East Pye Solar

Environmental Statement

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9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) of effects on the Water Environment as a result of the Scheme.

9.1.2 This chapter identifies and proposes measures to address the potential impacts and likely significant effects on the Water Environment, during the construction, operation and maintenance, and decommissioning phases.

9.1.3 The information presented within this chapter has been informed by the Scheme information provided in **ES Chapter 4: The Scheme [EN0110014/APP/6.1.4]**.

9.1.4 The following aspects have been assessed within this Water Environment chapter as follows:

- Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events for all phases of the Scheme;
- Impacts on the water environment from potential new contaminants in surface water runoff from the National Grid Substation, Project Substations, and the BESS for all phases of the Scheme;
- Impacts from spills and sediment/pollutant mobilisation (e.g. from vehicles and movement of material) during the construction and decommissioning phases of the Scheme. This is not considered for the operation and maintenance Phases of the Scheme as the vehicle/material movements will be limited, and any spills will be captured by the proposed surface water drainage systems;
- Impacts from potential change to the pattern, volume and quality of surface water runoff due to the compaction of ground and/or the storage of materials for the construction and decommissioning phases of the Scheme;
- Impacts from potential change to the volume of surface water runoff arising from impermeable areas associated with the BESS, National Grid Substation and Project Substations during the operation and maintenance phase;
- Impacts from contamination involving potential harmful materials from batteries (e.g. lead, lithium and other heavy metals) whilst being installed onto, replace or removed from within the Order Limits, and replacement/cracking of Solar PV Arrays due to antecedent conditions or vandalism for all phases of the Scheme;

- Impacts from contaminated firewater in the unlikely event of a fire at the BESS, National Grid Substation, and Project Substations for the operation and maintenance phase of the Scheme;
- Impacts from the reduction in agricultural chemical or fertiliser application and associated nutrient loading to receptors for the operation and maintenance phase of the Scheme; and
- Impacts to groundwater recharge arising from the introduction of impermeable areas at the National Grid Substation, Project Substations, and BESS for all phases of the Scheme; and
- Impacts from thermal dynamics/heat pollution to receptors from cable installation for the operation and maintenance, and decommissioning phases of the Scheme.

9.1.5 This Water Environment chapter has been prepared appropriately qualified experts. For further details, refer to **ES: Appendix 1.2 Statement of Expertise [EN0110014/APP/6.3.1.2]**.

9.1.6 A glossary of abbreviations can be found in **ES: Chapter 0 Contents, Glossary and Abbreviations [EN0110014/APP/6.1.0].**

9.2 Consultation

9.2.1 The Scheme has been subject to consultation throughout the DCO preparation period. A request for an EIA Scoping Opinion was sought from the Secretary of State (SoS) through the Planning Inspectorate (PINS) in January 2025. A Scoping Opinion was adopted by PINS in February 2025 **ES: Appendix 2.2 Scoping Opinion [EN0110014/APP/6.3.2.2]**.

9.2.2 The issues raised in the Scoping Opinion relating to the Water Environment are summarised and responded to within **Table 9.1** which demonstrates how the matters raised in the Scoping Opinion are addressed in this ES.

Table 9.1: Relevant Scoping Opinion Comments relating to Chapter 9 Water Environment

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
The Planning Inspectorate, Scoping Opinion, February 2025	3.2.1 Impacts to water quality and surface water runoff: *'The Scoping Report proposes these matters are scoped out of all phases on the basis of a commitment to best practice measures in the OCEMP, ODEMP and a drainage strategy to manage water runoff during operation. Based on the information provided and the nature of the Proposed Development, the Inspectorate agrees that significant impacts to water quality are not likely to occur. This matter can be scoped out of the ES.'*	Whilst PINS has agreed to scope out the impacts on water quality from the Scheme, the EA and Natural England (NE) have raised concerns in relation to this element for all phases, notably the potential for significant effects to occur on groundwater receptors, flow/recharge and designated sites due to mobilisation of contaminants and increases in impermeable area at the Scheme. As such, the effects of potential contaminants on these receptors from the Battery Energy Storage System (BESS) (where a higher pollution risk exists in the unlikely event of a fire incident) and National Grid Substation (to remain post decommissioning of wider Scheme) have been considered within the ES.	Sections **9.1** and **9.8** of this chapter
	3.2.2 Water Resources – all phases: *'The Scoping Report proposes to scope this matter out on the basis that measures outlined in the OCEMP and ODEMP will be sufficient to avoid significant effects.* *The Inspectorate notes that the site is located within an area designated as 'water stressed' by the EA; as such, the Inspectorate is not in a position to scope this matter out. The ES should assess the potential impact of the proposed development on water resources where there is potential for significant effects to occur and include details relating to the water supply and demand requirements during the construction and operational phases of the proposed development.'*	A Water Resource Assessment (WRA) has been prepared. Water resources, including the supply/demand balance and the potential for water stress have been scoped into the ES for all phases of the Scheme.	**ES: Appendix 9.3 Water Resources Assessment (WRA) [EN011014/APP/6.3.9.3],** **Outline CEMP [EN011014/APP/7.1]** **Outline DEMP [EN011014/APP/7.3]**
	3.2.3 Flood Risk – all phases: *'The Scoping Report proposes to scope out an assessment of flood risk for all phases of the proposed development on the basis that significant effects on*	A Flood Risk Assessment and Outline Surface Water Drainage Strategy (FRA and DS) report has been prepared as an appendix to the ES.	**ES: Appendix 9.1 Flood Risk Assessment & Outline Surface Water Drainage Strategy [EN011014/APP/6.3.9.1]**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
	surface water and flood risk are not expected with the proposed embedded mitigation measures implemented. *The Inspectorate notes that an FRA will be prepared and accompany as a technical appendix to the ES. The Inspectorate is content with this approach.'*		
	3.2.4 Water Framework Directive (WFD) Assessment: *'The Scoping Report does not make any reference to a WFD Assessment, although paragraphs 5.3.23 and 5.3.24 identify WFD waterbodies.* *Paragraph 8.7.2 of the Scoping Report indicates that there are potential of new watercourse or ditch crossings, and it is unknown whether potential crossings are for vehicles, cable routing etc.* *Given the potential for likely significant effects, and in the absence of further detail regarding what type of crossings are proposed and the location of these or potential impacts on WFD waterbodies, the ES should provide a WFD Assessment (or a screening assessment detailing why a full assessment is not required to inform the ES assessment.'*	A Water Framework Directive (WFD) Assessment has been prepared as an appendix to the ES Chapter.	**ES: Appendix 9.2 Water Framework Directive Assessment [EN011014/APP/6.3.9.2]**
	3.2.5 Private Water Supplies: *'The Inspectorate notes that a number of private water supplies are within 250m of the site, and the Scoping Report does not provide accurate location and abstraction data for these water supplies. Adopting a worst-case scenario that each private abstraction is for potable use and requiring Source Protection Zone 1 buffers, without accurate locations, it is difficult to ascertain whether the Proposed Development site overlies these designated buffers.* *The ES should identify the location of and assess the potential impacts to private water supplies and their buffers, where there is the potential for significant effects.'*	The WRA provides information on private water supplies and potential impacts are covered in the ES. Figure 16.5 displays the private water supplies.	**ES: Appendix 9.3 Water Resources Assessment [EN011014/APP/6.3.9.3]** **ES: Figure 16.5 Locations of Private Water Supplies [EN0110014/APP/6.2.16.5]**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
Environment Agency (EA), Scoping Opinion, February 2025	Refs. FR1 to FR6: *'The EA have provided general comments on flood risk as follows:* ▪ *An FRA should be prepared taking into account all sources of flood zones, sequential test, watercourse crossings and impact of climate change;* ▪ *Appropriate assessment of watercourses not covered within the EA Flood Zone maps and this must be considered when assessing flood risk to the proposed site;* ▪ *The updated surface water flood risk mapping should be used to prepare the FRA;* ▪ *Ensure appropriate climate change allowances are used in any modelling relied upon;* ▪ *Solar panels should be designed so that they sit above the 1 in 100 annual probability plus allowance for climate change flood level (higher central plus a 300mm freeboard, while the impact of the solar panel supports and other infrastructure should also be considered in the FRA; and* ▪ *Advice on proposed watercourse crossings (where needed) with preference for use of open span bridges rather than culverts.'*	An FRA and DS report has been prepared which is appended to the ES. Mitigation requirements have been considered as part of the FRA and DS and the ES.	**Section 9.7** of this chapter **ES: Appendix 9.1 Flood Risk Assessment & Outline Surface Water Drainage Strategy [EN011014/APP/6.3.9.1]**
	Refs. WR1 to WR5: *'The EA disagrees that water resources should be scoped out of the ES for the following reasons:* ▪ *The site lies within an area of water stress and there is a risk of lack of availability of water for activities of the*	A WRA has been prepared which is appended to the ES. The potential impacts to water resources have been scoped into the ES. Construction-phase measures relating to dewatering are secured through the Outline CEMP.	**Sections 9.1** and **9.8** of this chapter **ES: Appendix 9.3 Water Resources Assessment [EN011014/APP/6.3.9.3]**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
	Scheme (e.g. dust suppression, machinery washdown); and ▪ *There could be impacts to existing lawful water users (licensed and unlicensed (private) water supplies);* *The EA also advises that dewatering (if required) will require an abstraction license unless exempt, while a discharge license may also be required.'*		**Outline CEMP [EN011014/APP/7.1]**
	Ref. FBG1 to FBG2 *'The EA disagrees that the water environment should be scoped out for all phases of the Scheme, notably as the Site Boundary includes several main rivers, ordinary watercourses and Water Framework Directive (WFD) bodies.* *In particular, River Tas is a chalk stream (priority habitat) and water quality is a key concern for this watercourse. Any works that may impact the waterbody if not considered properly may lead to a reduction in waterbody classification.* *There are concerns as the final routing of cables and haul roads have not been finalised and the impacts of works to the waterbodies.* *The EA has advised that scoping for a Water Framework Directive (WFD) assessment should be undertaken.* *The EA recommend MoRPh surveys/River Corridor Assessments should be completed to inform both WFD enhancements and BNG watercourse metric.'*	A WFD Assessment has been prepared and is appended to the ES. The impacts in relation to potential pollution from surface water runoff on the water environment (from the BESS, National Grid Substation, and Project Substations) have been scoped into the ES.	**Sections 9.1 and 9.8** of this chapter **ES: Appendix 9.2 Water Framework Directive Assessment [EN011014/APP/6.3.9.2]**
	Ref. GWCL8: *'The EA has advised that the sensitivity of groundwater bodies and groundwater dependent sensitive ecological sites should be considered.'*	A WFD Assessment has been prepared and is appended to the ES.	**ES: Appendix 9.2 Water Framework Directive Assessment [EN011014/APP/6.3.9.2]**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
	Ref. GWCL12: *'The EA disagrees with the scoping out of water quality and quantity impacts to surface water and groundwater receptors from all phases of the Scheme.'*	Impacts on water quality from potential new contaminants in surface water runoff from all phases of the Scheme for the BESS, National Grid Substation and Project Substations from surface water runoff and quantity of groundwater recharge have been scoped into the ES.	**Sections 9.1 and 9.8** of this chapter
	Ref. GWCL13 and GWLCL14: *'The EA has concerns on surface water/groundwater interactions and the potential for the pollution of groundwater quality arising from contaminated surface water runoff if control measures (notably at the BESS in relation to fire water management).'*	Information in relation to the isolation and removal of surface water runoff in the unlikely event of a fire incident of the BESS has been provided in the FRA and DS report and Outline Battery Safety Management Plan (Outline BSMP) A surface water drainage strategy will be developed to provide details of the isolation and removal of potentially contaminated runoff from the BESS, National Grid and Project Substations. The strategy is outlined in the FRA and DS report which is appended to the ES.	**Section 9.8** of this chapter **ES Appendix 9.1 Flood Risk Assessment &Out Strategy [EN011014/APP/6.3.9.1]** **Outline BSMP [EN011014/APP/7.5]**
	Ref. GWCL16: *'The EA has concerns over potential groundwater pollutant from the buried high voltage cables.'*	Cables will not be fluid-filled.	**Section 9.8** of this chapter
Anglian Water Services (AWS), Scoping Opinion response, February 2025	*'AWS advises that the region is identified as 'seriously stressed' in the EA 2021 classification of water stressed areas, and that a WRA will be required and agreed with AWS if non-domestic water demand is likely to exceed 20m3/day. The WRA will need to address water and wastewater for the project's temporary construction compounds and activities as well for permanent operational sites including the substation and BESS.* *AWS advises that there is insufficient information on the project's water supply requirements during construction and operation to suggest that water resources should be scoped out.* *Anglian Water supports the preparation of an FRA and surface water drainage strategy, and their preference is for surface water run-off from above ground permanent*	A WRA has been prepared and is appended to the ES. Impacts to water resources has been scoped into the ES. Wastewater is not covered as part of the WRA. Effects associated with wastewater are considered within ES: Chapter 18 Other Environmental Matters, and is not expected to give rise to significant environmental effects.	**Sections 9.1 and 9.8** of this chapter **ES: Appendix 9.3 Water Resources Assessment [EN011014/APP/6.3.9.3]** **ES: Chapter 18 Other Environmental Matters [EN0110014/APP/6.1.18].**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
	buildings and impermeable surfacing to be managed by SuDS with re-use opportunities considered first followed by outfall to watercourse in accordance with the drainage disposal hierarchy.'		
Water Management Alliance (WMA)/Internal Drainage Board (IDB), February 2025	*'It appears from the consultation material (Figure 1.2 of Volume II, Part 1 of the EIA Scoping Report) that no part of the proposed development (including solar panel locations, cable route corridors, Battery Energy Storage System and either of the possible National Grid substation locations) overlaps with the internal drainage board districts of the Water Management Alliance's member Internal Drainage Boards. However, we have requested spatial data (shape files) from the applicant in order to be able to confirm this.* *We note that the Water Environment is to be scoped out of the Environmental Impact Assessment. We welcome the developer's commitment to preparing a Flood Risk Assessment and a Drainage Strategy for the development, both of which are to be secured by a Development Consent Order. Water Management Alliance would be expected to be consulted on both of these documents.'*	Appropriate minimum offsets/buffers have been provided from the banks of watercourses, as defined in Table 4.2 in ES: Chapter 4 The Scheme.	**Section 9.7** of this chapter ES: Chapter 4 The Scheme **[EN0110014/APP/6.1.4].** Buffer requirements secured through the **Works Plans [EN0110014/APP/2.3]** and the **Design Principles Parameters and Commitments Register [EN0110014/APP/7.18]**
Natural England, Scoping Opinion response, February 2025	*'Natural England has advised that several SACs, SSSIs and Broadland Ramsar are located within 10km of the site and that further assessment is required of the following:* ▪ *Impacts on water quality as proposed development may be hydrologically linked to other receptors.'*	A Hydrological Assessment has been undertaken as part of the FRA and DS report, appended to the ES. Potential changes to water quality resulting from the BESS and National Grid Substation and any resulting impacts on Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs) and the Broadland Ramsar are considered in the ES. The potential impacts on water quality in relation to infrastructure roofs and solar panels are scoped out as they are considered to be a low pollution risk.	**Sections 9.1 and 9.8** of this chapter **Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN011014/APP/6.3.9.1]**

