jp2

sewage discharge (see Table 11.9). None of these discharges are located onsite.

Table 11.9 – Discharges within 2 km of the Site

ID	CONSENT NUMBER	OPERATOR	SITE NAME	DISCHARGE TYPE	NGR	DISTANCE FROM THE SITE
D1	ANNNF1099	Anglian Water Services Ltd	Heckington STW	Sewage - water company	TF 15000 45400	0.84 km west
D2	AW3NF483	Anglian Water Services Ltd	Great Hale Pumping Station	Wastewater Treatment Works (WwTW) / Sewage Treatment Works (water company)	TF 15020 42600	1.73 km west
D3	PR3LFU293	Private Individual	Meads Farm	Domestic Property (single) (including farm house)	TF 11851 44670	0.70 km southeast
D4	PR3LFU5542	Private Individual	Asgarby Hall	Domestic Property (single) (including farm house)	TF 11661 45306	0.29 km south
D5	PRLFU5558	Private Individual	Carre Dyke Farm	Domestic Property (single) (including farm house)	TF 15900 41200	1.71 km southwest
D6	PRNNF18587	Private Individual	Court Row Farm Barn	Domestic Property (single) (including farm house)	TF 15550 45110	0.35 km west
D7	PRNNF09636	Not supplied	Not supplied	Not supplied	TF 21030 39460	0.14 km east
D8	PRNNF12164	Not supplied	Not supplied	Not supplied	TF 21158 41556	1.99 km east
D9	PRNNF18607	Not supplied	Not supplied	Not supplied	TF 21215 41557	1.92 km
D10	EPREP3925GY	Private Individual	35 Houses at Old Station Yard	Domestic property (multiple) (including farm houses)	TF 22110 42990	1.79 km north
D11	PRNNF18626	Not supplied	Not supplied	Not supplied	TF 21120 36780	1.04 km north
D12	PRNNF12058	Not supplied	Not supplied	Not supplied	TF 20150 43890	0.80 km north
D13	PR3LF686	Private Individual	Bargate Cottage	Domestic property (multiple) (including farm houses)	TF 22460 41540	0.73 km southeast
D14	PR3NFF742	Not supplied	Not supplied	Not supplied	TF 16980 43900	0.65 km north
D15	NPSWQD000304	Not supplied	Not supplied	Not supplied	TF 21160 41573	0.64 km southeast

ID	CONSENT NUMBER	OPERATOR	SITE NAME	DISCHARGE TYPE	NGR	DISTANCE FROM THE SITE
D16	PRNNF18173	Not supplied	Not supplied	Not supplied	TF 19070 44380	0.51 km southeast
D17	PRNNF12401	Not supplied	Not supplied	Not supplied	TF 19110 44540	0.78 km southeast
D18	NPSWQD008261	Not supplied	Not supplied	Not supplied	TF 22444 44137	0.84 km south
D19	PRNNF09584	Not supplied	Not supplied	Not supplied	TF 21130 38950	0.37 km south
D20	PR3LFU16	Private Individual	No 1 Cottage at Bridge Farm	Domestic property (single) (including farm house)	TF 21620 43007	0.35 km south
D21	PR3LFU1179	Private Individual	Staithe Cottage	Domestic property (multiple) (including farm houses)	TF 21868 39062	0.36 km south
D22	PRNNF12094	Not supplied	Not supplied	Not supplied	TF 22500 41870	0.55 km east
D23	PRNNF09979	Private Individual	Swineshead Bridge STW	WwTW (not water co) (not STP at a private premises)	TF 22050 43000	1.46 km east
D24	ANNNF13364	Anglian Water Services Ltd	Swineshead STW	Wastewater Treatment Works (WwTW) / Sewage Treatment Works (water company)	TF 22738 41946	0.87 km east
D25	NPSWQD002625	Not supplied	Not supplied	Not supplied	TF 22406 41456	1.83 km southeast

Hydro-ecology and Designated Sites

11.5.42 According to the MAGIC website,[10] there are no statutory designated sites (e.g. Ramsar, SPA, SAC or SSSI sites) present within the Site or within the 2 km study area.

11.5.43 Within 2 km of the Site there are a number of non-statutory LWS related to waterbodies with hydro-ecological importance as shown in Table 11.10, see **Chapter 7: Ecology (Document Ref: 6.2 ES Vol.1, 6.2.7)** for further information.

Table 11.10 - Non-Statutory Local Wildlife Sites within 2 km of the Site

SITE NAME	SUMMARY FEATURES	DISTANCE AND DIRECTION FROM THE SITE
Ewerby Pond	A flooded borrow pit bordered by small areas of fen and a hedgerow. The main interest at the site is marginal/fen habitat.	0.6 km north
Old Forty Foot to South Forty Foot Drain	A 0.95 km long channel. At the upstream end, the channel is 0.5 m wide, dominated by grassy vegetation and almost dry, whereas central and western parts are 2 m wide and hold water to a depth of circa 0.50 m. There is clear water throughout, but with plentiful algae midway along the drain.	0.6 km west
Cobbler's Lock and Reed beds	An area of tall scrubby fen, with some more open areas grading into wet woodland, damp grassland and dry reedbed.	0.75 km north
Broadhurst Drain East	This 0.73 km long channel and its banks extends upstream from Old Forty Foot Drain westwards to a hedge around Broadhurst Farm. The downstream end holds shallow, clear water 1.5 m across. On the southern drain bank there is botanically rich, open, managed grassland, whereas the unmanaged northern bank is characterised by a denser and longer sward.	0.8 km south
Old Forty Foot Drain	A 1.94 km long channel. Botanical interest declines slowly from south to north. The key aquatic species is the globally threatened fine-leaved water-dropwort *Oenanthe aquatica*, which is common south of Little Hale Drove.	1.2 km west

Future Baseline Conditions

11.5.44 The UK Climate Projections have predicted a +10 to +40 % change in rainfall values. An increase in rainfall could affect runoff across the Site and may alter river processes (e.g. erosion, deposition and the frequency and intensity of river flooding and ponding in depressions). This may correspond with an increase in groundwater levels and associated groundwater flooding.

11.5.45 The UK Climate Projections have also predicted a +1 °C to +5 °C change in temperature values. An increase in temperature could affect the amount of evapotranspiration in the catchments and subsequently increase rainfall. Furthermore, it is likely that an increase in air temperature will result in a corresponding increase in the water temperature of rivers and lakes.[23] Long-term trends observed between 1981 to 2005 in the UK surface waters revealed the greatest rates of change in water temperatures were in the

[23] Environment Agency (2007) Climate Change Impacts and Water Temperature, Science Report: SC060017/SR. Accessed January 2025. Available at: https://assets.publishing.service.gov.uk/media/5a7c07f2ed915d414762255d/scho0707bnag-e-e.pdf

Anglian basin.[23] This potential increase in water temperatures is likely to have important implications for some aquatic organisms through reduced flows in summer, decreases in Biological Oxygen Demand (BOD) and increases in phosphorus levels.

11.5.46 In a scenario where the Proposed Development is not constructed, the water flows through the Site and wider study area are likely to continue as per the baseline in the short term, although the frequency and intensity of flooding may increase due to climate change over time. This Chapter is supported by **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**, which provides a FRA that takes account of the climate change allowances.

11.6 Conceptual Site Hydrogeological Model

11.6.1 The Conceptual Site Hydrogeological Model (CSHM) illustrates water movement pathways from the ground surface to the bedrock. The baseline CSHM describes the pathways for the water environment baseline. Information on the water related components of the Proposed Development is then provided and the construction phase CSHM, operational phase CSHM and decommissioning phase CSHM are described.

11.6.2 The CSHM forms the basis of the assessment of effects in Section 11.7 and provides an explanation of how the Proposed Development may affect the baseline water environment. The evolution of the conceptual relationship between potential sources, pathways and receptors in the context of the water environment through the construction, operational and decommissioning phases of the Proposed Development is described in the rest of this section.

Baseline Conceptual Site Hydrogeological Model

11.6.3 The Site is located within Heckington Eau Surface Water Catchment and the South Forty Foot Drain Surface Water Catchment. Precipitation falls on the arable land and runs off into the onsite watercourses, a portion of water is intercepted by vegetation or the onsite above ground reservoir (used to supply water for irrigation purposes). Precipitation also falls directly into onsite watercourses, such as the Hodge Dike, Heckington Eau, South Forty Foot Drain, Catchwater Drain, Twelve Drain, Great Hele Eau and Old Sixteen Foot Drain (and their tributaries).

11.6.4 During periods of intensified rainfall, the proportion of direct runoff to surface water features is increased. These storm events create a more direct, faster pathway from a potential source to receptor. If surface water were present due to intensified rainfall, runoff would travel down the topographic gradient across both the onsite and offsite surface waterbodies and watercourses.

11.6.5 Where loamy and sandy soils or fine and coarse silty soils (Ruskington (512c) and Agney (812c) soils associations) are present, water will relatively easily infiltrate through the unsaturated zone soils into the underlaying superficial geology. Where stoneless clayey soils and fine loamy over clayey soils (Wallasea 2 (813g) and (Beccles 3 (711t) soil associations) are present, clayey soils are likely to inhibit infiltration and lead to seasonal waterlogged soils.

11.6.6 Superficial deposits onsite comprise of Secondary A aquifers (Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel), Secondary Undifferentiated aquifer (Till) and Unproductive strata (Tidal Flat Deposits). The Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel may be providing baseflow to watercourses in certain hydrological settings onsite and water is likely to percolate through these deposits relatively unhindered. This is supported by groundwater levels at the Bespoke Access Corridor being 1.05 to 5.00 mbgl, within the superficial deposits. This is also found at the Solar Array Area, where groundwater levels were found within the Till at 7.62 mbgl. The Cable Route Corridor also sees the superficial deposits supporting groundwater as groundwater levels were around 2.4 mbgl. Water in the Till is likely to be perched where water bearing deposits (e.g. sand and gravel) occur between more impermeable deposits such as clay. The Tidal Flat Deposits (clay and silt) and the clay component of Till are likely to inhibit percolation into the bedrock aquifer.

11.6.7 The bedrock underlaying the Site is comprised of Oxford Clay Formation (mudstone) and West Walton Formation (mudstone and siltstone), which are classed as unproductive strata and rocks with essentially no groundwater and, therefore, not considered a water resource. The Oxford Clay Formation and the West Walton Formation are both underlain by the Lincolnshire Limestone Formation, which is classed as a Principal Aquifer. The regional groundwater would typically be expected to be west to east (down topographic gradient towards the North Sea). However, the presence of public water abstractions (i.e. SPZs) offsite to the west of the Site means that any groundwater presence in the bedrock underlaying the Site flows to east to west towards the public water abstractions. The EA have produced a hydrogeological contour, which confirm regional groundwater flow is east to west. The Site is not located within an EA groundwater catchment or a SPZ.

11.6.8 The following surface water abstractions (see Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85) and Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)) are located upstream of the Site: A3b, A4a, A4b, A6, A7, A16a, A16b, A16c, A16d, A16e, A16f, A16g, A16h, A16i, A16k, A16l, A16m, A16n, A16o, A16p, A16q, A16r, A16s, A16u, A16W, A16x, A16y, A16z, A17, A19, A20a, A20b, and A22.

11.6.9 The following surface water abstractions (see Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85) and Figure 11.5 Abstractions and Discharges (Document Ref: 6.4 ES Vol.3, 6.4.66)) are located downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b.