Consultee and Date	Comment and Scoping Opinion ID No.	How has the comment been addressed in the ES chapter	Location of response in ES Chapter
Norfolk County Council (NCC) Lead Local Flood Authority (LLFA), Scoping Opinion response, February 2025 Section 11	NCC as the LLFA provided comments on the flood risk and drainage elements of the Scheme and advised at the time of consultation that there was insufficient detail to determine whether flood risk and the water environment can be scoped out.	Further detailed comments following this are set out in the Consultation Report. The FRA and DS report prepared for PEIR has been updated to include the information and detail requested and following further consultation with the LLFA in November 2025.	**Sections 9.1-9.8** of this chapter **Consultation Report Appendix 10 Section 47 Applicant Response Table [EN0110041.5.11]** and **Consultation Report Appendix 11 Section 42 Applicant Response Table [EN0110041.5.12].** **Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN011014/APP/6.3.9.1]**

Statutory Consultation and Preliminary Environmental Information Report (PEIR)

9.2.3 Statutory consultation was held between 18th June 2025, and 6th August 2025. Relevant responses to the PEIR relating to the Water Environment and how these have been addressed through the ES are set out within **Consultation Report Appendix 10 Section 47 Applicant Response Table [EN0110014/APP/5.11]** and **Consultation Report Appendix 11 Section 42 Applicant Response Table [EN0110014/APP/5.12]**.

Further Engagement

9.2.4 Further engagement has been undertaken as part of stakeholder engagement specific to the Water Environment, as detailed within **Table 9.2**.

Table 9.2: Summary of Further Engagement

Consultee and Date	Summary of Matter	Response
EA **(Response to Technical Note dated May 2025/follow up to meeting on 29th April 2025)**	EA confirmed that the present-day Yare-Tas extents within CRC6 have been included by error and has recommended that further modelling is undertaken by Stantec to refine this and undertake an assessment of climate change impacts.	CRC6 has been significantly reduced in width in comparison to that shown for PEIR. There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **outline CEMP [EN0110014/APP/7.1].** As such, the proposed works in areas of Flood Zones 2/3 are not considered to impact on ground levels or floodplain storage and undertaking further detailed hydrological assessment would be disproportionate to works proposed within these areas. The Scheme has been amended so that all above ground electrical infrastructure is located outside of areas of Flood Zones 2 and 3. Further analysis appropriate to nature of the works/Scheme and justification is provided in **ES: Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1**].
	The EA accepts approach to firewater management at the BESS and National Grid Substation.	Approach to surface water runoff and pollution management to be included within **ES: Appendix 9.1 Flood Risk Assessment & Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1]**.
	The EA notes that the BESS and National Grid Substation drainage systems will be separate from one another and that bunding will be incorporated into the design. The EA has outstanding concerns on risk of pollution from everyday spills and storage use/arrangements for oils/fuels/chemicals.	Measures for the risk of spills/storage of arrangements in the operation and maintenance phase are set out in the **Outline OEMP [EN0110014/APP/7.2]**

Consultee and Date	Summary of Matter	Response
	The EA has raised concerns in relation to the impact of thermal/heat pollution from buried HV cables at the crossing at the Hempnall Beck and the adjacent fenland habitat and has requested details of the thermal emission characteristics of the proposed cables.	The cables will be laid at a minimum of 5 metres below the bed of surveyed main rivers. The thermal dynamics of the cables are limited to their immediate proximity and will therefore have no significant effect on receptors. See **ES Chapter 8: Ecology and Biodiversity [EN0110014/APP/6.1.8]** for further detail on ecological receptors.
EA Meeting 15th December 2025	Summary of Key Matters: • Flood Zones and cable route interactions • National Grid Substation location and interaction with Starston Brook floodplain	Responses (cross reference to **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]** and **ES: Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1]** for further detail): • The CRC has been reduced in size since statutory consultation. There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **outline CEMP [EN0110014/APP/7.1].** As such, requirement for further modelling of Hempnall Beck tributaries is not considered necessary. EA confirmed this approach is acceptable. • The Scheme has been amended to place the National Grid Substation within Sub-Site 1B (Option 2 in the PEIR). The Order Limits have been refined in area and now exclude the Starston Brook floodplain. Within Sub-Site 1C, as it is now referred to, works are limited to existing overhead lines for grid connection. As such, the Scheme is located a significant distance from and elevation above the Starston Brook floodplain and therefore further modelling is not considered necessary. The EA confirmed this is acceptable. • The EA queried thickness of Diamicton and cabling depth. The Diamicton (blue/yellow clay) is generally 6-20m thick across the area encompassing the Order Limits. Stantec confirmed that parameters for cabling trenches will be set out in the DCO application.