11.6.10 Abstraction A7 is for groundwater but is located approximately 1 km to the west of the Site and is likely to be an abstraction from deep Lincolnshire Limestone Formation (limestone) aquifer, which is overlain by the Oxford Clay Formation (mudstone) and the West Walton Formation (mudstone and siltstone). Flow directions in the Lincolnshire Limestone Formation is down dip to the east, as seen on BGS Hydrogeological 1:126,720 scale map.[22]

11.6.11 There are five hydro-ecological designated sites within 2 km of the Site. The Ewerby Pond and Cobber's Lock and Reed Beds are both located upstream of the Site and not within a Local catchment (e.g., Heckington Eau Surface

Water Catchment or South Forty Foot Drain Surface Water Catchment) with the Site. Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East are all located downstream of the Site and within the South Forty Foot Drain Surface Water Catchment.

11.6.12 There are no registered private water supplies present within 2 km of the Site.

Water Related Components of the Proposed Development

11.6.13 This section of the CSHM provides information on the water related components of the Proposed Development, see **Chapter 2: Proposed Development (Document Ref: 6.2 ES Vol.1, 6.2.2)** for further details on the full extent of the Proposed Development. In terms of design components relating to the water environment these mainly comprise of the drainage strategy (see **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**) and proposed watercourse crossings (see **Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)**).

11.6.14 The percentage of the catchment that the Proposed Development footprint would occupy has been calculated below:

- The Proposed Development footprint represents 0.04 % of the South Forty Foot Drain Surface Water Catchment; and
- The Proposed Development footprint represents 1.10 % of the Heckington Eau Surface Water Catchment.

11.6.15 The percentage of the catchment that the Proposed Development footprint would occupy can be further broken down to consider the areas of the Site, which are to be covered by new impermeable surfaces. Impermeable surfaces include the BESS/Onsite Substation area of the Solar Array Area and comprise of 10.5 ha. The BESS/Onsite Substation is located within the Heckington Eau Surface Water Catchment and occupies approximately 0.59 % of this catchment. On the regional scale the new impermeable surfaces represent 0.02 % of the Black Sluice IDB area, draining to the South Forty Foot Drain surface water catchment.

11.6.16 The outline drainage strategy comprises the discharge of surface water by infiltration, where feasible. This will be achieved through the use of SuDS design to accommodate a 1 in 100 year plus climate change storm event such as infiltration devices, rainwater harvesting filter stripes, swales, infiltration and detention basins, wet ponds, constructed wetlands and underground attenuation.

11.6.17 In regard to watercourse crossings, Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83) and Figure 11.6 Watercourse Crossings (Document Ref: 6.4 EA Vol.3, 6.4.67) present the identified Bespoke Access Road, pedestrian footpath and cable watercourse crossings locations and provides information on the type of watercourse (e.g. Main River, Ordinary Watercourse, IDB Drain) and give an indication on the crossing type. There are 79 proposed crossings of mapped watercourses across the Site. Of the 79, eight of these crossings are proposed pedestrian

footbridges[24] and 36 are proposed vehicular tracks. These are all within the Solar Array Area. 35 of the crossings relate to the cable of the Cable Route Corridor and will be subject to either trenched or trenchless methods. The location of the proposed watercourse crossings are indicative and subject to detailed design. The watercourse crossing locations may be microsited. The micrositing tolerance for watercourse crossings would be limited to the same watercourse and within the DCO order limits (the Site).

11.6.18 For water demand for the Proposed Development, this falls into two categories: potable and non-potable. For each phase of development there are different potable and non-potable water demands, which include the below:

Construction and Decommissioning Phases:

Potable:
- Drinking Water
- Showers / Emergency Showers

Non-potable:
- Concrete batching
- Dust Suppression
- Welfare – e.g., toilets and hand washing
- Consumptive use of water for Horizontal Directional Drilling (HDD)

Operational Phase:

Potable:
- Drinking Water
- Showers / Emergency Showers

Non-potable:
- Welfare – e.g., toilets and handwashing
- Water used for firefighting / suppression and for the testing of the firefighting system
- Panel Cleaning
- Cooling system for batteries
- Irrigation of onsite habitats

11.6.19 In terms of water supply for the Proposed Development, the following options are being considered and will be confirmed during the detailed design stage:

- Rainwater harvesting
- Surface water or groundwater abstraction <20 m^3/day
- Surface water or groundwater abstraction >20 m^3/day
- Mains water <20 m^3/day
- Tankered supply

11.6.20 A number of options are being considered for the form of water storage (for all phases of the Proposed Development) onsite and this will be confirmed during the detailed design stage. The options being considered include: utilising the existing onsite reservoir and / or using above or below ground tanks. The number of firewater storage tanks will to be determined as part of the detailed

[24] The provision of footpaths (i.e., new footbridge crossings) across the Solar Array Area is subject to detail design.

design phase, however it is likely to be either two 120 m^3 tanks or four 60 m^3 tanks, in any case with a total capacity of 240 m^3.

11.6.21 Foul water and trade water effluent requiring disposal is likely to be generated from the following sources:

Construction and Decommissioning Phases:

- Welfare – e.g., toilets and hand washing

Operational Phase:

- Welfare – e.g., toilets and hand washing and showers
- Firefighting – disposal of used firewater
- Cooling system for batteries

11.6.22 In regard to foul water and trade effluent water there are a number of disposal options being considered including, which will be confirmed at the detailed design stage:

- Foul water from welfare – cesspit and tankering to a licenced waste facility. Portacabins with built in foul storage tanks are also being considered for the construction and decommissioning phases.
- Trade Effluent water from used firewater / cooling system – drain to storage tank and tankering to a licenced waste facility.

Construction Phase Conceptual Site Hydrogeological Model

11.6.23 The construction phase (as well as the decommissioning phase) is considered to be the phase of the Proposed Development when the receptors are at higher risk (in comparison to the operational phase) due to the various activities required to construct (and decommission) the Proposed Development. This section details the source, pathways and receptors associated with the main construction activities.

11.6.24 Regarding water quality, there are two key aspects of risk to receptors. These include the issue of increased sedimentation from ground disturbance, which can enter surface waterbodies and cause a degradation of water quality, and contamination from introduced contamination sources (e.g. oil / fuel) from accidental releases of oil / fuel from vehicles.

11.6.25 The release and mobilisation of sediment through earthworks during the construction and decommissioning phases may increase sediment contents of surface water flows during storm events within and downstream of the Site. The creation of access roads and the digging of cable trenches are examples of activities that will all cause ground disturbance, exposing soil and increasing the risk of sedimentation to surface flows. This is because these activities cause a temporary reduction of vegetation cover (through soil strips and track laying), reducing interception whilst also exposing soil as a source of sediment.

11.6.26 Rainwater can be channelised via infrastructure, such as access tracks creating shorter pathways for mobilised sediment and contaminants to be carried as runoff down gradient to low lying areas.

11.6.27 Where present, field underdrainage may act as a preferential pathway and, if disrupted or disconnected by construction activities, may lead to localised groundwater flooding.

11.6.28 Potential contamination sources are typically associated with vehicles / machinery, such as fuel and oil that could infiltrate through soils and superficial deposits to contaminate aquifers (free-phase and dissolved phase contamination).

11.6.29 Groundwater is conceptually at low risk from sediment, as the water is filtered as it percolates down, likely removing the fine sediment.

11.6.30 Watercourse crossing construction includes methods such as HDD activities (i.e. drilling under a watercourse, channel or roads). HDDs and other methods of trenchless techniques are a potential source of contamination. These activities may also result in the localised alteration and possible deterioration of water quality of the superficial deposits groundwater below the watercourse bed through the introduction of bentonite / polymer as a drilling mud additive. Depending on the drilling method, the borehole and pits themselves could act as a pathway to deeper groundwater from surface, enabling any contamination at the surface to penetrate to greater depth especially during storm events. Additionally, watercourse crossings for the cable include trenched methods such as cofferdam, which potentially could cause contamination to the watercourse through sediment release. For the Bespoke Access Corridor and Solar Array Area, footbridges and vehicular tracks will be constructed also posing as a potential source of sediment release during construction. A more detailed summary of watercourse crossings locations and methods is available in **Appendix 11.3 Summary of Watercourse Crossings and Photographs (Document Ref: 6.3 ES Vol.2, 6.3.83)**.

11.6.31 Panels do not require deep excavation for their foundations and will only be piled 1.0 to 2.5 metres of the ground, thus there will be minimal ground disturbance during solar panel installation.

11.6.32 None of the activities from the Proposed Development are likely to penetrate the ground to depths approaching or exceeding the depth of the Lincolnshire Limestone Formation. Therefore, the likelihood of artesian conditions affecting the Proposed Development or the water environment due to construction activities is considered to be negligible. The only exception to this is the potential for a deep borehole groundwater abstraction from the Lincolnshire Limestone Formation, which has the potential to cause a reduction in groundwater availability in the Principal Aquifer.

11.6.33 There is also potential for surface water abstractions, which could potentially cause reduction in surface water levels and flows in watercourses subject to the abstraction and downstream watercourses. Additionally, this could affect water availability for existing abstractions of these watercourses. The need for abstractions (surface water or groundwater) would be localised to the Solar Array Area. All required licences would be applied for once sufficient information is available at the detailed design phase (prior to start of the construction phase of work). Engagement with the Environment Agency specific to these aspects will be undertaken during this time. Any restrictions (e.g., only abstractions in winter periods) as specified in abstraction licence will be adhered to.

11.6.34 If previously unknown contamination is encountered through the course of excavation and earthworks, contamination could become mobilised in water and adversely affect downgradient surface water, groundwater and abstractions.

Operational Phase Conceptual Site Hydrogeological Model

11.6.35 During the operational phase, there will be a requirement for maintenance visits. Associated with this is the risk of accidental releases of oil / fuel from vehicles. The presence of impermeable surfaces and foundations for the Onsite Substation could affect local groundwater recharge and lead to an increase in local flooding. The presence of watercourse crossings could overtime lead to disruption / blockage of watercourse flow from watercourse crossing leading to flooding. Potential operational phase effects relate to:

- Pollution from spills and leaks of fuel, oil and chemicals from vehicles and maintenance works;
- Pollution from battery acid from breach of BESS battery acid containment system;
- Pollution from firewater as a result of a breach of the firewater containment system;
- Presence of impermeable structures causing a reduction in recharge to the underlying aquifer; thereby locally reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding;
- Presence of solar panels causing rainfall onto the angled panels which may cause erosion beneath the lower edge of each panel, resulting in erosion and sediment laden runoff;
- If previously unknown contamination is encountered through the course of maintenance activities and earthworks, contamination could become mobilised in water and adversely affect downgradient surface water, groundwater and abstractions.
- Long term use of watercourse crossings leading to disruption / blockage of watercourse flow from watercourse crossing leading to flooding; and
- Continued use of surface water / groundwater abstractions and the reduction in availability of water for other users.