Consultee and Date	Summary of Matter	Response
	• Interaction with BESS with watercourse to north	• A local watercourse north of the BESS has associated surface water flood risk extents, however the BESS has been situated to the south of these in accordance with the sequential approach.
	• Sub-Site 8A food extents/solar PV placement	• The Scheme has been amended to remove Solar PV Arrays from Flood Zones 2 and 3 (including combined fluvial/surface water eastern flow route) in Sub-Site 8A and where possible outside the higher surface water flood risk areas. Across the Scheme, solar PV Arrays are located within Flood Zone 1 and in areas of 'very low' surface water flood risk as far as practicable, but some Solar PV Arrays extend into areas of higher surface water flood risk. However, the Solar PV Arrays are raised above the ground on thin stilts/supports (or in limited areas concrete footings where sensitive archaeology has been identified) and will therefore not impede flow routes/floodplain storage and are designed to remain operational in times of flood.
	• Surface Water/pollution management for BESS and Substations	• The National Grid Substation and Project Substations will contain oil-filled transformers. These will be on a plinth and bunded, and any oil leakage will be self-contained and treated separately to the wider drainage system. • The National Grid Substation and Project Substations and BESS will have drainage systems lined with an impermeable membrane with a controlled discharge to watercourse. The BESS (and where required National Grid Substation and Project Substations) will have auto shut-off valves for firewater management. After a fire event, runoff would likely be collected and tankered from the site.
	• Foul water disposal from welfare facilities	• Foul water from any welfare facilities will be contained within a sealed septic system and tankered off site.
LLFA Meeting 10th December 2025	Summary of key matters: • Infiltration testing should be undertaken, notably to confirm rates for inverter drainage systems. • Solar PV Arrays are located within areas of surface water flood risk and therefore the Sequential and Exception Tests should be applied.	Responses: • Ground conditions based on historic boreholes in close proximity to Order Limits will be outlined in the FRA report. Infiltration testing is to be undertaken post-consent in appropriate locations (once inverter locations are finalised) to confirm rates for inverter drainage systems. • NPPF PPG paragraph 027 (September 2025) states that '*where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the*

Consultee and Date	Summary of Matter	Response
	• A preliminary maintenance schedule for the drainage system should be provided including activities, who will be maintaining the system (including any joint third party responsibilities).	*risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied.'* • **ES: Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1]** confirms that a sequential approach has been applied to the Scheme. The Sequential and Exceptions Tests have been undertaken for the Scheme and are included in Appendix A of the **Planning Statement [EN0110014/APP/7.14].** • A Preliminary Surface Water Drainage Maintenance Schedule is included in the **Outline OEMP [EN0110014/APP/7.2]** setting out likely maintenance activities and frequency for the drainage system.
WMA/IDB, email dated September 2024	*'The WMA advised that any works within 9m of arterial drainage infrastructure (or 7m if within the Waveney, Lower Yare and Lothingland IDB will require consent from the Board under Byelaw 10.'*	10m buffers have been provided as described in **ES: Chapter 4 The Scheme [EN0110014/APP/6.1.4]** and Section 9.7 of this chapter in accordance with EA and IDB requirements. Buffer requirements will be secured through the **Works Plans [EN0110014/APP/2.3]** and the **Design Parameters and Commitments [EN0110014/APP/7.18]**

Targeted Consultation

9.2.5 A further round of targeted consultation was undertaken between 22 October 2025 and 26 November 2025 following changes to the development boundary area of the Scheme presented in the PEIR and during Stage Two Statutory Consultation. All the changes are documented in full in the **Consultation Report [EN0110014/APP/5.1].** These changes did not give rise to any materially new or different likely significant environmental effects compared to those reported in the PEIR. How these have been addressed through the ES are set out within **Consultation Report - Appendix 10 Section 47 Applicant Response Table [EN0110014/APP/5.11]** and **Consultation Report - Appendix 11 Section 42 Applicant Response Table [EN0110014/APP/5.12]**.

9.3 Legislation, Planning Policy and Guidance

9.3.1 A summary of applicable legislation, planning policy and other guidance documents against which the Scheme has been considered relating to the Water Environment is set out in **ES: Appendix 2.3 Legislation, Planning Policy and Guidance [EN0110014/APP/6.3.2.3]**.

9.3.2 An overview of the legislation, planning policy and guidance against which the Scheme has been considered for the Water Environment assessment is set out below.

Legislation and Regulations

- The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 (Ref 9-1).
- The Land Drainage Act 1991 (Ref 9-2).
- The Flood and Water Management Act 2010 (Ref 9-3).
- The Flood Risk Regulations 2009 (Ref 9-4) [2007/60/EC] ('The Flood Directive').
- Water Supply Regulations 2016 (Ref 9-5).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 9-6).
- The Water Resources (Environmental Impact Assessment) (Amendment) (England and Wales) Regulations 2017 (Ref 9-7).
- The UK Nitrates Directive (1991) (91/676/EEC) (implemented through the Nitrate Pollution Prevention Regulations 2015) (Ref 9-8).
- The Groundwater (Water Framework Directive) (England) Direction 2016 which forms an amendment to Annex II of the Groundwater Directive 2006/118/EC) (Ref 9-9).

Planning Policy

National Planning Policy

9.3.3 National Policy Statements - National Policy Statements (NPS) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Scheme has been considered pursuant to section 104 of the Planning Act 2008. Listed below are the details of the elements of NPS considered relevant to the Water Environment assessment:

- Department for Energy Security & Net Zero, Overarching National Policy Statement for Energy (EN-1), dated December 2025 (Ref 9-10). The relevant section to this chapter is Section 5.8 Flood Risk and 5.16 Water Quality and Resources.
- National Policy Statement for Renewable Energy Infrastructure EN-3, dated 2024, dated December 2025 (Ref 9-10). Notably, paragraph 2.4.4 and Section 2.10.
- National Policy Statement for Electricity Networks EN-5, dated January 2026 (Ref 9-10). The relevant section to this chapter is Section 2.3.

National Planning Policy Framework

9.3.4 The National Planning Policy Framework (NPPF) (Ref 9-11) as revised in December 2024 sets out national planning policies that reflect priorities of the Government for operation of the planning system and the economic, social, and environmental aspects of the development and use of land.

9.3.5 The NPPF has a strong emphasis on sustainable development, with a presumption in favour of such development. The NPPF has the potential to be considered important and relevant to the Secretary of State's (SoS) consideration of the Scheme. NPPF section 14 paragraphs 170-182 are of relevance to this chapter. An update to the NPPF was released in December 2025 which shows that the wording of these paragraphs is anticipated to be updated to reflect the Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change' September 2025 update with regards to the application of the Sequential and Exception Tests

National Planning Practice Guidance

- The NPPF PPG 'Flood Risk and Coastal Change' was last in updated September 2025) (Ref 9-12) and includes the EA 'Flood risk assessments: climate change allowances guidance (last updated May 2022) (Ref 9-13);
- The NPPF PPG sets out the requirements for the sequential and exceptions tests, ensures that climate change is considered and outlines the requirements for a site-specific FRA.

Local Planning Policy

9.3.6 The Scheme is located within the administrative areas of Norfolk County Council (NCC) and South Norfolk Council (SNC) who are the host authorities. Local planning policies which are relevant to the Water Environment and have informed the Water Environment assessment are detailed below.

- The South Norfolk Development Management Policies Document (DMPD) (October 2015) Policy DM4.2 – Sustainable Drainage and water management (Ref 9-14).
- There are no specific policies that are relevant to the Water Environment within the Greater Norwich Local Plan (adopted by SNC in March 2024) (Ref 9-15).

Other Guidance

9.3.7 The assessment has been carried out in accordance with the following other guidance documents:

- Planning Inspectorate – Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (2024) (Ref 9-16).
- The EA's approach to Groundwater Protection (2018 v1.2);
- Pollution Prevention Guidelines (2014). These have been withdrawn but are still considered relevant in the absence of superseded guidance;
- The NCC 'LLFA Statutory Consultee for Planning Guidance Document' (Version 7.3, April 2025) (Ref 9-17).
- The Department for Environment, Food and Rural Affairs (DEFRA) 'National standards for sustainable drainage systems' (2025) (Ref 9-18).
- Construction Industry Research and Information Association (CIRIA) C752 'The SuDS Manual' (2015) (Ref 9-19).
- CIRIA 'Environmental Good Practice On Site' guide (5th Edition) C811 (2023) (Ref 9-20).
- Environment Agency classification on water stressed areas (2021) (Ref 9-21).
- Anglian Waters Water Resources Management Plan (WRMP) 2024 (Ref 9-22).
- Anglian Waters Drought Plan 2022 (Ref 9-23).
- Anglian Water's approach to handling non-domestic water supply requests is set out in Anglian Water's non-domestic water requests policy (2023) (Ref 9-24);

- A review of the Environment Agency's Catchment Abstraction Management Strategy (CAMS) for the Broadland Catchment (2017) (Ref 9-25).
- The EA Guidance on Rainwater Harvesting (2019) (Ref 9-26).
- The Design Manual for Roads and Bridges guidance sets out the methodologies for assessing drainage and water environment impacts (Ref 9-27).

9.4 Assessment Assumptions and Limitations

9.4.1 The Water Environment assessment has considered the following assumptions and limitations:

- The assessment is based on the information available at the time of writing of this chapter.
- Small areas are detached from the main Order Limits which pertain to locations where works will be undertaken to facilitate the Scheme including tree removal/hedge trimming and verge improvements (Land at Station Road (LSR)1-4, Land at Church Hill (LCH), Land at Ipswich Road (LIR) and Land at Hall Lane (LHL)). These works are not considered to significantly impact on or be relevant to flood risk the water environment and have not been assessed in this chapter.
- Construction, operation and maintenance, and decommissioning phase measures to minimise the risk of flooding, surface water runoff, and pollution to waterbodies are detailed and secured within the following:
  - **Outline CEMP [EN0110014/APP/7.1]**
  - **Outline OEMP [EN0110014/APP/7.2]**
  - **Outline DEMP [EN0110014/APP/7.3]**
- Analysis of flood extents based on National FRA (NaFRA2) mapping update where detailed EA hydraulic modelling is not available for smaller tributaries of the Hempnall Beck.
- The Scheme will be typically unmanned during the operation and maintenance phase, with infrequent attendance for routine maintenance, monitoring and activities associated with the replacement of solar panels and batteries at the end of their operational life. These activities will require specific management measures and may necessitate temporary welfare facilities; however, no or limited permanent welfare facilities are proposed.
- For the water resources element of the assessment, it is assumed that potential effects during construction and decommissioning will be similar owing to largely similar activities. However, this is a conservative

assumption at this stage as decommissioning is not due to happen until 2091, and the demand data may be subject to change.

9.5 Assessment Methodology

9.5.1 This Section sets out the scope and methodology for the assessment of the impacts of the Scheme on the Water Environment.

Sources of Information

9.5.2 The following sources of information that have been consulted in the preparation of this Chapter:

- EA published 'Opendata' (Ref 9-28) datasets available online;
- Topographic survey by Survey Solutions dated July 2024;
- AWS sewer records dated August 2023;
- EA modelled outputs from the Yare 2014 Study;
- NCC Flood Investigations Report (Ref 9-29);
- Greater Norwich Strategic Flood Risk Assessment (SFRA) Final Report: Level 1, dated November 2017 (Ref 9-30);
- British Geological Survey (BGS) online viewer (Ref 9-31);
- EA Catchment Data Explorer (Ref 9-32);
- EA Hydrology data explorer (Ref 9-33);
- Water demand data per phase of the Scheme, supplied by Viking; and
- Fire suppression data based on current NFCC (Ref 9-34) guidelines.