11.6.36 Understanding the thermal effects of electrical cables on groundwater is an emerging topic and it is understood that the EA are currently developing guidance related to it. The Applicant has engaged with the EA in regarding to assessment of the thermal effects on groundwater and the EA has provided extracts from the emerging guidance as follows "*in the first instance the developer should ensure that where practicable the proposed cabling:*

is fully sealed

- *does not discharge pollutants other than heat transfer to the environment*
- *does not cause pollution of surface water or groundwater*
- *is not within a groundwater source protection zone 1 (SPZ1) that's used to supply water for domestic or food production purposes*

- *is not within 50m of a well, spring or borehole used to supply water for domestic or food production purposes*
- *installation does not mobilise any contaminants present in the subsurface to the extent that the pollution of groundwater occurs*
- *is not adjacent to a septic tank or cesspit, including the infiltration system*"

11.6.37 The final design of the cable trenches (including if these are fully sealed or not) will be confirmed at the detailed design phase and will be based upon the findings of ground investigations and consideration of any evidence, guidance or best practice that emerges. It is anticipated that the cables will be sealed (that is, the cable would not be exposed as it would have an insulation layer to protect the conductor) and there would therefore be no discharges from the cables and therefore the electrical cables would not cause pollution of surface water or groundwater. In addition, there are a number of measures in the Outline Construction Environmental Management Plan (OCEMP) (**Appendix 2.4: Outline Construction Environmental Management Plan (Document Ref: 6.3 ES Vol.2, 6.3.7),** which would protect surface water and groundwater from pollution during the installation of the cables. The CEMP produced in accordance with Requirement 12 of the Draft DCO **(Document Ref: 3.1)** will ensure the measures in the OCEMP are implemented (including a Bentonite Breakout Plan) and will include construction method statements for the installation of the cable trenches

11.6.38 In regard to the potential effects on groundwater, the Site is not located in SPZ1 (inner SPZ), the Cable Route Corridor is not located within 50 m of a well, spring, private water supply, licence groundwater abstraction or permitted discharge (i.e. not close to a septic tank or cesspit). Therefore, potential thermal effects on groundwater receptors are unlikely to occur. On this basis, this topic has not been considered further in the assessment as it is unlikely to give rise to significant effects.

11.6.39 In addition, the detailed design of the welfare facilities at the BESS/Onsite Substation would take into account potential thermal effects of the cables by locating the below ground structures for foul water treatment / storage (i.e. a cesspit) away from the cables and by the consideration of thermal protective materials / insulation of the cesspit if determined to be required. This is secured though requirements 5 (Detailed Design Approval) and 12 (CEMP) of the draft DCO **(Document Ref: 3.1).**

Decommissioning Phase Conceptual Site Hydrogeological Model

11.6.40 The decommissioning phase will have similar risks associated with it as the construction phase due to vehicle movements and removal of infrastructure, introducing potential sources of contamination (e.g. oil and grease) and disturbance of the ground exposing sediment. Potential decommissioning phase effects related to:

- Removal of principle features e.g. all PV modules, mounting structure, low voltage and medium voltage cabling, inverters, and transformers, which would lead to a decrease in impermeable area and obstructions to baseline flow pathways leading to pre-development runoff conditions and pre-development rainfall-runoff response time;

- Re-vegetation may lead to pre-development interception and evapotranspiration rates and pre-development runoff conditions;
- Reinstatement of soil profile may lead to pre-development infiltration rates and to pre-development runoff conditions; and
- The use of machinery during the decommissioning activities could cause pollution from spills or leakage of fuel and oil.
- If previously unknown contamination is encountered though the course of decommissioning activities and earthworks, contamination could become mobilised in water and adversely affect downgradient surface water, groundwater and abstractions.

11.6.41 The Cable Route (i.e. the 400 kV circuit including its trench) will not be removed as part of the decommissioning phase and instead will remain *in situ* as is standard industry practice. In the long term, the presence of the Cable Route could theoretically lead to contamination of groundwater from microplastics and metals if the cables / ducting comes into sustained contact with groundwater.

11.6.42 The depth of the Cable Route (approximately 2.5 m deep for open-cut trench excavations and up to 25 m depth for trenchless techniques) has been considered in regard to the current baseline groundwater elevations.

11.6.43 In regard to shallow groundwater in the superficial deposits is typically found around 2.4 mbgl when encountered along the Cable Route Corridor. Therefore, where the groundwater is shallower than 2.5 mbgl or where trenchless techniques are used there is the potential for the Cable Route to be in contact with groundwater in the superficial deposits.

11.6.44 The trenchless techniques for watercourse crossing (e.g. HDD) includes the use of bentonite, which will effectively isolate the Cable Route from the surrounding shallow groundwater (if present). The ratio of bentonite to water in the bentonite drilling slurry used for trenchless techniques for watercourse crossing will depend on the structural stability and composition of the surrounding superficial deposits. Where the superficial deposits comprise unconsolidated material (such as sand and gravels) the composition of the bentonite drilling slurry is likely to be 'thicker' and more clayey in structure, which would prevent a pathway to the shallow groundwater in the sand and gravels. Where the superficial deposits are consolidated or where naturally occurring clay is present in the superficial deposits (e.g. Till), the bentonite drilling slurry is likely to have higher water content. The naturally occurring clay along with the bentonite would afford the groundwater protection from the Cable Route. The bentonite also helps to prevent fluid loss by forming a filter cake on the walls of the borehole. This filter cake acts as a barrier, preventing the excessive fluid loss from being absorbed into the surrounding superficial deposits. The method statement and materials used for the trenchless techniques for watercourse crossings will be finalised at detailed design and will be reflected in the Bentonite Breakout Plan of the detailed CEMP (secured by Requirement 10 of the draft DCO **(Document Ref: 3.1)**).

11.6.45 It should also be noted that shallow groundwater is not expected to be encountered along the entire Cable Route, this therefore limits the potential for contamination of shallow groundwater units. It should be noted that future groundwater elevations are very difficult to predict particularly those in superficial deposits, as they are more readily influenced by changes of land

use. Therefore, at the time of writing, there is uncertainty if groundwater elevations in the superficial deposits are likely to be to in contact with the Cable Route at decommissioning and post-decommissioning.

11.6.46 The Lincolnshire Limestone Formation aquifer is found at depth and is overlain by the Oxford Clay Formation and West Walton Formation, which are unproductive strata and provide the Lincolnshire Limestone Formation aquifer protection from mobilised contaminated water from the surface and shallow groundwater. Therefore, the Lincolnshire Limestone Formation aquifer is not at risk of effects associated with the Cable Route.

Sensitive Receptors

11.6.47 Table 11.11 summarises the potential receptors and the reasons for inclusion or exclusion from the assessment. The water receptors identified within Table 11.11 that are shown as 'not at risk' from the Proposed Development have been scoped out of the assessment and are not considered further.

Table 11.11 – Summary of Receptors and Sensitivity

RECEPTOR	DISTANCE FROM SITE	SUMMARY OF RECEPTOR CHARACTERISTICS	RECEPTORS SENSITIVITY	RECEPTOR AT RISK FROM PROPOSED DEVELOPMENT?
Heckington Eau Surface Water Catchment	The Site is within this catchment	Comprised of Main Rivers, Ordinary Watercourses and IDB drains. Within Black Sluice IDB area.	Medium	Yes - The Site is within the surface water catchment.
South Forty Foot Drain Surface Water Catchment	The Site is within this catchment	Comprised of Main Rivers, Ordinary Watercourses and IDB drains. Within Black Sluice IDB area.	Medium	Yes - The Site is within the surface water catchment.
Lincolnshire Limestone Formation Aquifer	Underlies the Site	Principal Aquifer	High	Yes – Only at risk of effects from a potential groundwater abstraction
Tidal Flat Deposits, Oxford Clay Formation and West Walton Formation.	Underlies the Site	Unproductive Strata.	None	No - Not considered water receptors.
Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers.	Underlies the Site	Secondary A Aquifer.	Medium	Yes - Underlies the Site.
Water in Till.	Underlies the Site	Secondary Undifferentiated.	Low	Yes - Underlies the Site.
Abstractions Located Upstream / Upgradient of the Site: A3b, A4a, A4b, A6, A7, A16a, A16b, A16c, A16d, A16e, A16f, A16g, A16h, A16i, A16k, A16l, A16m, A16n, A16o, A16p, A16q, A16r, A16s, A16u,	Various, see **Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85)**	Surface water abstractions and one groundwater abstraction (A7) used for Spray and Trickle Irrigation and general agricultural transfer.	High	No - These abstractions are located upstream of the Proposed Development.

RECEPTOR	DISTANCE FROM SITE	SUMMARY OF RECEPTOR CHARACTERISTICS	RECEPTORS SENSITIVITY	RECEPTOR AT RISK FROM PROPOSED DEVELOPMENT?
A16w, A16x, A16y, A16z, A17, A19, A20a, A20b, and A22.				
Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	Various, see **Appendix 11.5 Abstractions within 2km of the Site (Document Ref: 6.3 ES Vol.2, 6.3.85)**	Surface water abstraction used for Spray and Trickle Irrigation and general agricultural transfer.	High	Yes – These abstractions are located downstream of the Proposed Development.
LWS located upstream: Ewerby Pond and Cobbler's Lock and Reed bed's	0.6 km	LWS with hydro-ecological significance	Low	No – These LWS are located upstream of the Proposed Development and not within the same local catchment.
LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot drain, Old Forty Foot Drain, and Broadhurst Drain East	0.75 to 1.2 km	LWS with hydro-ecological significance	Low	Yes – These LWS are located downstream of the Proposed Development and within the South Forty Foot Drain Surface Water Catchment

11.7 Assessment of Effects

Embedded Mitigation

11.7.1 Throughout the pre-application design stage, the initial layout and locations of the access tracks (including the Bespoke Access Road) and ancillary infrastructure have been designed to avoid hydrologically sensitive areas. A minimum preferred separation distance of up to 5 m from built development was applied along or around every watercourse and waterbody and was taken into consideration into the Proposed Development design, as far as possible. The preferred separation distance has not been implemented at proposed watercourse crossing locations, as by their nature watercourse crossings are required to be in proximity to watercourses and appropriate consents would be applied for these (see **Other Consents and Licences Statement (Document Ref: 5.4)**). In addition, the 5 m preferred separation distance has also not been applied where existing infrastructure (e.g., existing onsite tracks) have been incorporated into the Proposed Development. There will also be a 9 m buffer from all watercourses and waterbodies, within which there will be no new infrastructure that would impede access to the watercourse or waterbody. Activities that would occur within 5 to 9 m of watercourses and waterbodies include temporary (e.g. no longer than one month storage time) storage of construction materials and topsoil from cable trenches, access tracks, permissive footpaths and ecological enhancement.

11.7.2 The access tracks within the Site are being routed to make as much use of existing tracks across the Site as possible, upgrading where required, to minimise the requirement for entirely new tracks and watercourse crossings.

11.7.3 Underground cabling will, wherever possible, aim to follow the same route as the access tracks to reduce the ground disturbance across the Site. Where trenchless techniques are proposed, the shortest practicable route will be used and where open cut crossing are proposed, measures will be implemented to maintain water flows downstream of the crossing during construction and these crossings will be designed to prevent scour of the watercourse bed. The routing of access tracks and cabling will be designed to minimise the overall environmental effect and to limit the number of watercourse crossings.

11.7.4 SuDS will be developed and maintained throughout the Proposed Development. SuDS will be utilised within the Site to provide conveyance and storage for surface water runoff, as well as water quality treatment and enhancing biodiversity. SuDS mitigation includes use of swales and detention basins, which are to be monitored to maintain effectiveness.

11.7.5 Other embedded mitigation measures in relation to flood risk are as follows:

- Solar panels will be raised up to 600 mm above the depth of flooding;
- Transformers will be constructed on raised bunds up to 600 mm above the 1 in 100 year plus climate change breach flood depth;
- Base fence panels will be designed to have sufficient width to allow debris to flow and prevent blockage; and
- All proposed bridge crossings, temporary and permanent, will be constructed in accordance with flood permits granted by the EA, LCC or the IDB to ensure there would be no increased flood risk upstream or to the Site itself.

Construction Phase

11.7.6 The Proposed Development will be undertaken in-line with current guidance and codes of best practice. The following documents include details of best practice industry guidance intended to prevent adverse impacts during construction:

- GPP1 Understanding your environmental responsibilities - good environmental practices;[1]
- GPP2 Above Ground Oil Storage Tanks;[1]
- GPP4 Treatment and disposal of wastewater where there is no connection to the public foul sewer;[1]
- GPP5 Works and Maintenance In or Near Water;[1]
- GPP6 Working at Construction and Demolition Sites;[1]
- GPP8 Safe Storage and Disposal of Used Oils;[1]
- GPP13 Vehicle washing and cleaning;[1]
- GPP21 Pollution Incident Response Planning;[1]
- GPP22: Dealing with spills;[1]
- GPP26 Safe storage - drums and intermediate bulk containers;[1]

- CIRIA C532 Control of Water Pollution from Construction Sites;[25]
- CIRIA C811 Environmental good practice on site guide;[26]
- CIRIA C750 Groundwater control - design and practice;[27]
- CIRIA C753 The SuDS manual;[28] and
- CIRIA C786 Culvert, screen, and outfall manual.[29]

11.7.7 The measures detailed in these guidance documents will limit the potential for disturbance or contamination of water resources and will be adopted.

11.7.8 The Outline Construction Environmental Management Plan (OCEMP) (**Appendix 2.4: Outline Construction Environmental Management Plan (Document Ref: 6.3 ES Vol.2, 6.3.7))** incorporates the principles of good practice, legislation, regulations and guidance. The OCEMP takes into account the current good practice, legislation, regulations and guidance at the start of construction and will be updated throughout the construction phase if any new or amended relevant documents are produced. With respect to protection of water resources, the OCEMP will provide practical measures to avoid and minimise the impact of the Proposed Development on ground and surface waters, as well as providing emergency preparedness and corrective actions together with measures for monitoring, recording**,** and disseminating of information.

11.7.9 Of relevance to this assessment, the OCEMP includes the following measures:

- A number of measures will be adopted to prevent and control the release of sediment, with the measures used depending upon the situation encountered onsite. Examples of measures include surface water being directed across vegetated zones or through mesh fencing to capture sediment, as appropriate. Alternatives, such as sediment traps or settlement lagoons, may also be considered if the quantity of sediment laden water is anticipated to be large. Maintenance measures would ensure that sediment control measures, drains and potholes would be regularly inspected and cleared / infilled / repaired;
- The OCEMP includes reference to contingency procedures being in place for the eventuality that unexpected contamination is encountered during construction. These comprise a ‘stop protocol’, testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process;

[25] Construction Information Research and Information Association (2001) C532 Control of Water Pollution from Construction Sites [online]. Accessed January 2025. Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532.

[26] Construction Information Research and Information Association (202) C811 Environmental good practice on site guide [online]. Accessed January 2025. Available at: https://www.ciria.org/ci/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=C811&Category=BOOK

[27] Construction Information Research and Information Association (2016) C750 Groundwater control - design and practice [online]. Accessed January 2025. Available at: https://www.ciria.org/ItemDetail?iProductCode=C750&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91.

[28] Construction Information Research and Information Association (2015) CIRIA C753 The SuDS Manual [online]. Accessed January 2025. Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753

[29] Construction Information Research and Information Association (2019) C786 Culvert, screen and outfall manual [online]. Accessed January 2025. Available at: https://www.ciria.org/News/Press_centre2/Culvert_screen_and_outfall_manual_C786_press.aspx

- All fuel, oils and other polluting substances would be securely stored in suitably bunded containers on impermeable surfaces. The total quantity and range of potential pollutants to be used onsite is anticipated to be small. Static machinery and plant would, where practicable, have integral drip trays of 110 % of the capacity of the fuel tank. The use of biodegradable oils and lubricants will also be used, where practicable. All plant, vehicles and machinery will be inspected regularly for leaks. Refuelling would be undertaken in a designated refuelling area;
- If field underdrainage is encountered, in the first instance, measures to avoid damage or disruption to the underdrainage system will be implemented, by micrositing excavations. Where this is not practicable, field underdrainage would be diverted or replaced or such other solution required to alleviate flooding in consultation with the landowner. Field underdrainage will only be replaced/mended when damaged by the Proposed Development and therefore field underdrainage will be repaired to the same standard to its prior state;
- Confirmation, detailed design, and further detailed survey of watercourse crossings required to facilitate access to the Proposed Development will be required prior to construction. The EA / IDB will be consulted on the level of authorisation for engineering works in the water environment and appropriate permissions will be sought during the detailed design stage but prior to the start of construction;
- Pollution incident response plans will be prepared for incorporation into the construction phase detailed CEMP(s) and will identify the type and location of onsite resources (e.g. spill kits, absorbent materials, oil booms etc.) available for the control of accidental releases of pollution and other environmental incidents. Cement / concrete mixes will be calculated to ensure that sufficient quantities are supplied (without needing to dispose of any excess), and that the cement / sand mix ratio will be monitored for consistency and suitability; The time any excavation is open will be kept to a minimum to avoid ingress and removal of water;
- Where appropriate, temporary cut-off drains will be installed to prevent shallow throughflow entering excavations. Treated / clean water would be discharged downstream of the excavation and encouraged to infiltrate into the ground mimicking natural flow patterns;
- Excavations will be reinstated as soon as practicable once construction works are complete and will ensure that natural hydrological conditions are restored as far as possible;
- All new and upgraded access tracks, include those relating to the Bespoke Access Road, will be constructed with a suitable camber and will have a permeable, granular surface;
- Where the access tracks, include those relating to the Bespoke Access Road, are oriented parallel to the dominant flow direction, transverse drains will be constructed, where appropriate, in the surface of the access track to convey runoff into adjacent drainage ditches. This would help prevent the tracks from acting as a preferential flow path for surface runoff;

- Where access tracks are oriented perpendicular to the dominant flow direction the trackside drainage will include a lateral drainage channel cut along the uphill side of the track to intercept the natural runoff and shallow throughflow and this will be conducted under the track at regular intervals through cross drainage pipes. The trackside drains will be broad and shallow with moderate gradients to prevent scouring;
- Where possible, storage of materials and stockpiling to be located outside the functional fluvial floodplain (Flood Zone 3a), flood storage areas and areas known to be at risk of surface water flooding. Excavated materials will be placed to ensure a 1 m gap is provided at 10 m intervals for any linear stockpiles that intersect existing overland flow routes;
- Pouring of concrete for foundations will take place within well shuttered pours to prevent egress of concrete from the pour area;
- Pouring of concrete or cement bound sand during adverse weather conditions will be avoided, where possible;
- Preference to strip soils and vegetation should only be carried out under the driest practicable conditions, this must take into account of prevailing weather conditions;
- Use of track mats to prevent unnecessary soils compaction, damage to vegetation, and/or erosion;
- Grass seeding after installation of panels to encourage grass regrowth;
- SuDS features will undergo regular maintenance and monitoring to ensure they are working effectively and not blocked;
- For the interest of protection of Anglian Water Assets, the following mitigation will be put in place:
    - The use of penetrating radar (CAT) before excavation to identify any unknown utilities will be undertaken;
    - If assets are identified then they will be protected from damage and from vehicles driving over them. This will include signage about the asset to allow people to identify where the assets are;
    - Where assets are to be crossed (to be advised by Principal Contractor), ramps will be used to spread the load across the crossing point;
    - Environmental clerk of works (ECoW) will supervise works around assets; and
    - If during the detailed design phase, it is identified that Anglian Water Assets are in close proximity to construction works, a construction method statement would be prepared taking into account protection measures for that asset. In addition, the detail design will include and incorporate these protection measures into the final design.

11.7.10 Within the construction phase detailed CEMP, a bentonite breakout plan or equivalent will be included and set out the response to a breakout of bentonite during construction.

Operation Phase

11.7.11 Mitigation of effects upon flow rates and volumes of watercourses within the surface water catchments would be achieved through design of a suitable surface water drainage scheme for the Proposed Development, which takes into account climate change (1 in 100 year plus climate change event). The drainage proposals would ensure that the existing greenfield rate of surface water runoff discharged to the adjacent watercourses is maintained and (in the long-term) can take into account and accommodate climatic changes. A drainage strategy has been prepared for the Proposed Development, see **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**. In addition, during the operational phase, in order to mitigate the potential for pollution from maintenance activities, best practice recommends all vehicles and plant to carry a spill kit.

11.7.12 Depending on the nature of maintenance activities during the operational phase, these may include excavations and earthworks, which present a small possibility that previously unrecorded contaminated ground might be encountered. A general watching brief for evidence of contamination will be undertaken during the operational maintenance activities.

11.7.13 If visual / olfactory evidence of contamination is encountered, maintenance activities in the area will cease and a suitably qualified and experienced geoenvironmental consultant will be contacted. The local planning authority will be notified of the incident and depending on the nature and extent of the contamination, the EA may also be consulted to ensure appropriate regulatory oversight.

11.7.14 Under the direction of the geoenvironmental consultant, the area of concern will be examined. If required, samples of potentially contaminated material will be taken and analysed at an accredited laboratory to determine if the material meets the required criteria to be protective of human health and the environment. The results will be discussed with the EA and / or relevant planning authority, as appropriate.

11.7.15 Pending the laboratory results of the samples, the extent of the potential contamination will be delineated where practicable. It may be appropriate to separately stockpile arisings of potentially contaminated material on low permeability membrane to prevent leaching. Dust suppression and stockpile management (e.g. sheeting) will be provided as necessary to minimise airborne emissions and/or leachate generation from soils affected by contamination.

11.7.16 Material deemed unsuitable for reuse within the project will be removed from the Site and either disposed of to appropriate landfill or treated at a soil treatment centre to facilitate reuse (where appropriate).

11.7.17 Upon receipt of the laboratory results, the results will be screened against suitable generic assessment criteria and assessed in accordance with Land Contamination Risk Management (LCRM) guidance. If concentrations above the criteria are encountered, the findings of the assessment will be used to determine the risks and the appropriate course action.

11.7.18 Should contamination be identified, piling activities will be conducted in-line with a risk assessment prepared in accordance with EA guidance documents

'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.'[30] In addition, any piling risk assessments prepared under these guidelines will be submitted to the EA for review prior to implementation, to ensure alignment with regulatory expectations and pollution prevention standards.

11.7.19 The findings of the sample testing will be included within the health and safety risk assessment and method statement for the maintenance works. This will include instruction to maintain a watching brief during the works for evidence of contamination and, where necessary, site briefings and toolbox talks (TBT) relating to the contamination encountered and the implementation of such measures as appropriate use of Personal Protection Equipment (PPE) and dampening stockpiles of excavated material to prevent dust generation.

11.7.20 Where required, a remediation strategy will be prepared, which will then be submitted to and approved by the local authority Environmental Protection Team. In line with best practice, the remediation strategy will also be submitted to the EA for review.

11.7.21 Following the completion of remediation works, a verification report will be produced. This report will include data collected during the remediation process and will demonstrate that the agreed measures have been successfully implemented. The verification report will be submitted to the local planning authority and the EA, as appropriate, to confirm that the Site is suitable for continued development.

11.7.22 Maintenance activities in the affected area will only recommence once the remediation strategy has been implemented and verified, and formal confirmation has been received from the relevant planning authority and, where applicable, the EA. This ensures that all risks associated with the contamination have been appropriately mitigated and that the Site is safe for ongoing works.

11.7.23 Contingency procedures will be in place for the eventuality that unexpected contamination is encountered during maintenance activities. These will comprise a 'stop protocol', testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process.