Study Area

9.5.3 The Study Area in relation to the assessment of water quality on receptors has been assumed to be within 2km of the Order Limits. This is considered an appropriate Study Area as it includes several designated sites (Site of Specific Scientific Interest (SSSIs), Special Area of Conservation (SACs), Local Nature Reserves (LNRs) and Ancient Woodlands (Aws), and watercourses within the Order Limits and in the wider area.

9.5.4 The Study Area for the impacts in relation to water resources is 5 km as this also overlaps with the SPZ, the identified WFD surface water and groundwater bodies and both Water Resource Zones (WRZ) (Norfolk Norwich & the Broads WRZ, and Norfolk Harleston WRZ).

Potential Impacts

9.5.5 Embedded mitigation measures being incorporated into the design and construction of the Scheme are set out in the Section below.

9.5.6 Prior to the implementation of any mitigation (embedded or additional), the Scheme has the potential to affect (beneficially or adversely), during the construction, operation and maintenance, and decommissioning phases in the following ways:

- Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events for all phases of the Scheme;
- Impacts on the water environment from potential new contaminants in surface water runoff from the National Grid Substation, Project Substations, and the BESS for all Phases of the Scheme;
- Impacts from spills and sediment/pollutant mobilisation (e.g. from vehicles and movement of material) during the construction and decommissioning phases of the Scheme;
- Impacts from potential change to the pattern, volume and quality of surface water runoff due to the compaction of ground and/or the storage of materials for the construction and decommissioning phases of the Scheme;
- Impacts from contamination involving potential harmful materials from batteries (e.g. lead, lithium and other heavy metals) whilst being installed onto, replace or removed from within the Order Limits for all phases of the Scheme;
- Impacts from contaminated firewater in the unlikely event of a fire at the BESS, National Grid Substation, and Project Substations for the operation and maintenance phase of the Scheme;
- Impacts from the reduction in agricultural chemical or fertiliser application and associated nutrient loading to receptors for the operation and maintenance phase of the Scheme; and
- Impacts to groundwater recharge arising from the introduction of temporary impermeable areas during the Construction and Decommissioning Phases of the Scheme, and impermeable areas associated with the National Grid Substation, Project Substations and BESS for the Operational Phase of the Scheme; and
- Impacts from thermal dynamics/heat pollution to receptors from cable installation for the operation and maintenance, and decommissioning phases of the Scheme.

Impact Assessment Methodology

9.5.7 The Water Environment assessment follows the general approach to undertaking EIA, explained in **ES: Chapter 2 EIA Methodology [EN0110014/APP/6.1.2]**. Albeit it has been modified to be similar to the approach taken in **ES: Chapter 16 Ground Conditions [EN0110014/APP/6.1.16]**, which has been derived from the Design Manual for Roads and Bridges (2020).

9.5.8 The methodology for attributing sensitivity of receptors, magnitude of effects and the significance of effects in relation to the Water Environment is described further below in this chapter of the ES.

Sensitivity of Receptor

9.5.9 The sensitivity of likely impacted receptor is defined depending on the vulnerability, recoverability and value/importance of the receptor, to potential effects arising from the Scheme is assessed in line with the below, as detailed in **Table 9.3**.

9.5.10 The sensitivities have been derived to align with **ES: Chapter 16 Ground Conditions [EN0110014/APP/6.1.16]**, which has been derived from the Design Manual for Roads and Bridges (2020).

9.5.11 The surface water flood risk definitions have been added to the table below as requested by NCC as the LLFA in their PEIR consultee response. The sensitivity classification for each level of surface water flood risk (Very Low, Low, Medium and High) has been identified to closely match that of the Flood Zone designations, given that the return periods that define the fluvial and surface water categories are relatively similar.

9.5.12 The water supply/demand definitions have been obtained from the EA's Broadland Catchment Management Abstraction Strategy (Ref 9-35).

Table 9.3: Sensitivity Criteria of Identified Receptor

Sensitivity	Description
Very High	Hydrology: Watercourse or water body with a WFD classification Overall Water Body Class of 'High'. Surface Water Drinking Protected Area. The hydrological receptor is designated as having international importance, such as SAC and SPA. Areas classified as Functional Floodplain (Flood Zone 3b) (1 in 30 (3.3%) annual exceedance probability (AEP)) and flood storage areas not protected by flood defences. Areas of 'High' surface water flood risk (greater than 1 in 30 (3.3%) AEP) (within fields only).

Sensitivity	Description
	Hydrogeology: Either of the following apply: ▪ Principal aquifer providing a regionally important resource e.g. public water supply, industrial supply; ▪ Groundwater quality associated with Groundwater Source Protection Zone (SPZ) I (including a 50m SPZ I around any private water supply); ▪ Nearest abstraction (including private water supplies) is within 50m of the Order Limits. Water Supply/ Demand Water Resources Zone (WRZ) with supply/deficit balance (Ml/d) <-15 by 2025 and/or impacted by severe drought and/or sustainability reductions (Ref 9-21). Abstraction Licencing Assessment: Water not available for Licencing.
High	Hydrology: Watercourse or water body with a WFD classification Overall Water Body Class of 'Good'. The hydrological receptor is of high national importance such as SSSI. Areas classified as Flood Zone 3a 'High Probability' (greater than a 1 in 100 (1.0%) AEP of river flooding). Areas of 'Medium' surface water flood risk (between a 1 in 30 (3.3%) and 1 in 100 (1.0%) AEP) (within fields only). Hydrogeology: Either of the following apply: ▪ Principal aquifer providing a locally important resource e.g. public water supply, spray irrigation, top up water etc. ▪ Groundwater quality associated with Groundwater Source Protection Zone (SPZ) II. ▪ Nearest abstraction (including private water supplies) is between 50m and 250m from the Order Limits. Water Supply/ Demand WRZ with supply/deficit balance (Ml/d) -15 to 0 by 2025 and/or vulnerably to severe drought and/or sustainability reductions (Ref 9-21). Abstraction Licencing Assessment: Restricted Water available for Licencing.
Medium	Hydrology: Watercourse or water body having a WFD classification of 'Moderate'. The hydrological receptor is of medium regional importance such as Local Nature Reserves, and medium county importance such as irreplaceable habitats (e.g. Ancient Woodland), and County Wildlife Sites (CWS) and Roadside Nature Reserves (RNR). Areas classified as Flood Zone 2 'Medium Probability' (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP of river flooding). Areas of 'Low' surface water flood risk (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP) (within fields only).

Sensitivity	Description
	Hydrogeology: Either of the following apply: ▪ Secondary A Aquifer; ▪ Groundwater quality associated with Groundwater Source Protection Zone (SPZ) III; ▪ Nearest abstraction (including private water supplies) is between 250m and 500m from the Order Limits. Water Supply/ Demand WRZ with supply/deficit balance (Ml/d) at 0 by 2025 and/or no vulnerability to severe drought and/or with sustainability reductions (Ref 9-21). Abstraction Licencing Assessment: Water available for Licencing.
Low	Hydrology: Watercourse or water body having a WFD classification of 'Poor' or 'Bad'. The hydrological receptor is of low or local importance and/or heavily modified. Areas classified as Flood Zone 1 'Low Probability' (less than a 1 in 1000 (0.1%) AEP of river flooding). Areas of 'Low' surface water flood risk (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP) (within fields only). Hydrogeology: Either of the following apply: ▪ Secondary B or Secondary Undifferentiated Aquifer; ▪ Not located within an SPZ; ▪ Nearest abstraction (including private water supplies) is between 500m and 1km from the Order Limits. Water Supply/ Demand WRZ with supply/deficit balance (Ml/d) >0 by 2025 and/or no vulnerability to severe drought and/or with no sustainability reductions target (Ref 9-21). Abstraction n/a for this sensitivity level.
Negligible	Hydrology: No receptor defined within the Study Area. Areas classed as Flood Zone 1 'Low Probability' (less than a 1 in 1000 (0.1%) AEP of river flooding). Areas outside of surface water flood risk extents ('Very Low' risk – less than a 1 in 1000 (0.1%) AEP). Hydrogeology: Either of the following apply:

Sensitivity	Description
	▪ Unproductive Stratum (i.e. non-aquifer); ▪ Not located within an SPZ; ▪ Abstractions (including private water supplies) not identified within 1km from the Order Limits.

9.5.13 Based on the criteria set out in **Table 9.3**, the sensitivities of identified receptors are shown below in **Table 9.4**.

9.5.14 The table includes other receptors (hydrogeological and designated sites) within the Study Area and wider area (5-10km radius) that could be potentially impacted by changes to the Water Environment.

9.5.15 Information in relation to geology, hydrogeology and existing contamination within the Order Limits is contained within **ES: Chapter 16 Ground Conditions [EN0110014/APP/6.1.16]** and further information in relation to ecological designated sites (including groundwater dependent terrestrial ecosystems (GWDTEs) is contained within **ES: Chapter 8 Ecology and Biodiversity [EN0110014/APP/6.1.8]**.

Table 9.4: Sensitivity of Identified Receptor

Sensitivity	Identified Receptor
Very High	River Tas and Hempnall Beck (chalk streams)
	Private Water Supplies (within the 1 km radius of the Order Limits)
	Bedrock geology of the Norwich Crag Formation, Crag Group & Chalk Formations
	Superficial deposits of the Leet Hill Sand and Gravel Member, and River Terrace Deposits
	Norfolk Valley Fen and The Broads SAC, and Broadlands Ramsar (within Wider Area)
	SPZ1
High	Norfolk Norwich and the Broads WRZ
	Private Water Supplies (within the 1-3 km radius of the Order Limits)
	Shotesham Common, Fritton Common and Pulham Market Bigwood SSSIs (GWDTEs) (within Study Area) Tindall Wood Ditchingham (GWDTE), Shotesham-Woodton Hornbeam Woods and Hedenham Wood SSSIs (within Study Area)
	Forncett Meadows (GWDTE), Aslacton Parish Land, Sexton Wood and Flordon Common SSSIs (within Wider Area)
	SPZ2
Medium	Broome Beck and Starston Brook
	Norfolk Harleston WRZ
	Private Water Supplies (within 3-5 km radius of the Order Limits)
	Superficial deposits of the Happisburgh Glacial Formation, Lowestoft Formations, Peat, Head and Alluvium

Sensitivity	Identified Receptor
	Bath Hills and Broom Heath LNRs (within Wider Area)
	SPZ3
	Little Beck
Negligible	Field ditches

Magnitude of Impact

9.5.16 The categorisation of the magnitude of impact takes into account the following factors:

- Extent
- Duration
- Frequency; and
- Reversibility

9.5.17 The magnitude of impact is the level of change caused by the Scheme and is defined in **Table 9.5**. This has been derived as outlined above for the receptor sensitivity.