11.7.24 In addition to pollution prevention, further details on fire safety management can be found in the **Outline Battery Safety Management Plan (OBSMP) (Document 7.2)**.

11.7.25 During the operational phase, any contact between water and cement-bound sand in cable trenches during the curing process would inherently result in alkaline pH issues, which would require treatment via a lamellar settlement tank (or equivalent) prior to permitted discharge to surface water. Cable trenches will be designed to be completely isolated from rainfall via clay capping and from nearby watercourses via clay plugs place within cable trenches to prevent flow within backfilled trenches to prevent this. This will effectively fully seal the cable trenches meaning there will be no discharges associated with the cable trenches during the operational phase, which

[30] CL:AIRE (2025). Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention. ISBN: 978-1-905046-51-5. Accessed November 2025 Available at: https://claire.co.uk/phoca-download/1-publications-library/22-important-industry-documents.html?download=1042:piling-guidance.

removes the potential for pollution of surface water or groundwater. The final design of the Cable Route will be confirmed at the detailed design phase and will be based upon the findings of ground investigations.

Decommissioning Phase

11.7.26 Decommissioning phase mitigation will be similar to construction phase mitigation. A detailed decommissioning environmental management plan, secured by Requirement 18 of the **Draft DCO (Document Ref: 3.1)**, substantially in accordance with the Outline Decommissioning Environmental Management Plan (ODEMP) (**Appendix 2.5: Outline Decommissioning Environment Management Plan (Document Ref. 6.2 ES Vol.2, 6.3.8)**) must be submitted to the local planning authority for approval and must be implemented as approved.

11.7.27 Additionally, the ODEMP includes reference to contingency procedures being in place for the eventuality that unexpected contamination is encountered during decommissioning. These comprise a 'stop protocol', testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process.

Assessment of Effects

Construction Phase

11.7.28 Construction impacts can be categorised into the following two types:

- Those that relate to the act of carrying out construction (e.g. earthworks causing sedimentation of watercourses); and
- Those that relate to the construction of the Proposed Development itself (e.g. the creation of impermeable surfaces such as the Onsite Substation and foundations and the presence of these structures).

11.7.29 Table 11.12 details potential impacts that may arise from the activities of the Proposed Development during construction.

Table 11.12 – Potential Construction Phase Impacts

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
Fence Posts	Excavations	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Release of sediment from excavations into the water environment.	Pollution prevention measures in the OCEMP, such as sediment management measures (silt fencing, settlement tanks etc.) and emergency response plan to be provided in a construction phase detailed CEMP.
	Use of cement products	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Pollution from spills or leakage of highly alkaline water that has come into contact with cement.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
Solar Panel Installation	Excavations (piling)	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Release of sediment from excavations.	Pollution prevention measures in the OCEMP, such as sediment management measures (silt fencing, settlement tanks etc.) and emergency response plan to be provided in a construction phase detailed CEMP.
		Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Disruption / damage to field underdrainage if present. This could lead to localised groundwater flooding.	Measures in the OCEMP such as redirecting intercepted underdrainage.
	Use of cement products	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Pollution from spills or leakage of highly alkaline water that has come into contact with cement.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
	Soil compaction from vehicle plant	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Compaction due to use of heavy machinery reduces infiltration, increases runoff, and shortens the rainfall–runoff response and may lead to flooding.	Measures in the OCEMP, such as decompaction of ground and soil handing and management procedures.
	Vegetation removal	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	Use of SuDS to manage and control the movement of water around the Proposed Development and restricting discharges from the Site to greenfield runoff rates.

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Use of machinery	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Pollution from spills or leakage of fuel and oil from use of machinery.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
	Installation of solar panels	Heckington Eau Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Interception of rainfall by panels causing an intensification of runoff and reduces interception and evapotranspiration rates.	Use of SuDS to management and control the movement of water around the Proposed Development and restricting discharges from the Site to Greenfield runoff rates.
Construction of Access Track and Underground Cabling	Soil Stripping and vegetation removal	Heckington Eau Catchment South Forty Foot Drain Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	Use of SuDS to management and control the movement of water around the Proposed Development and restricting discharges from the Site to Greenfield runoff rates.
	Use of access track	Heckington Eau Catchment South Forty Foot Drain Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Increased sediment mobilisation and transport from road material through surface wash off.	Pollution prevention measures in the OCEMP, such as sediment management measures (silt fencing, settlement tanks etc.) and emergency response plan to be provided in a construction phase detailed CEMP.
	Placement of aggregate	Heckington Eau Catchment South Forty Foot Drain Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Disruption to lateral flow (throughflow in soil and runoff) from the placement of aggregate.	Use of cross drains and road drains to convey water flows and prevent mounding on the upgradient side of the track.
	Use of machinery	Heckington Eau Catchment South Forty Foot Drain Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers Water in Till Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Pollution from spills or leakage of fuel and oil from use of machinery.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
	Use of cement bound sand	Heckington Eau Catchment South Forty Foot Drain Catchment Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Pollution from spills or leakage of highly alkaline water that has come into contact with cement bound sand.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Watercourse Crossings	Construction of road and pedestrian watercourse crossing	Heckington Eau Catchment	Disruption/blockage of watercourse flow from watercourse crossing leading to flooding.	Maintenance plan include periodic visual monitoring.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Use of machinery	Heckington Eau Catchment	Pollution from spills or leakage of fuel and oil from use of machinery.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	HDD activities	Heckington Eau Catchment	Pollution from bentonite breakout and local disruption to superficial geology groundwater flows.	Pollution prevention measures in the OCEMP, such as bentonite breakout plan and emergency response plan to be provided in a construction phase detailed CEMP.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Excavations	Heckington Eau Catchment	Release of sediment from excavations into the water environment.	Pollution prevention measures in the OCEMP, such as sediment management measures (silt fencing, settlement tanks etc.) and emergency response plan to be provided in a construction phase detailed CEMP.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Construction of Bicker Fen Substation, inverter, transformers, Onsite Substation extension, BESS and impermeable surfaces	Vegetation removal	Heckington Eau Catchment	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	The total area of impermeable surfaces in the BESS / Onsite Substation area compared to the associated catchments is low. Therefore, any change to interception and evapotranspiration rates are unlikely to substantially alter the runoff within the catchment. Although, SuDS will be used to manage and control the movement of water around the Proposed Development and restrict discharges from the Site to Greenfield runoff rates.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Construction of foundations	Heckington Eau Catchment	Increased impermeable area may lead to increased runoff and shorter rainfall-runoff response time.	The total area of impermeable surfaces in the BESS / Onsite Substation area compared to the associated catchments is low. Therefore, any change to interception and evapotranspiration rates are unlikely to substantially alter the runoff within the catchment. Although, SuDS will be used to manage and control the movement of water around the
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		Proposed Development and restrict discharges from the Site to Greenfield runoff rates.
		Heckington Eau Catchment	Impermeable underground structure that may disrupt and/or disconnect the hydraulic connectivity of the groundwater in the surrounding area.	Groundwater is likely to redirect its self around impermeant underground structures.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Use of machinery and use of concrete or equivalent	Heckington Eau Catchment	Pollution from spills or leakage of concrete or equivalent and fuel, and oil from use of machinery.	Pollution prevention measures in the OCEMP, such as spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Foundations of buildings (e.g., BESS and Onsite Substation)	Excavation for foundation	Heckington Eau Catchment	Excavation and removal of the topsoil and superficial deposits has the potential to reduce the pathway to the underlying bedrock aquifers therefore may increase the vulnerability of the aquifer to potential contamination/oil spills during construction.	Pollution prevention measures in the OCEMP, such as sediment management measures (silt fencing, settlement tanks etc.) and emergency response plan to be provided in a construction phase detailed CEMP.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Dewatering of excavations	Heckington Eau Catchment	Pumping of groundwater may cause a localised drawdown of the water table and cause water in the surrounding area to be drawn into the excavations. May cause contaminated groundwater to be drawn into the Site.	Dewatering of excavations are likely to be of low volume and only have small scale locally changes to natural flow regime of water. Pollution prevention measures in the OCEMP, such as sediment management measures, spill kits and emergency response plan to be provided in a construction phase detailed CEMP.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Groundwater and / or surface water abstractions (located in Solar Array Area)	Abstraction of groundwater and / or surface water	Lincolnshire Limestone Formation Aquifer	Abstractions of water can cause a reduction in water availability of groundwater / surface water.	All required permits and licences would be applied for once sufficient information is available at the detailed design phase (prior to start of the construction phase of work). Engagement with the Environment Agency specific to these aspects will be undertaken during this time. Any restrictions (e.g., only abstractions in winter periods) as specified in abstraction licence will be adhered to. Water supply would be stored locally onsite in existing reservoir / containers to ensure year round supply.
		Heckington Eau Catchment		
		Abstractions Located Downstream of the Solar Array Area: A8, A9, A15a, A15b, A15c		
General excavations and earthworks	Excavations and earthworks	Heckington Eau Catchment	Encountering of unknown contamination though the course of excavation and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	The OCEMP includes reference to contingency procedures being in place for the eventuality that unexpected contamination is encountered during construction. These comprise a ‘stop protocol’, testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		

11.7.30 With mitigation in place, the magnitude of change from the baseline condition caused by the construction activities identified in Table 11.12, above, has been assessed as Negligible or Low for all activities. The potential change to the water environment is likely to be Small or Slight (barely distinguishable from the current baseline condition) with the use of SuDS and the implementation of such measures as pollution incident response plans and sediment runoff containment and treatment. No effect arising from the construction phase was found to be greater than Minor Adverse, which is assessed as Not Significant (see Table 11.15).

Operational Phase

11.7.31 There are two types of operational impacts on the water environment. These are:

- Those that result from the creation of the Proposed Development (e.g. the creation of impermeable surfaces causing changes in the hydrologic regime); and
- Those associated with the use of the Proposed Development (e.g. accidental releases of fuel from a maintenance vehicle).

11.7.32 Table 11.13 details the potential impacts that may arise from the activities of the Proposed Development during operation.

Table 11.13 – Potential Operational Phase Impacts

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
Maintenance	Use of motorised vehicles (when access needed for maintenance works).	Heckington Eau Catchment	Pollution from spills and leaks of fuel, oil and chemicals from vehicles and maintenance works.	Pollution prevention measures in a maintenance plan or equivalent, such as spill kits and emergency response plan.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Onsite Substation inverters, transformers, BESS and impermeable surfaces	Presence of Onsite Substation and impermeable surfaces.	Heckington Eau Catchment	Reduction in recharge to the underlying aquifer; thereby locally reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.	The total area of impermeable surfaces in the BESS / Onsite Substation area compared to the associated catchments is low. Therefore, any change to interception and evapotranspiration rates are unlikely to substantially alter the runoff within the catchment. Although, SuDS will be used to manage and control the movement of water around the Proposed Development and restrict discharges from the Site to Greenfield runoff rates.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Breach of BESS battery acid containment system and firewater containment system.	Heckington Eau Catchment	Pollution from battery acid or firewater may result in degradation in water quality and harm to aquatic life	An **Outline Battery Safety Management Plan (OBSMP) (Document 7.2)** is being prepared for the Proposed Development. Pollution prevention measures in a maintenance plan or equivalent, such emergency response plan.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
BESS - replacement of individual energy storage units	Use of machinery and use of concrete or equivalent	Heckington Eau Catchment	Pollution from spills or leakage of concrete or equivalent and fuel, and oil from use of machinery	Pollution prevention measures in a maintenance plan or equivalent, such as spill kits and emergency response plan.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Solar Panels	Presence of solar panels.	Heckington Eau Catchment	Rainfall onto the angled panels may cause erosion beneath the lower edge of each panel, resulting in erosion and sediment laden runoff.	Maintenance plan include periodic visual monitoring and sediment management measures (silt fencing, settlement tanks etc.) and reseeding.
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
Watercourse Crossings	Long term use of road and pedestrian watercourse crossings.	Heckington Eau Catchment	Disruption / blockage of watercourse flow from watercourse crossing leading to flooding.	Maintenance plan include periodic visual monitoring.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Abstraction of groundwater and / or surface water	Lincolnshire Limestone Formation Aquifer		All required permits and licences would be applied for once sufficient information is available at the detailed design phase (prior to start of
		Heckington Eau Catchment		

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
Groundwater and / or surface water abstractions (located in Solar Array Area)		Abstractions Located Downstream of Solar Array Area: A8, A9, A15a, A15b, A15c.	Abstractions of water can cause a reduction in water availability of groundwater / surface water.	the construction phase of work). Engagement with the Environment Agency specific to these aspects will be undertaken during this time. Any restrictions (e.g., only abstractions in winter periods) as specified in abstraction licence will be adhered to. Water supply would be stored locally onsite in existing reservoir / containers to ensure year round supply.
Excavations and earthworks relating to maintenance works	Excavations and earthworks relating to maintenance works	Heckington Eau Catchment	Encountering of unknown contamination though the course of excavation and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	Contingency procedures would be in place for the unlikely eventuality that unexpected contamination is encountered during operational phase maintenance works. These comprise a 'stop protocol', testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		

11.7.33 With mitigation in place, the magnitude of change from the baseline condition caused by the operational phase activities identified in Table 11.13 has been assessed as Negligible or Low for all operations. The potential change to the water environment is likely to be Small or Slight (barely distinguishable from the current baseline condition) with the use of SuDS and the implementation of such measures as pollution incident response plans. No effect arising from the operational phase was found to be greater than Minor Adverse, which is assessed as Not Significant (see Table 11.15).

Decommissioning Phase

11.7.34 Decommissioning impacts can be categorised into the following two types:

- Those that relate to the act of carrying out decommissioning activities (e.g. earthworks causing sedimentation of watercourses); and
- Those that relate to the removal of the Proposed Development's structures and restoration of the Site (e.g. the removal of impermeable surfaces and revegetation).

11.7.35 Table 11.14 details the potential impacts that may arise from the activities of the Proposed Development during the decommissioning phase.

Table 11.14 – Potential Decommissioning Phase Impacts

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
Decommissioning of Principle Features and Restoration	Removal of principle features e.g. all PV modules, mounting structure, low and medium voltage cabling, inverters, hardstanding, fences, BESS, and transformers.	Heckington Eau Catchment	Decrease in impermeable area and obstructions to baseline flow pathways leading to pre-development runoff conditions and pre-development rainfall-runoff response time.	None identified, activity reinstates baseline characteristic, as far as practicable.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Revegetation	Heckington Eau Catchment	Re-vegetation may lead to pre-development interception and evapotranspiration rates and pre-development runoff conditions.	None identified, activity reinstates baseline characteristic, as far as practicable.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Backfilling	Heckington Eau Catchment	Reinstatement of soil profile may lead to pre-development infiltration rates and to pre-development runoff conditions.	None identified, activity reinstates baseline characteristic, as far as practicable.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
	Use of machinery	Heckington Eau Catchment	Pollution from spills or leakage of fuel and oil from use of machinery.	Pollution presentation measures in the Outline Decommissioning Environmental Management Plan (ODEMP) or equivalent, such as spill kits and emergency response plan.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East		
General decommissioning activities and earthworks	Decommissioning activities and earthworks	Heckington Eau Catchment	Encountering of unknown contamination though the course of decommissioning activities and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	The ODEMP includes reference to contingency procedures being in place for the eventuality that unexpected contamination is encountered during decommissioning. These comprise a ‘stop protocol’, testing and risk assessment, followed by the implementation of any remediation or additional protection measures identified to be necessary by this process.
		South Forty Foot Drain Catchment		
		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers		
		Water in Till		
		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b		
		LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot		

PROJECT COMPONENT	ACTIVITY	RECEPTOR AFFECTED	POTENTIAL IMPACTS	EMBEDDED MITIGATION MEASURES / COMMENTS
		Drain, Old Forty Foot Drain and Broadhurst Drain East		
Cable Route	Cable Route (400 kV circuit and trench) remaining *in situ*	Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	The potential for contamination (e.g. microplastics and metals) of shallow groundwater from the degradation of the Cable Route overtime.	The trenchless techniques for watercourse crossing (e.g. HDD) includes the use of bentonite, which will effectively isolate the Cable Route from the surrounding shallow groundwater (if present). Therefore, this will prevent a pathway to the shallow groundwater. It should also be noted that shallow groundwater is not expected to be encounter along the entire Cable Route, which therefore limits the potential for contamination of shallow groundwater units.
		Water in Till		

11.7.36 With mitigation in place, the magnitude of change from the baseline condition caused by the decommissioning operations identified in Table 11.14 has been assessed as Negligible or Low for all operations. The potential change to the water environment is likely to be Small or Slight (barely distinguishable from the current baseline condition) with the use of SuDS and the implementation of such measures as pollution incident response plans and sediment runoff containment and treatment. No effect arising from the decommissioning phase was found to be greater than Minor Adverse, which is assessed as Not Significant (see Table 11.15).

Assessment Of Effects

Table 11.15 – Summary of Assessment with Embedded Mitigation

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
Construction Phase								
Fence Posts	Excavations	Release of sediment from excavations into the water environment.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Use of cement products	Pollution from spills or leakage of highly alkaline water that has come into contact with cement.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Solar Panel Installation	Excavations (piling)	Release of sediment from excavations.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
		Disruption / damage to field underdrainage if present. This could lead to localised groundwater flooding.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of cement products	Pollution from spills or leakage of highly alkaline water that has come into contact with cement.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Soil compaction from vehicle plant	Compaction due to use of heavy machinery reduces infiltration, increases runoff, and shortens the rainfall–runoff response and may lead to flooding.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Vegetation removal			Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
Construction of access track and Underground Cabling	Soil stripping and vegetation removal	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	Short-term, reversible, adverse, and local	Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Installation of a solar panels	Interception of rainfall by panels causing an intensification of runoff and reduces interception and evapotranspiration rates.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Soil stripping and vegetation removal	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of access track	Increased sediment mobilisation and transport from road material through surface wash off.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Placement of aggregate	Disruption to lateral flow (throughflow in soil and runoff) from the placement of aggregate.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Use of cement bound sand	Pollution from spills or leakage of highly alkaline water that has come into contact with cement bound sand.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	HDD of cable Route under Hodge Dike, Heckington Eau and South Forty Foot Drain	Release of bentonite can cause a degradation in water quality and discharge of sediment laden water from excavations can affect water quality	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
		Dewatering of excavation can cause localised drawdown causing changes in groundwater flows	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
Watercourse Crossings	Construction of road and pedestrian watercourse crossing	Disruption/blockage of watercourse flow from watercourse crossing leading to flooding.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	HDD activities	Pollution from bentonite breakout and local disruption to	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
		superficial geology groundwater flows.		Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Excavations	Release of sediment from excavations into the water environment.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Onsite Substation inverters, transformers, BESS and areas of hardstanding	Vegetation removal	Removal of vegetation reduces interception and evapotranspiration rates and increases runoff.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Construction of foundations	Increased impermeable area may lead to increased runoff and shorter rainfall-runoff response time.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
		Impermeable underground structure that may disrupt and/or disconnect the hydraulic connectivity of the groundwater in the surrounding area.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of machinery and use of concrete or equivalent	Pollution from spills or leakage of concrete or equivalent and fuel, and oil from use of machinery.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Foundations and modification of buildings (e.g., BESS and Onsite Substation)	Excavation for foundation	Excavation and removal of the topsoil and superficial deposits has the potential to reduce the pathway to the underlying bedrock aquifers therefore may increase the vulnerability of the aquifer to potential contamination/oil spills during construction.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
	Dewatering of excavations	Pumping of groundwater may cause a localised drawdown of the water table and cause water in the surrounding area to be drawn into the excavations. May cause contaminated groundwater to be drawn into the Site.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
Groundwater and / or surface water abstractions (located in Solar Array Area)	Abstraction of groundwater and / or surface water	Abstractions of water can cause a reduction in water availability of groundwater / surface water.	Short-term, reversible, adverse, and local	Lincolnshire Limestone Formation Aquifer	High	Low	Minor	Not Significant
				Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Abstractions Located Downstream of the Solar Array Area: A8, A9, A15a, A15b, A15c	High	Low	Minor	Not Significant
General excavations and earthworks	Excavations and earthworks	Encountering of unknown contamination though the course of excavation and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
Operational Phase								
Maintenance	Use of Motorised Vehicles (when	Pollution from spills and leaks of fuel, oil and chemicals from	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
	access needed for maintenance works)	vehicles and maintenance works.		Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Onsite Substation inverters, transformers, and impermeable surfaces	Presence of Onsite Substation and impermeable surfaces	Reduction in recharge to the underlying aquifer therefore locally reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Breach of BESS battery acid containment system and firewater containment system	Pollution from battery acid or firewater may result in degradation in water quality and harm to aquatic life	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Replacement of individual energy storage units	Use of machinery and use of concrete or equivalent	Pollution from spills or leakage of concrete or equivalent and fuel, and oil from use of machinery.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Solar Panels	Presence of solar panels	Rainfall onto the angled panels may cause erosion beneath the lower edge of each panel, resulting in erosion and sediment laden runoff.	Long-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
Watercourse Crossings	Long term use of road and pedestrian	Disruption / blockage of watercourse flow		Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
	watercourse crossings	from watercourse crossing leading to flooding.	Long-term, reversible, adverse, and local	Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
Groundwater and / or surface water abstractions (located in Solar Array Area)	Abstraction of groundwater and / or surface water	Abstractions of water can cause a reduction in water availability of groundwater / surface water.	Short-term, reversible, adverse, and local	Lincolnshire Limestone Formation Aquifer	High	Low	Minor	Not Significant
				Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				Abstractions Located Downstream of the Solar Array Area: A8, A9, A15a, A15b, A15c	High	Low	Minor	Not Significant
Excavations and earthworks relating to maintenance works	Excavations and earthworks relating to maintenance works	Encountering of unknown contamination through the course of excavation and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Medium	Low	Minor	Not Significant
Decommissioning Phase								
Decommission of Principle Features and Restoration	Removal of principle features e.g. all PV modules, mounting structure, low and medium voltage cabling, handstanding, fences BESS, inverters, and transformers.	Decrease in impermeable area and obstructions to baseline flow pathways leading to pre-development runoff conditions and pre-development rainfall-runoff response time.	Long-term, Irreversible, neutral, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Revegetation	Re-vegetation may lead to pre-development interception and evapotranspiration rates and pre-development runoff conditions.	Long-term, Irreversible, neutral, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Backfilling	Reinstatement of soil profile may lead to pre-development infiltration rates and to pre-development runoff conditions.	Long-term, Irreversible, neutral, and local	Heckington Eau Catchment	Medium	Negligible	Negligible	Not Significant
				South Forty Foot Drain Catchment	Medium	Negligible	Negligible	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Negligible	Negligible	Not Significant
				Water in Till	Low	Negligible	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Negligible	Negligible	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Negligible	Negligible	Not Significant
	Use of machinery			Heckington Eau Catchment	Medium	Low	Minor	Not Significant