Table 9.5: Criteria for Determining Magnitude of Impact

Magnitude of Impact	Description
High	Adverse: A major shift in hydrochemistry or hydrological conditions sufficient to negatively change the function of the receptor. This change would result a downgrading of a WFD Quality classification by two classes e.g. from 'High' to 'Moderate'. A material (adverse) increase in the probability of fluvial and surface water flooding onsite and offsite, adding to the extent which requires flood prevention measures or affecting the ability of the functional floodplain to attenuate the effects of flooding by storing water (in accordance with NPPF paragraphs 170-182) i.e. loss of floodplain (Flood Zone 3b) storage (1 in 30 (3.3%) AEP floodplain). Loss of floodplain storage in areas of 'High' surface water flood risk (greater than a 1 in 30 (3.3%) AEP) A permanent or long-term degradation of groundwater quality or a long-term reduction in the available yield. A greater than 50% loss of a hydrogeological receptor or peat habitat site, or where there would be complete severance of a site such as to fundamentally affect the integrity of that site (e.g. severing hydrological connectivity). Loss of an internationally/nationally protected site (e.g. SAC, SPA, SSSI). Pollution of potable sources of water abstraction. Significant potential increase in supply deficit or demand (>5 Ml/d or >5000 m^3/d) (Ref 9-21).
	Beneficial: A major shift in hydrochemistry or hydrological conditions sufficient to positively change the function of the receptor. This change would result an upgrading of a WFD Quality classification by two classes e.g. from 'Moderate' to 'High'. A material (adverse) reduction in the probability of flooding onsite and offsite, and increasing the ability of the functional floodplain to attenuate the effects of flooding by storing water (in accordance with NPPF paragraphs 170-182) i.e. gain of floodplain (Flood Zone 3b) storage (1 in 30 (3.3%) AEP floodplain). Gain in floodplain storage in areas of 'High' surface water flood risk (greater than a 1 in 30 (3.3%) AEP)

Magnitude of Impact	Description
	A permanent or long-term improvement of groundwater quality or a long-term increase in the available yield. A greater than 50% gain of a hydrogeological receptor or peat habitat site, or where there would be complete severance of a site such as to fundamentally affec severing hydrological connectivity). Gain of an internationally/nationally protected site (e.g. SAC, SPA, SSSI). Improvement of water quality of potable sources of water abstraction. Significant potential reduction in supply deficit or demand (>5 Ml/d or >5000 m^3/d) (Ref 9-21).
Medium	Adverse: A fundamental change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change would result in a downgrading of a WFD Water Quality classification by one class e.g. from 'Good' to 'Moderate'. A loss of between 15% and 50% of a hydrogeological receptor or peat habitat site, complete or substantial severance and effects to its integrity as a feature, or disturbance such that the value of that site would be affected but could still function. The yield or quality of potable or public water supply may be temporarily reduced. A moderate increase in the probability of fluvial and surface water flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional floodplain to attenuate the effects of flooding by storing floodwater i.e. moderate loss of floodplain storage within Flood Zone 3a (greater than a 1 in 100 (1.0%) AEP of river flooding). Loss in floodplain storage in areas of 'Medium' surface water flood risk (between a 1 in 30 (3.3%) and 1 in 100 (1.0%) AEP) Some potential increase in supply deficit or demand (2-5 Ml/d or 2000- 5000 m^3/d) (Ref 9-21).
	Beneficial: A fundamental beneficial change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change would result in an upgrade of a WFD Water Quality classification by one class e.g. from 'Moderate' to 'Good'. A gain of between 15% and 50% of a hydrogeological receptor or peat habitat site, complete or substantial restoration.

Magnitude of Impact	Description
	The yield or quality of potable or public water supply may be temporarily increased. A moderate reduction in the probability of flooding onsite and offsite, reducing the area of land which requires protection by flood prevention measures or increasing the ability of the functional floodplain to attenuate the effects of flooding by storing floodwater i.e. moderate gain of floodplain storage within Flood Zone 3a. Gain in floodplain storage in areas of 'Medium' surface water flood risk (between a 1 in 30 (3.3%) and 1 in 100 (1.0%) AEP) Some potential reduction in supply deficit or demand (2-5 Ml/d or 2000- 5000 m^3/d) (Ref 9-21).
Low	Adverse: A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change would not reduce the WFD status of the receptor. Interaction with the groundwater table which will marginally alter local ecology or will lead to a slight detectable displacement of groundwater. A detectable but non-material effect on the receptor or a moderate effect on its integrity as a feature or where there would be a minor severance or disturbance such that the functionality of the receptor would not be affected. Loss of floodplain storage within Flood Zone 2 and areas of 'Low' surface water flood risk (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP) Minor potential increase in supply deficit or demand (1-2 Ml/d or 1000-2000 m^3/d) (Ref 9-21).
	Beneficial: A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change would not increase the WFD status of the receptor. Interaction with the groundwater table which will marginally alter local ecology or will lead to a slight detectable increase in groundwater level. A detectable but non-material effect on the receptor or a moderate effect on its integrity as a feature or where there would be a minor improvement such that the functionality of the receptor would not be affected.

Magnitude of Impact	Description
	Gain of floodplain storage within Flood Zone 2/areas of 'Low' surface water flood risk (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP) Minor potential reduction in supply deficit or demand (1-2 Ml/d or 1000-2000 m^3/d) (Ref 9-21).
Negligible	Adverse and Beneficial: No detectible changes to the baseline hydrochemistry or hydrological environment. No increase in the probability of flooding onsite and offsite. No potential increase in supply deficit or demand (<1 Ml/d, or <1000 m^3/d) (Ref 9-21).

Categorising Scale of Effect

9.5.18 The scale of effect that the Scheme may have on an impacted receptor will be influenced by a combination of the sensitivity of the identified receptor and the magnitude of impact. The matrix differs from that in **ES: Chapter 2 EIA Methodology [EN0110014/APP/6.1.2]** to align with the wider methodology used for the sensitivity and magnitude of impact, taken from the Design Manual for Roads and Bridges (Ref 9-27).

9.5.19 There are four categories demonstrating the scale of effect:

- Negligible;
- Minor;
- Moderate; and
- Major.

Table 9.6: Proposed Matrix for Categorising Scale of Effect

Importance/ Value/ Sensitivity	Magnitude of Impact			
	High	Medium	Low	Negligible
Very High	Major	Major	Moderate	Minor
High	Major	Major	Minor	Minor
Medium	Moderate	Moderate	Minor/Negligible	Negligible
Low	Minor	Minor/Negligible	Negligible	Negligible
Very Low	Minor/Negligible	Negligible	Negligible	Negligible

9.5.20 The nature of effects will be defined as either: beneficial or adverse.

9.6 Baseline Conditions

The Order Limits

9.6.1 The Scheme is located within the administrative areas of NCC and SNC who are the host authorities. A full description of the Scheme within the Order

limits is provided in **ES: Chapter 3 The Order Limits [EN0110014/APP/6.1.3]**.

Existing Baseline

Hydrology

9.6.2 The principal watercourses within the Order Limits and the Study Area are summarised as follows (refer to **ES: Figure 9.1 Site Location and Watercourses [EN0110014/APP/6.2.9.1]**):

- The **Hempnall Beck** (main river and chalk stream) flows between Site 7 and Sites 4 to 6 and through CRC7. Ordinary watercourse tributaries of the Hempnall Beck flow through CRC4 and CRCs 6 and 8 and adjacent to the western boundary of Sub-Sites 5B and 7A. The watercourse becomes part of the Waveney, Yare and Lothingland Internal Drainage Board (IDB) district approximately 600metres (m) to the north-east of Sub-Site 4B and south of Sub-Site 7A;

- The **River Tas** – Tasburgh to River Yare (main river and chalk stream) flows along the boundary between Sub-Sites 8A and 8B (known as Shotesham Beck) and north-east of Sub-Site 7F. An ordinary watercourse tributary of the River Tas (Head to Tasburgh) flows north-east close to the western boundary of Sub-Site 4A and is managed by the Waveney, Yare and Lothingland IDB;

- The **Broome Beck** (ordinary watercourse at Order Limits boundary) flows in a south-westerly direction as an ordinary watercourse adjacent to the southern boundary of Sub-Sites 10A and 10C and becomes a main river shortly downstream of Sub-Site 10A. The watercourse flows into the River Waveney to the east of the village of Broome; and

- **Little Beck** (ordinary watercourse tributary of the River Chet (main river)) flows in a northerly direction to the north-west of Sub-Site 10E and to the east of Sub-Site 9.

9.6.3 Other smaller ordinary watercourses/field boundary ditches are present within several of the Sub-Sites (refer to **ES: Figure 9.1 Site Location and Watercourses [EN0110014/APP/6.2.9.1]**).

9.6.4 Seven WFD water body catchments lie within the Order Limits, six of which relate to surface water and one to groundwater. Four of these waterbodies were screened out as there will not be access crossings within them and the proposed works are not anticipated to have an impact.

9.6.5 The three water bodies screened in are the Hempnall Beck Water Body, Tas (Tasburgh to River Yare) Water Body and Starston Brook Water Body.

Flood Risk

9.6.6 Information on the flood risk within the Order Limits is outlined in **ES: Appendix 9.1 Flood Risk Assessment and Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1]**.

Water Quality

9.6.7 The aim of the WFD is to ensure that all surface water bodies and groundwater water bodies are of good chemical quality. Chemical status is an assessment of the concentrations of priority substances in surface water bodies. Ecological status is an assessment of the quality of surface water ecosystems.

9.6.8 Water quality data available from the EA's online 'Catchment Data Explorer' (Ref 9-32) has been reviewed. The Order Limits lie within the Anglian River Basin District. The majority of the Order Limits is located within the Yare Operational Catchment and the south-western (National Grid Substation Site, BESS, Sub-Sites 1A, 1B (including the National Grid Substation Option 2 Site), 2A, 2B, 2C and 10A are located within the Waveney Operational Catchment.

9.6.9 The Hempnall Beck Water Body, Starston Brook Water Body, Tas (Head to Tasburgh) Water Body and Chet Water Body are designated as '*not artificial or heavily modified'* watercourses. The Broome Beck Water Body and Tas (Tasburgh to R. Yare) Water Body are designated as '*heavily modified'*.

9.6.10 The Hempnall Beck Water Body and the Chet Water Body have a 'poor' ecological status and 'moderate' physio-chemical status (physical and chemical properties of water including temperature, oxygenation and nutrient conditions). The Tas (Tasburgh to R.Yare) Water Body, Tas (Head to Tasburgh) Water Body, Starston Brook Water Body and Broome Beck Water Body have a 'moderate' ecological and physio-chemical status. All watercourses have a 'fail' chemical status.

9.6.11 The groundwater waterbody that underlies the Order Limits is the Broadland Rivers Chalk and Crag Water Body This waterbody covers a total surface area of approximately 3,076km^2 and has a 'poor' ecological status classification.

9.6.12 A 'good' standard for chemical status was achieved for all watercourses up to 2016 but failed in 2019 due to changes in the latest Cycle 3 records. However, in 2022, Chemical, Priority Hazardous Substances and Priority Substances were no longer assessed; therefore, all waterbodies in England currently have this classification.

9.6.13 It was identified that '*measures [have been] delivered to address issues, awaiting recovery*', although the projected timescales to achieve the targeted 'good' classification for the problematic chemical substances is identified as up to 40 years, due to the natural conditions and chemical status recovery time.

9.6.14 In summary, the available information indicates that surface water quality over the Order Limits and the receiving WFD watercourses is considered to be of 'poor' to 'moderate' quality.

Water Resources – Water Supply and Demand

9.6.15 The EA classified the East Anglia region as 'seriously water stressed' in 2021 where there is a significant risk that water supplies may not be available for new non-domestic demands (Ref 9-21).

9.6.16 The Order Limits falls within the Broadland Catchment Abstraction Management Strategy (CAMS) area. Review of the Broadland abstraction licencing strategy finds Low flows (Q70) and Median flows (Q50) to be restricted, Very Low flows (Q95) to be unavailable for licencing and High flows (Q30) to be available for licencing (Ref 9-42).

9.6.17 AWS is the provider of potable water and wastewater services to the area within which the Order Limits is situated. The Order Limits is located across two AWS WRZ, namely Norfolk Norwich & the Broads WRZ, and Norfolk Harleston WRZ. Both WRZs are currently in deficit under the baseline scenario (Ref 9-21). The deficit for Norfolk Norwich & the Broads WRZ results in a High receptor sensitivity, whilst the Norfolk Harleston WRZ deficit receptor sensitivity is Medium.

9.6.18 Private water supplies are present in vicinity to the Order Limits as set out in **ES: Chapter 16 Ground Conditions [EN0110014/APP/6.1.16]**. These receptors are considered to have a variable sensitivity ranging from Very High to Medium.

9.6.19 The Order Limits spans across four surface waterbodies. These are the Tas (Tasburgh to R. Yare) (GB105034051230), the Chet (GB105034051190), Waveney (Starston Brook - Ellingham Mill) (GB105034045902) and Broome Beck (GB105034045930) and all have a hydrological regime which 'Supports Good' (Ref 9-37)(Ref 9-38)(Ref 9-39)(Ref 9-40). The Order Limits is also underlaid by the Broadland Rivers Chalk & Crag WFD groundwater body, which is currently classified as poor status due to the Quantitative Groundwater Dependent Terrestrial Ecology test. The WFD water balance test is classified as good (Ref 9-41).

9.6.20 The current water supply and demand for the Order Limits is low and in line with typical agricultural practices, due to it being agricultural land. There are also currently no private abstraction licences associated with the Order Limits (Ref 9-42).

9.6.21 There are no lakes, water storage facilities, canals or surface water transfer systems in the vicinity of the Order Limits.

9.6.22 The northern part of the Order Limits is located within a Groundwater Source Protection Zone (SPZ) 3. This results in a Medium receptor sensitivity. The remaining area of the Order Limits is outside of the SPZ boundary.

Future Baseline

9.6.23 This Section considers changes to the baseline conditions, as described above, as far as changes can be established that might occur in the absence of the Scheme coming forward during the time period over which the Scheme would be in place. The future baseline scenarios are set out in **ES: Chapter 2 EIA Methodology [EN0110014/APP/6.1.2]**.

9.6.24 The future baseline of the Study Area without the implementation of the Scheme would be unlikely to change substantially, however there would be potential for increases in peak river flow and peak rainfall intensity as a result of climate change, leading to an increase in flood risk within the Order Limits and the Study Area.

9.7 Embedded Mitigation

9.7.1 Likely environmental effects have been or will be avoided, minimised, mitigated or reduced through design measures and/or management of the Scheme, as outlined in this section. Proposed environmental enhancements are also described where relevant.

9.7.2 The following embedded mitigation measures have been incorporated into the Scheme's design.

Embedded Construction Phase Mitigation

9.7.3 The following embedded mitigation measures have been incorporated into the Scheme construction phase, which are detailed within the **Outline CEMP [EN0110014/APP/7.1]** and **Outline CTMP [EN0110014/APP/7.6]** . Measures include:

- Limitation of heavy goods vehicles (HGV) movements to compound areas as far as practicable. Several internal haul routes for construction vehicles are proposed to connect Site 7 and Site 8.
- No temporary construction compounds and stockpiles would be located within Flood Zones 2 and 3.
- The storage and handling of materials will be undertaken in temporary compounds/designated areas, away from main rivers and watercourses.
- Management of runoff and pollution in temporary construction compounds through the use of bunding, silt traps, oil drip trays and filter drains.
- All chemicals will be stored in a secure impermeable and bunded area and accordance with the Control of Substances Hazardous to Health (COSHH) guidelines. Spillage kits will be held, and personnel will be trained in their use.

- Oil drip trays will be utilised and be inspected. Any polluting materials suctioned out and stored in a bunded tank will be removed for disposal.

- All reasonably practicable measures will be taken to prevent the deposition of sediment or other material in, and the pollution by sediment of, any watercourse, arising from construction activities. These measures will include soil bunds/silt traps where ground differences.

- There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **outline CEMP [EN0110014/APP/7.1].**

- Use of temporary access ramps for internal haul route vehicular crossing points over watercourses. Following installation haul routes will be removed and the ground reinstated to original condition as secured within the **Outline CTMP [EN0110014/APP/7.6]**.

- The management of the cable works in areas of flood risk areas will be managed through measures outlined in the **Outline CEMP [EN0110014/APP/7.1]** so as not to impact on floodplain storage or increase flood risk at the Order Limits or elsewhere.

- The cables will be laid at a minimum of 5m below the surveyed bed of main rivers. The thermal dynamics of the cables are limited to their immediate proximity and therefore will not significantly affect the thermal dynamics in the watercourses and their associated receptors.

- Foul water from welfare facilities during the construction and decommissioning phases will be contained within sealed systems and tankered from the Order Limits.

- Water neutrality options have been given priority to reduce the supply requirements. These options include rainwater harvesting, on-site water storage, and water tankering (to meet peak demand). Tankering is the preferred method of embedded mitigation.

9.7.4 Cables will be fluid-free to reduce the risk of leaching of pollutants to the surrounding hydrogeological environment.

9.7.5 Further detail on the water resources supply options is provided in **ES: Appendix 9.3 Water Resources Assessment [EN0110014/APP/6.3.9.3]**.

Embedded Operation and Maintenance Phase Mitigation

9.7.6 The following embedded mitigation measures have been incorporated into the Scheme's design for the operation and maintenance phase and are summarised below.

9.7.7 Further detail on the embedded mitigation measures for the operation and maintenance phase is provided in the following documents:

- **ES: Appendix 9.1 Flood Risk Assessment & Outline Surface Water Drainage Strategy [EN0110014/APP/6.3.9.1]**; and
- **ES: Appendix 9.3 Water Resources Assessment [EN0110014/APP/6.3.9.3]**.

9.7.8 The embedded mitigation is secured through the following documents:

- **Outline OEMP [EN0110014/APP/7.2]**
- **Outline LEMP [EN0110014/APP/7.4]**
- **Outline BSMP [EN0110014/APP/7.5]**
- **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**

Infrastructure Design, Sequential Approach & Flood Resilience

- Application of flood risk sequential approach in locating infrastructure outside of areas of highest flood risk (as far as reasonably practicable to do so). Areas of infrastructure located in highest flood risk areas are limited to Solar PV Arrays, which are raised above the ground on thin pile-driven steel supports. The supports are very narrow and represent a negligible increase in impermeable area (typically less than 1% of the total Order Limits);
- Concrete footings for Solar PV Arrays will be limited to areas of where there is a requirement to protect any underground assets/resources e.g. if archaeological protection is required;
- All electrical infrastructure associated with the panels (excluding cabling) will be elevated by the Mounting Structures so that it is no less than 300mm above the 1 in 100 (1%) Annual Exceedance Probability (AEP) flood level; or, where this is not possible, as high as practicable.
- Integrated Conversion Units/33kV Sub-Distribution Switch Rooms will be located in Flood Zone 1 and away from areas of surface water flooding, as far as practicable.

- Standalone Conversion Units will be located in Flood Zone 1 and away from areas of surface water flooding, as far as practicable.
- O&M buildings to be located outside of Flood Zones 2 and 3.
- The lowest edge of the Solar PV Panels will be set at a minimum of 0.4m above ground level. Where Solar PV Panels are situated in areas of 'low' to 'high' surface water flood risk, the Solar PV Panels will be raised higher where practicable, or the use of Single Axis Tracker panels will be considered.
- Where access tracks are located in areas of Flood Zones 2 or 3 and/or significant 'low' to 'high surface water flow routes/flood risk areas, access tracks to be kept at existing ground level so as to not impede floodplain storage or flood flow routes.
- The land underneath and between the rows of Solar PV Arrays will be sown as grassland/wildflower meadow which will be maintained to a suitable height using machinery such that the plants will slow the rate of contact between rainfall and the soil through this phase of the Scheme. The provision of ground cover across the Order Limits year-round will reduce soil erosion, contribute to greater interception/evapotranspiration of rainfall and increase ground roughness across the fields, thereby slowing the rate of runoff across the Order Limits and reducing flooding to villages located at the bottom of drainage catchments;
- All Solar PV Panels will be PFAS free (including within the manufacturing process), meaning there is no risk of the mobilisation of PFAS coatings on the panels being leached or otherwise mobilised and entering ground or surface water;
- The cables will have standard cross-linked polyethylene (XLPE) insulation which is typically not a fluorinated polymer (unlike PTFE or FEP), so pure XLPE insulation generally does not inherently contain PFAS. However, associated components or manufacturing steps might involve PFAS, for which their use will be avoided if there is a reasonable alternative.