Project component	Activities	Potential Impact	Nature and geographical relevance of Impact	Receptors	Sensitivity of Receptor	Magnitude of Change from Baseline*	Scale of Effect	Significant / Not Significant**
		Pollution from spills or leakage of fuel and oil from use of machinery.	Short-term, reversible, adverse, and local	South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
General decommissioning activities and earthworks	Decommissioning activities and earthworks	Encountering of unknown contamination though the course of decommissioning activities and earthworks. Contamination could become mobilised in water and affect downgradient surface water, groundwater and abstractions.	Short-term, reversible, adverse, and local	Heckington Eau Catchment	Medium	Low	Minor	Not Significant
				South Forty Foot Drain Catchment	Medium	Low	Minor	Not Significant
				Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant
				Abstractions Located Downstream of the Site: A1, A2, A3a, A5, A8, A9, A10, A11, A12a, A12b, A12c, A12d, A13, A14a, A14b, A15a, A15b, A15c, A16j, A16t, A16v, A18, A21, A23a, A23b	High	Low	Minor	Not Significant
				LWS located downstream of the Site: Old Forty Foot Drain to South Forty Foot Drain, Old Forty Foot Drain and Broadhurst Drain East	Low	Low	Negligible	Not Significant
Cable Route	Cable Route (400 kV cable and trench) remaining *in situ*	The potential for contamination (e.g. microplastics and metals) of shallow groundwater from the degradation of the Cable Route overtime.	Lorg-term, reversible, adverse, and local	Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel Aquifers	Medium	Low	Minor	Not Significant
				Water in Till	Low	Low	Negligible	Not Significant

Note
* The assessment has considered the magnitude of change from the baseline with the embedded mitigation in place.
** Effects that are determined to be Major or Moderate are considered to be Significant. Effects that are determined to be Minor or Negligible are considered to be Not Significant.

11.8 Mitigation

11.8.1 As presented in Table 11.15, there are no significant effects. Therefore, no additional mitigation is required beyond the embedded mitigation set out in Section 11.7.

11.9 Residual Effects

Construction Phase

11.9.1 As detailed within Table 11.15, all effects are considered to be **Not Significant**. As such, no further additional mitigation measures are required. As no further mitigation measures are required, the residual effects are as per previously identified (i.e. Not Significant).

Operation Phase

11.9.2 As detailed within Table 11.15, all effects are considered to be **Not Significant**. As such, no further additional mitigation measures are required. As no further mitigation measures are required, the residual effects are as per previously identified (i.e. Not Significant).

Decommission Phase

11.9.3 As detailed within Table 11.15, all effects are considered to be **Not Significant**. As such, no further additional mitigation measures are required. As no further mitigation measures are required, the residual effects are as per previously identified (i.e. Not Significant).

Monitoring

11.9.4 The OCEMP includes details of water quality monitoring to be undertaken during the construction phase. Owing to the low level of risk posed by the construction works, this will consist of visual and olfactory observations, plus *in-situ* testing using hand held water quality meters and supplementary laboratory testing. Any construction phase water monitoring requirements from licenses and permits will be incorporated into the CEMP and the CEMP will include measures to ensure compliance to any limits or reporting requirements.

11.9.5 In order to ensure the successful continued management of surface water runoff, the proposed SuDS features must have routine maintenance including but not limited to:

- Removal of littler and debris;
- Inspection of vegetation coverage;
- Inspection of inlets and facility surface for silt accumulation;
- Reseeding of areas of poor vegetation growth; and
- Remove and dispose of oils or petrol residues using safe standard practices.

11.9.6 For further information regarding SuDS Management and maintenance please refer to **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**.

11.10 Assessment of Cumulative Effects

Intra-Cumulative Effects

11.10.1 The potential for intra-cumulative effects is largely restricted to environmental topics that have common water receptors; namely being surface water, groundwater and water resources (abstractions and private water supplies). Of the other environmental topics considered within the ES, the potential for intra-cumulative effects is possible with Ground Conditions (i.e. soils and geology) and Ecology, specifically hydroecology. However, no significant intra-cumulative effects have been identified from the Proposed Development.

Inter-Cumulative Effects

11.10.2 There is a possibility of inter-cumulative effects on the water environment occurring when two or more developments are constructed, are operational and / or have overlapping decommissioning phases within the same catchment at the same time. Potential cumulative effects include deterioration in water quality as a result of pollutants entering waterbodies during construction / decommissioning and alteration to the hydrological regime from inappropriate drainage design resulting in increased flood risk.

11.10.3 As set out in Table 11.16, below, there are 88 schemes that have been scoped-in to this assessment and have the potential to generate inter-cumulative effects with the Proposed Development.

11.10.4 In terms of the water environment, the greatest risk to water receptors generally occurs during the construction and / or decommissioning phases. As stated, it has been assumed that the scheme will have to be designed and implemented with mitigation measures, such as the use of a SuDS, which would mitigate operational phase effects from the scheme. Therefore, the operational phase cumulative effects of the Proposed Development are not considered further.

Table 11.16 – Cumulative Scheme

SCHEME NAME	APPROX DISTANCE FROM THE SITE	IS DEVELOPMENT WITHIN SURFACE WATER CATCHMENT OF THE SITE?		POTENTIAL FOR CUMULATIVE EFFECTS DURING CONSTRUCTION, OPERATION, AND / OR DECOMMISSIONING?
		HECKINGTON EAU SURFACE WATER CATCHMENT	SOUTH FORTY FOOT DRAIN SURFACE WATER CATCHMENT	
Triton Knoll Electrical System (EN090019). Granted – 05/09/2016. Correction Order Granted – 23/03/2017.	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in very close proximity to the Proposed Development.
Heckington Fen Solar Park (EN010123). Pre-Examination. Received – 15/02/2023.	2.6 km	Yes	No	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
Outer Dowsing Offshore Wind (Generating Station) (EN010130). Pre-Application. Expected to be submitted – Q4 2023.	3.4 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Lincolnshire Reservoir (WA010003). Pre-Application. Expected to be submitted - 09/2025.	5.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
Springwell Solar Farm (EN010149). Pre-Application. Expected to be submitted - Q2 2024.	11.6 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Boston Alternative Energy Facility (EN010095). Granted - 06/07/2023.	12.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Temple Oaks Renewable Energy Park (EN101126). Pre-Application. Expected to be submitted – 03/2023 (no update to date).	15.9 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
Fosse Green Energy (EN010154). Pre-Application. Expected to be submitted – Q4 2024.	27.2 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Mallard Pass (EN010127). Under Examination. Received – 24/11/2022. Examination Began – 21/12/2022.	29.9 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
A46 Newark Bypass (EN010065). Pre-Application Expected to be submitted – Summer 2023 (no update to date).	34.1 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
West Burton Solar Project (EN010132). Pre-Examination. Received – 21/03/2023. Examination Began – 18/04/2023.	39.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Cottam Solar Project (EN010133). Pre-Examination. Received – 12/01/2023. Examination Began – 10/02/2023.	42.8 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Gate Burton Energy Park (EN010131). Under Examination. Received – 27/01/2023. Examination Began – 22/02/2023.	46.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Tillbridge Solar Project (EN010142). Pre-Application. Expected to be submitted – Q4 2023.	46.3 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
West Burton C Power Station (EN010088). Granted (with minor modifications) - 21/10/2020.	50.2 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Viking CSS Pipeline (EN070008). Pre-Application. Expected to be Submitted – August 2023.	51.4 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
One Earth Solar Farm (EN010159) Pre-Application. Expected to be submitted – Q1 2025	38.3 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Meridian Solar Farm Ltd (EN010169) Pre-Application. Expected to be submitted - Q3 2025	14.2 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Grimsby to Walpole (EN020036) Pre-Application. Expected to be submitted – Q2 2027	7.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Eastern Green Link 3 and 4 (EN0210003) Pre-Application. Expected to be submitted – Summer 2026	7.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Leoda Solar Farm (EN0110016) Pre-Application. Expected to be submitted – January to June 2026	17.5 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
Mr Mark Bates – FKB Ltd -PL/0111/24 (LCC) – Validated 10/12/2024	5.9 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.

SCHEME NAME	APPROX DISTANCE FROM THE SITE	IS DEVELOPMENT WITHIN SURFACE WATER CATCHMENT OF THE SITE?		POTENTIAL FOR CUMULATIVE EFFECTS DURING CONSTRUCTION, OPERATION, AND / OR DECOMMISSIONING?
		HECKINGTON EAU SURFACE WATER CATCHMENT	SOUTH FORTY FOOT DRAIN SURFACE WATER CATCHMENT	
Stream Bioenergy - EIA/01/24 (LCC) – Confirmed as EIA development 11/06/2024	3.1 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
National Grid Viking Link Ltd - B/17/0340 (BBC) Granted – 12/09/2018	0.4 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
National Grid Viking Link Ltd - H04-0823-17 (SHDC) - Granted – 08/10/2018	1.0 km	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
National Grid Viking Link Ltd - H04-0656-23 (SHDC) - Approved – 19/09/2023	1.0 km	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
National Grid Viking Link Ltd - 17/1200/FUL (NKDC) - Approved – 18/09/2018	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
13/0498/OUT (NKDC) – Approved 15/07/2015	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT - 18/0652/RESM (NKDC) - Approved 09/08/2018	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT - 21/0669/RESM (NKDC) - Approved – 22/11/2021	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT -21/1068/RESM (NKDC) - Approved – 17/03/2022	4.8 km	Yes	No	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT -22/0188/RESM (NKDC) - Approved 06/07/2022	4.8 km	Yes	No	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT -23/0649/RESM (NKDC) - Granted 03/06/2024	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT – 23/1223/RESM (NKDC) – Granted 27/03/2024	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
13/0498/OUT – 24/1221/RESM (NKDC) – Validated 21/10/2024	4.8 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
20/1475/FUL (NKDC) – Approved 12/03/2021	4.3 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
23/0562/EIASCR (NKDC) – EIA Development 12/12/2023	3.6 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
23/1419/FUL (NKDC) – Application Validated 08/12/2023	3.7 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
23/0390/EIASCO – Decided 14/09/2023	17.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
24/1265/FUL (NKDC) – Validated 08/11/2024	0.9 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
24/1041/EIASCR (NKDC) – Not EIA Development 01/10/2024	2.5 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
24/0311/EIASCR (NKDC) – Non-EIA Development 16/08/2024	0.9 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
18/1384/S36 -Granted 28/07/2022	2.3 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
15/0383/EIASCR (NKDC) - Screening Opinion – 02/04/2015	1.6 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
19/0060/FUL (NKDC) - Approved - 11/04/2019	3.0 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
22/1596/OHL (NKDC) - No objections – 25/11/2022	0.4 km	Yes	No	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
22/1597/OHL (NKDC) - No objections – 25/11/2022	1.8 km	Yes	No	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
22/1598/OHL (NKDC) - No objections – 25/11/2022	3.7 km	Yes	No	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.