Surface Water Runoff and Pollution Management

- The access roads (infrequent vehicle movements during operation), infrastructure building roof areas and Solar PV Arrays are considered to have a low pollution risk, therefore, the incorporation of permeable surfaces with aggregate sub-base or gravel filter drains around standalone inverter, transformer and welfare cabins will provide adequate treatment.
- Access tracks will be constructed of a permeable surface, with additional passive drainage features such as shallow ditches and filter drains that are located downstream of or run parallel with the tracks.

- The inverters will be typically set on blocks 100-150mm or concrete plinth above the surrounding ground level. Other ancillary buildings will likely consist of temporary style modular buildings over a concrete pad that provides a 150mm freeboard above the surrounding ground level.

- Surface water runoff of Standalone Conversion Units and Integrated Conversion Units/33kV Sub-Distribution Switch Rooms will be managed via a filter drain around the perimeter or permeable aggregate surface with underlying sub-base, with appropriate overflow outlet, if required, should infiltration testing confirm that rates are too low to facilitate infiltration drainage as a stand-alone solution.

- The National Grid Substation situated within Sub-Site 1B is to remain beyond the operational lifetime of the Scheme and will include a formalised surface water drainage system.

- The BESS will manage surface water runoff both under normal operation and unlikely fire incident scenarios through local bunding and attenuation within lined SuDS features (assumed to be permeable surfaces for the purposes of this assessment, with final configuration and form to be confirmed at detailed design). The proposed surface water drainage system will have an auto shut-off valve that activates in the event of the fire alarms sounding to isolate the system from on and off-site receptors. Fire water will be tanked from the Order Limits and the affected areas of the drainage system isolated, flushed and remediated where required. Further information is provided in **Outline BSMP [EN0110014/APP/7.5]**;

- A similar approach will also be applied to the Project Substations with a lined drainage system and the incorporation of auto shut-off valves as appropriate.

- Fuel and other potentially polluting chemicals will either be in self-bunded leak proof containers or stored in a secure impermeable and bunded area (minimum capacity of 110% of the capacity of the containers), If pollution is detected it will be suctioned to a self-bunded (or similar) tank and removed from site for suitable disposal.

- All smaller fixed infrastructure (e.g. transformers) will be self-bunded to prevent any leaks from reaching the watercourse. If pollution is detected it will be suctioned to a self-bunded (or similar) tank and removed from site for suitable disposal.

- Oil drip trays will be utilised and be inspected. Any polluting materials suctioned out and stored in a bunded tank will be removed for disposal.

- Mitigation for the possible mobilisation of contaminants from surface water runoff generated by the Scheme are set out and secured in **Outline OEMP [EN0110014/APP/7.2]**.

- The proposed surface water drainage systems will be regularly maintained through measures agreed with the LLFA and set out and secured within **Outline OEMP [EN0110014/APP/7.2]**.

Watercourse Buffers

- 10m watercourse edge buffers will be incorporated into the Scheme as detailed within the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**

Water Supply/Resources and Wastewater

- The same water neutrality options outlined for construction have been given priority to reduce the supply requirements. These options include rainwater harvesting, on-site water storage, water tankering (to meet peak demand).
- Wastewater from welfare facilities will be contained within sealed systems and tankered from the Order Limits.

Embedded Decommissioning Phase Mitigation

9.7.9 The following embedded mitigation measures have been incorporated into the Scheme design for the Decommissioning Phase (and secured through the **Outline DEMP [EN0110014/APP/7.3]** and the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**):

- No temporary construction compounds and stockpiles would be located within Flood Zones 2 and 3.
- The storage and handling of materials will be undertaken in temporary compounds/designated areas, away from main rivers and watercourses.
- Management of runoff and pollution in temporary construction compounds through the use of bunding, silt traps, oil drip trays and filter drains.
- All chemicals will be stored in a secure impermeable and bunded area and accordance with the Control of Substances Hazardous to Health (COSHH) guidelines. Spillage kits will be held, and personnel will be trained in their use.
- All reasonably practicable measures will be taken to prevent the deposition of sediment or other material in, and the pollution by sediment of, any watercourse, arising from construction activities. These measures will include soil bunds/silt traps where ground differences.
- Foul water from welfare facilities during the construction and decommissioning phases will be contained within sealed systems and tankered from the Order Limits.

9.8 Assessment of Likely Effects

9.8.1 This section of the Water Environment chapter identifies and characterises potential impacts arising during the construction, operation and management and decommissioning phases of the Scheme.

9.8.2 Taking into account the embedded mitigation measures as detailed in **section 9.7,** the potential for the likely effects of the Scheme on the Water Environment receptors was assessed using the methodology as detailed in **section 9.5** of this chapter. In the sections below, effects during the construction, operation and maintenance, and decommissioning phases of the Scheme are assessed for Water Environment receptors scoped into the ES chapter.

9.8.3 Any additional mitigation required to reduce these effects is then set out in **section 9.9.** Thereafter, an assessment is made of the significance of any residual effects after all mitigation measures have been accounted for.

9.8.4 Effects occurring during the construction and decommissioning phases are considered to be short-term due to the duration of these phases (up to 24 months per Phase), though less in any one location due to phasing of the works), while those occurring as a result of the operation and maintenance phase are considered to be long-term effects (up to 60 years).

Construction & Decommissioning Phases

9.8.5 The following impacts have been identified for the construction and decommissioning phases within **Section 9.1** and are assessed below.

Water Supply/Resources

9.8.6 The construction and decommissioning phases are considered to be the those with the higher water demand. Due to the East Anglia region being classified as ‘seriously water stressed’, both private and public water supplies could be at risk of a reduction in water quality or quantity, particularly during summer or drought events.

9.8.7 Within **ES: Appendix 9.3 Water Resources Assessment [EN0110014/APP/6.3.9.3]** new groundwater or surface water abstraction options were scoped out, following the EA response to the PEIR (see **Consultation Report [EN0110014/APP/5.1]** and the current status of the catchment (Ref 9-35). This results in there being no potential impact on existing lawful water users in the area including both licenced abstractions and unlicenced (private) water supplies or the SPZ. The associated impacts have therefore not been considered any further in the WRA.

9.8.8 With the inclusion of the embedded mitigation measures described above, the potential construction effects identified on the WRZs (assuming worst case, High and Medium sensitivity) are considered to have a worst case magnitude of impact of Low and a worst case **Minor** scale of effect.

9.8.9 These effects are **Not Significant** in EIA terms based on the current understanding of climate change and future water demand in the region.

9.8.10 The impact on the WRZ is considered to be **Negligible** and **Not Significant** in EIA terms with the embedded mitigation.

Spills and Sediment/New Contaminant Mobilisation

9.8.11 Construction and decommissioning activities present a risk of spills (oils, chemicals, coolants fuel etc.) and sediment/contaminant mobilisation through the movement of vehicles and materials, and the potential to adversely affect the water quality of above and below ground receptors.

9.8.12 Embedded construction and decommissioning phase mitigation measures will be implemented as outlined in **section 9.7**. On this basis, the potential construction and decommissioning phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from spills and sediment/contaminants mobilisation from these Phases of the Scheme are considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.13 These effects are **Not Significant** in EIA terms.

Ground Compaction and Storage of Materials

9.8.14 During the construction and decommissioning phases of the Scheme, the movement of construction vehicles, soil stripping and placement of materials/stockpiling can contribute to ground compaction and changes in the pattern, quantity and quality of surface water runoff. These activities are likely to be more frequent with the construction of the BESS and National Grid Substation which would have a larger impermeable area.

9.8.15 Embedded mitigation measures are detailed in **Section 9.7** above and will include using limitation of heavy goods vehicles (HGV) movements to compound areas as far as practicable and the storage and handling of materials will be undertaken in temporary compounds/designated areas.

9.8.16 Based on the above, the potential construction and decommissioning phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from ground compaction and placement of materials from these phases of the Scheme are considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.17 These effects are **Not Significant** in EIA terms.

Battery Installation and Removal

9.8.18 During the construction and decommissioning Phases of the Scheme, removal of infrastructure such as batteries may pose a risk of mobilisation of

potentially harmful materials such as lead to hydrological and hydrogeological receptors.

9.8.19 Batteries will be stored and handled carefully with appropriate management measures put in place as set out in the **Outline BSMP [EN0110014/APP/7.5]**, notably where batteries are being replaced due to damage.

9.8.20 Based on the above, the potential construction and decommissioning Phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from battery installation/removal from these Phases of the Scheme are considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.21 These effects are **Not Significant** in EIA terms.

Groundwater Recharge

9.8.22 The construction and decommissioning phases may result in a temporary reduction in groundwater recharge through the installation of temporary impermeable surfaces for compounds/laydown areas.

9.8.23 These areas will be temporary and the land will be restored once the Phases are complete.

9.8.24 With the inclusion of the embedded mitigation measures described above, the potential construction and decommissioning Phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from the introduction of temporary impermeable surfaces from these Phases of the Scheme are considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.25 These effects are **Not Significant** in EIA terms.

Impact of Heat Pollution from Cables (Decommissioning)

9.8.26 During and beyond the decommissioning Phase, there is potential for the thermal dynamics of the cables transferring energy across the Order Limits to impact on GWDTEs.

9.8.27 The cables will be laid at a minimum of 5m below the bed of surveyed main rivers. The thermal dynamics of the cables are limited to their immediate proximity and therefore will not significantly affect the thermal dynamics in the watercourses and their associated receptors.

9.8.28 With the inclusion of the embedded mitigation measures described above, the potential effects on the identified receptors (assuming a worst case Very Hig**h** sensitivity) during and post-decommissioning from the impacts of thermal dynamics/heat pollution from cables is considered to have a worst

case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.29 The effect in relation to this element of the Scheme is **Not Significant** in EIA terms.

Operational and Maintenance Phase

9.8.30 The following impacts have been identified for the operation and maintenance phase within **Section 9.1** and are assessed below.

Water Supply/Resources

9.8.31 The operation and maintenance phase of the Scheme has a lower water demand. However, private and public water supplies could still be at risk of a reduction in water quantity or quality, resulting from a reduction in water, due to the East Anglia region being classified as 'seriously water stressed', particularly during summer or drought events.

9.8.32 Similarly to what is outlined in **9.8.7**, the impact on existing lawful water users in the area including both licenced abstractions and unlicenced (private) water supplies has been screened out, following new groundwater or surface water abstraction options being scoped out (**ES: Appendix 9.3 Water Resources Assessment [EN0110014/APP/6.3.9.3]**).