SCHEME NAME	APPROX DISTANCE FROM THE SITE	IS DEVELOPMENT WITHIN SURFACE WATER CATCHMENT OF THE SITE?		POTENTIAL FOR CUMULATIVE EFFECTS DURING CONSTRUCTION, OPERATION, AND / OR DECOMMISSIONING?
		HECKINGTON EAU SURFACE WATER CATCHMENT	SOUTH FORTY FOOT DRAIN SURFACE WATER CATCHMENT	
22/1599/OHL (NKDC) - No objections – 25/11/2022	2.9 km	Yes	No	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
21/1337/EIASCR (NKDC) - Screening Opinion – 06/10/2021	0.9 km	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
24/0377/EIASCR and 24/114/FUL – Validated 22/03/2024	12.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
16/0498/OUT – Approved 11/04/2023	5.2 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
20/1357/EIASCR – Not EIA Development 21/10/2020 and 20/1475/FUL – Approved 12/03/2021	3.9 km	No	Yes	No - the development is in the same surface water catchment however it is not in close proximity to the Proposed Development and is situated upstream.
20/0057/OUT – Approved 05/04/2023	23.1 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
24/1476/RESM – Validated 23/12/2024	23.1 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
24/0912/FUL – Validated 13/08/2024	6.2 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
22/1426/EIASCO – Comments made 02/12/2022 and 24/0374/CCC – Comments made 02/12/2022	23.1 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
16/1564/OUT and 24/0841/RESM – Approved 20/12/2022	24.0 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
B/19/0281 (BBC) – Approved 30/09/2019	Adjacent to the Site	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
B/21/0121 (BBC) - Not EIA Development – 29/03/2021	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/21/0443 (BBC) - Granted – 17/02/2022	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/22/0198 (BBC) - Granted – 23/09/2022	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/22/0356 (BBC) B/21/0412 (Request for screening Opinion) H04-0849-22 (SHDC) - Resolution to grant planning permission from Planning Committee – 18/07/2023	Within Site Boundary	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/23/0423 (BBC) – EIA Development 23/01/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/24/0415 (BBC) – Awaiting decision 10/10/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/24/0231 (BBC) – Not EIA Development 08/07/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/24/0245 (BBC) – No objections 18/07/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/24/0363 (BBC) – Not yet determined 10/09/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
B/24/0452 (BBC) – Not yet determined 06/11/2024	1.7 km	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.
B/24/0266 (BBC) – No objections 25/07/2024	Adjacent to the Site	No	Yes	Yes, the development is in the same surface water catchment and is in close proximity to the Proposed Development.
H04-0769-24 (SHDC) – Approved 03/10/2024	Adjacent to the Site	No	No	No – not in the same surface water catchment as the Proposed Development therefore no common receptors.

11.10.5 The following assessment considers where there could be an overlap between the Proposed Development's construction and / or decommissioning phases and one or more construction phases for other developments within the same catchment(s) as the Site.

11.10.6 All developments would need to comply with the strict planning guidance and regulation relating to the water environment to be acceptable in planning terms. As such, the design of these other developments would need to incorporate appropriate mitigation measures and drainage design (as is the case for the Proposed Development). Should the other developments require permitted activities, these would also be subject to control and regulation by the relevant issuing authority.

11.10.7 In addition, pollution prevention measures in a OCEMP and ODEMP (or equivalent), including emergency response plans, are likely to be implemented during the construction / decommission of the other development. Therefore, on the basis of the implementation of these mitigation measures, the potential construction and decommissioning cumulative effects arising from other developments (or any future other scheme within the same catchment as the Site) with the Proposed Development are considered to be Negligible, which is considered to be **Not Significant**.

11.11 Flood Risk Assessment

11.11.1 The FRA (**Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**) has found that the Solar Array Area, Cable Route Corridor and Bespoke Access Corridor are located within Flood Zones 1, 2 and 3. The risk of flooding to the Site from fluvial, surface water, groundwater and artificial sources varies across the Site. Eastern areas of the Solar Array Area and southern portions of the Cable Route Corridor are located within Flood Zone 3 (i.e. High risk). These areas are also at risk of reservoir flooding. Areas of the Site are also at high risk of surface water flooding with overland flow pathways extending through central areas of the Solar Array Area and sections of the access road and Cable Route Corridor. Western areas of the Site may also be susceptible to groundwater flooding.

11.11.2 The FRA has found there will be a negligible increase in impermeable ground at the Site as a result of the Proposed Development. The management of surface water runoff will ensure that flood risk from the Site is not increased as a result of the Proposed Development. Any offsite discharges of surface water will be restricted to Greenfield runoff rates for all storm events up to an including the 1 in 100 year plus climate change return period. SuDS will be utilised within the Site to provide conveyance and storage for surface water runoff, as well as water quality treatment and enhancing biodiversity.

11.11.3 Potential loss of floodplain storage as a result of the Proposed Development will be minimal. Solar panels will be mounted on piles, with any flood flows able to pass through unobstructed. There will be few other structures within areas of Flood Zone 3 and it is anticipated that there will be no substantial changes to existing ground levels. Where there is built development or associated ground level raising within areas at risk of flooding in the 1 in 100 year design storm event, compensatory floodplain storage will be provided to ensure that there is no net loss of floodplain storage as a result of the

Proposed Development and will be secured though DCO Requirement 5 of the **Draft DCO (Document Ref: 3.1).**

11.11.4 The impermeable area within the Site, although small, will increase, potentially causing a small increase in the rate and volume of surface water runoff generated at the local scale. Surface water runoff will be managed within the Site area, using SuDS features, where feasible. Runoff will be dispersed via infiltration or else discharged to watercourses at a restricted rate. Sufficient attenuation will be provided for all storm events up to and including the 1 in 100 year event (plus an allowance for climate change).

11.11.5 Mitigation measures relating to flood risk measures include:

- Solar panels to be raised up to 600 mm above depth of flooding;
- Transformers will be constructed on raised bunds up to 600 mm above the 1 in 100 year plus climate change breach flood depth;
- Base fence panels will be designed to have sufficient width to allow debris to flow and prevent blockage; and
- All proposed bridge crossings, temporary and permanent, will be constructed in accordance with flood permits granted by the EA, LCC or the IDB to ensure there would be no increased flood risk upstream or to the Site itself.

11.11.6 The vulnerability class of the Proposed Development is Essential Infrastructure and is considered suitable for sites within Flood Zone 3a if confirmed, with the Exception Test, which benefits to the community to outweigh the risk of flooding, and that the development and surrounding area will be safe from flooding. As the Proposed Development will provide a source of renewable energy to the National Grid, this will provide significant benefit to the UK, and it is considered that this benefit outweighs the flood risk.

11.11.7 The FRA has found that there will be a negligible increase in impermeable surfaces at the Site due to the Proposed Development. Therefore, with best practice and mitigation measures in place, the offsite flood risk across the Site will not be increase. For further information please see **Appendix 11.1 Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**.

11.12 Water Framework Directive Compliance Assessment

11.12.1 The WFD Compliance Assessment (**Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**) has considered the potential for the Proposed Development to affect the Black Sluice IDB area draining to the South Forty Foot Drain Water Body, WFD status and programme of measures. The WFD Compliance Assessment has found that the Proposed Development is unlikely to include any activities that are likely to cause deterioration in the WFD status for the water body or prevent the Water Body from achieving its WFD objectives, provided that best practice and established guidance are adhered to.

11.12.2 Furthermore, the planned provisions of SuDS and its associated benefits for water quality, and the additional embedded mitigation discussed above and in the OCEMP, the effect on the EA's 'Black Sluice IDB draining to the South

Forty Foot Drain Water Body' Water Body would be neutral with an element of providing betterment. Further details on the WFD Compliance Assessment can be found in **Appendix 11.6 Water Framework Directive Assessment (Document Ref: 6.3 ES Vol.2, 6.3.85)**.

11.13 Summary

11.13.1 Regionally, the Site lies within the EA's 'Black Sluice IDB draining to the South Forty Foot Drain Water Body' catchment and within the Black Sluice IDB area. On a local scale, the Site is split between two surface water catchments: Heckington Eau and South Forty Foot Drain Catchment. Within these catchments there are a number of Main Rivers and Ordinary Watercourses, and IDB drains, that are within the Site. There are three LWS downstream of the Site with hydro-ecological significance; the Old Forty Foot Drain to South Forty Foot Drain, Old Forty Food Drain, and Broadhurst Drain East. There are no registered private water supplies within 2 km of the Site.

11.13.2 Superficial deposits vary across the Site from those with no groundwater resources (Tidal Flat Deposits) to those considered to be locally important aquifers (Glaciofluvial Ice Contact Deposits and Sleaford Sand and Gravel). The bedrock geology is not considered to be a groundwater resource. Parts of the Site are considered to be at risk of flooding. There are 16 licensed surface water abstraction locations downstream of the Site, which have been considered in the assessment.

11.13.3 Potential effects on the water environment are those that may change the hydrological and hydrogeological flow regime, and those which may cause pollution and a degradation in water quality. The assessment found that, with appropriate mitigation in place, the scale of potential effects on the water environment were no greater than Minor Adverse and, as such, **Not Significant**.

11.13.4 Embedded mitigation measures, such as the avoidance of hydrologically sensitive areas and flood zones where possible, have been incorporated into the design of the Proposed Development. The key principles of the water related components of the OCEMP / ODEMP for the Proposed Development include the careful design and control of sediment and potential pollutants. The OCEMP / ODEMP will draw upon good industry guidance and best practice measures. The assessment has assumed the implementation of good industry guidance and best practice measures, such as pollution prevention plan and sediment management measures, would avoid the likelihood of potentially significant effects occurring. Furthermore, the OBSMP sets out the appropriate measures taken in regard to maintenance and management of the BESS.

11.13.5 The assessment identified that all effects were considered to be **Not Significant** therefore no further additional mitigation measures were required. Due to this the residual effects remained as per previously identified (i.e. Not Significant). In regard to monitoring the OCEMP / ODEMP will include details of water quality monitoring to be undertaken during the construction phase. Owing to the low level of risk posed by the construction works, this will consist of visual and olfactory observations, plus *in-situ* testing using hand held water quality meters only.

11.13.6 The FRA has found that there will be a negligible increase in impermeable surfaces at the Site due to the Proposed Development. Therefore, with best practice and mitigation measures in place, the offsite flood risk across the Site will not be increase. The vulnerability class of the Proposed Development is Essential Infrastructure and is considered suitable for sites within Flood Zone 3a if confirmed, with the Exception Test, which benefits to the community to outweigh the risk of flooding, and that the development and surrounding area will be safe from flooding. As the Proposed Development will provide a source of renewable energy to the National Grid, this will provide significant benefit to the UK, and it is considered that this benefit outweighs the flood risk.

11.13.7 The WFD Compliance Assessment found that the Proposed Development is unlikely to include any activities that are likely to cause deterioration in WFD status for the WFD monitored water body within the Site boundary or prevent the Water Body from achieving its WFD objectives.

11.13.8 The inter-cumulative effect assessment identified that as the other developments will need to comply with the strict planning guidance and regulation relating to the water environment to be acceptable in planning and permitting terms, the potential inter-cumulative effects arising from the Proposed Development and other cumulative development are considered to be Negligible and **Not Significant**.

11.13.9 A summary of the likely significant residual effects of the Proposed Development on the receptors considered within this chapter are summarised in Table 11.17 below.

Table 11.17 – Water Resources and Flood Risk – Summary Likely Significant Residual Effects

ISSUE	DESCRIPTION OF IMPACT	GEOGRAPHICAL SIGNIFICANCE							IMPACT	NATURE	SIGNIFICANCE	MITIGATION MEASURES
		I	N	R	C	D	P	L				
Water Resources												
No Significant Effects												
Key: Geographical Significance: I = International N = National R = Regional C = County D = District P = Parish L = Low to Local Nature: St = Short Term Mt = Medium Term Lt = Long Term R = Reversible Ir = Irreversible												