9.8.33 With the inclusion of the embedded mitigation measures described above, the potential operation and maintenance effects identified on the WRZ (assuming worst a case High sensitivity) are considered to have a worst case magnitude of impact of Low and a worst case **Minor** scale of effect.

9.8.34 These effects are **Not Significant** in EIA terms based on the current understanding of climate change and future water demand in the region.

9.8.35 The impact on the WPZ is considered to be **Negligible** and **Not Significant** with the embedded mitigation.

Contaminant Mobilisation in Surface Water Runoff from BESS and Substations

9.8.36 During the operation and maintenance phase, there is a risk of contaminant mobilisation from accidental vehicle leaks and spills associated with maintenance and monitoring activities, oil leaks from transformers and in surface water runoff from the new impermeable areas associated with the Scheme, notably the BESS, the National Grid Substation and the Project Substations.

9.8.37 These areas will incorporate surface water drainage systems for the management of the quantity and quality of surface water runoff.

9.8.38 It is anticipated that the storage of chemicals or oils within the compounds during this Phase will be limited however should a spill/leak occur the risk of

contamination will be minimised through the use of the embedded mitigation measures secured through the **Outline OEMP [EN0110014/APP/7.2]** as detailed above.

9.8.39 With the inclusion of the embedded mitigation measures described above, the potential operation and maintenance Phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from the mobilisation of contaminants in surface water runoff in the Operational Phase of the Scheme are considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.40 The above is **Not Significant** in EIA terms.

Risk of Chemical Pollution from Battery & PV Array Replacement/Breakage

9.8.41 During the operation and maintenance Phase, batteries may require replacement, and PV Arrays may also require localised replacement if they break/crack due to antecedent conditions or vandalism. This therefore presents a risk of the mobilisation of potentially harmful substances from these components of the Scheme.

9.8.42 The composition of Solar PV Arrays is such that even if they become damaged at surface level, they are likely to remain intact both at the surface and underside near the racking system and not leak. As such, there is limited potential to transfer chemicals to the hydrological and hydrogeological environment.

9.8.43 Control measures for the replacement and maintenance activities associated with battery and PV Array replacement are outlined in the **Outline OEMP [EN0110014/APP/7.2]**;

9.8.44 With the inclusion of the embedded mitigation measures described above, the potential operation and maintenance Phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from battery replacement activities and/or potential Array breakage/replacement from this Phase is considered to have a worst case Negligible magnitude of impact and a worst case **Minor** scale of effect.

9.8.45 These effects are **Not Significant** in EIA terms.

Contaminant Mobilisation in Firewater at the BESS & Substations

9.8.46 For the BESS (and potentially the National Grid Substation and Project Substations), there poses a risk of a fire (in the unlikely event) and the mobilisation of contaminants from fire water runoff to receptors.

9.8.47 These elements of the Scheme will incorporate lined drainage systems with auto shut-off penstock valves to prevent potentially contaminated runoff from a firewater incident being discharged to hydrological and hydrogeological

receptors within or outside of the Order Limits. The runoff will be tested and if required collected from the Order Limits and treated.

9.8.48 With the inclusion of the embedded mitigation measures described above, the potential operation and maintenance Phase effects on the identified hydrological and hydrogeological receptors (assuming a worst case Very High sensitivity) from battery replacement activities and/or potential Array breakage/replacement from this Phase is considered to have a worst case Negligible magnitude of impact and a worst case **Minor** scale of effect.

9.8.49 The above is **Not Significant** in EIA terms.

Cessation of Agricultural Chemical/Fertiliser Application

9.8.50 Once the Scheme has been fully implemented, the ground will have been converted from agricultural use to a grassland across the majority of the Order Limits (for areas of Solar PV Arrays) as shown in the **Outline LEMP [EN0110014/APP/7.].** This will provide greater soil stability, and the cessation of agricultural use will reduce the nutrient loading to hydrological receptors (Very Low to Very High sensitivity) and hydrogeological receptors (Medium to Very High sensitivity) which is associated with the application of nutrient-rich fertilisers and chemicals.

9.8.51 The existing agricultural use across the Order Limits is contributing to poor water quality of watercourses in the area with potential onward transfer to designated sites (Medium to Very High sensitivity) through the application of nutrient-rich fertilisers and chemicals.

9.8.52 Assuming a worst case Very High sensitivity, the impact in relation to a reduction in agricultural chemical application and associated reduction in nutrient loading is therefore considered to be Significant in EIA terms with a worst case High magnitude of impact.

9.8.53 The effect is considered be **Significant** in EIA terms with a worst case **Major Beneficial** scale of effect.

Groundwater Recharge

9.8.54 As with the construction and decommissioning phases, there is potential for impacts on groundwater recharge due to increases in impermeable area at the Order Limits, notably for the BESS, Project Substation and National Grid Substation areas (including cabins and transformers).

9.8.55 The depth to the groundwater table within the Order Limits is anticipated to be at least 13.0m bgl (within the Crag or Chalk) and therefore the impacts on groundwater recharge is considered to be negligible when comparing the size of the BESS and Substation areas with the area of the Order Limits.

9.8.56 Based on the above, the potential operation and maintenance phase effects on the identified hydrological and hydrogeological receptors (assumed to be a worst case Very High sensitivity) from changes to groundwater recharge is

considered have a worst case Negligible magnitude of impact and a worst case **Minor** scale of effect.

9.8.57 These effects are **Not Significant** in EIA terms.

Impact of Heat Pollution from Cables

9.8.58 During the operation and maintenance phase, there is potential for the thermal dynamics of the cables transferring energy across the Order Limits to impact on GWDTEs.

9.8.59 The cables will be laid at a minimum of 5m below the bed of surveyed main rivers. The thermal dynamics of the cables are limited to their immediate proximity and therefore will not significantly affect the thermal dynamics in the watercourses and their associated receptors.

9.8.60 With the inclusion of the embedded mitigation measures described above, the potential operation and maintenance phase effects on the identified receptors (assuming a worst case Very High sensitivity) during and post-decommissioning from the impacts of thermal dynamics/heat pollution from cables is considered to have a worst case magnitude of impact of Negligible and a worst case **Minor** scale of effect.

9.8.61 The effect in relation to this element of the Scheme is **Not Significant** in EIA terms.

9.9 Additional Mitigation Measures

9.9.1 As no significant adverse effects have been identified above for receptors during any phase of the Scheme once embedded mitigation is taken into account, no additional mitigation measures for the Scheme are required.

9.10 Residual Effects

9.10.1 No additional mitigation is proposed and as there are no significant effects identified (other than Significant Beneficial), the effects will remain unchanged as those reported above in the assessment of likely effects. These are summarised in **Table 9.7**.

9.11 Cumulative Effects Assessment

9.11.1 This Section presents an assessment of cumulative effects between the Scheme and other existing and/or approved developments.

9.11.2 As set out in **ES: Chapter 2 EIA Methodology [EN0110014/APP/6.1.2]**, a Cumulative Effects Assessment (CEA) has been undertaken as part of the EIA in accordance with PINS Advice on Cumulative Effects Assessment (September 2024) and has considered two types of cumulative effects:

- In combination effects: the combined effect generated by individual effects on a particular receptor (presented within **ES: Chapter 19: In-Combination Effects Assessment [EN0110014/APP/6.1.19]**; and

- Cumulative effects: effects generated by the Scheme and other planned or approved developments on the same receptor (presented in **ES: Chapter 2: EIA Methodology [EN0110014/APP/6.1.2]**).

Cumulative Effects

9.11.3 Cumulative effects may arise as a result of effects associated with the Scheme combining with effects associated with other developments. The list of developments has been narrowed down to focus on those developments which are most likely to give rise to cumulative effects. A long list was generated which was then refined following consultation with relevant local planning authorities, this short-list forms the basis of this assessment.

9.11.4 The shortlist of cumulative developments/allocations can be found in **ES: Appendix 2.4 Cumulative Schemes [EN0110014/APP/6.3.2.4]**. These developments range from residential schemes (minimum 9 residential dwellings) to other National Significant Infrastructure Projects (NSIP) including solar farms, new substations and offshore wind farms.

9.11.5 Given their nature and size, these cumulative developments will all require the submission of FRA and surface water drainage strategy documents and relevant management plans for approval by the relevant authorities as part of planning applications/DCOs. These reports will contain information and embedded mitigation similar to that of the Scheme.

9.11.6 The potential for cumulative effects is considered in turn for each Phase below.

Cumulative Effects Assessment

Construction Phase

9.11.7 For the construction phase, cumulative developments will require the implementation of embedded mitigation measures and best practice in relation to pollution and surface water management that are similar to that of the Scheme for the construction phase and secured through management plans.

9.11.8 As such it is considered that cumulative effects in relation to the construction phase are **Not Significant** in EIA terms.

Operation and Maintenance Phase

9.11.9 The cumulative developments (with and without an EIA) will require the submission and approval of an FRA and surface water drainage strategy for

the operation and maintenance phase. These reports should include embedded mitigation similar to that of the Scheme.

9.11.10 As such, it is considered that cumulative effects in relation to the operation and maintenance phase are **Not Significant** in EIA terms, except for where cumulative developments will be built over agricultural fields which will provide a cumulative **Significant Beneficial** effect, with the cessation of agricultural use and fertiliser application.

Decommissioning Phase

9.11.11 Where cumulative developments will involve a decommissioning phase, embedded mitigation measures and best practice similar to that for the construction phase will be required and secured through management plans.

9.11.12 As such it is considered that cumulative effects in relation to the construction phase are **Not Significant** in EIA terms.

9.12 Conclusion

9.12.1 This chapter has set out and assessed the likely effects of the Scheme in relation to the Water Environment. Likely effects have been assessed for the construction, operation and decommissioning Phases of the Scheme.

9.12.2 Following the implementation of embedded mitigation detailed in **section 9.7**, residual effects have not been identified in relation to the Water Environment during the construction, operation and maintenance, and decommissioning phases.

9.12.3 **Table 9.7** sets out a summary of the Water Environment environmental effects.

Table 9.7: Summary of Residual Effects for the Water Environment

Receptor	Sensitivity	Description of Impact	Magnitude of Impact	Scale and Nature of Effect (with Embedded Mitigation)	Significant/Not Significant
Construction and Decommissioning Phases					
Hydrological (watercourses and designated sites)	Very Low to Very High	Impacts from spills and sediment/pollutant mobilisation on water environment from potential new contaminants	Negligible	Minor	Not significant
		Impacts from contamination involving potential harmful materials from batteries whilst being installed onto, replaced or removed from within the Order Limits			
		Impacts from potential change to the pattern, volume and quality of surface water runoff due to the compaction of ground and/or storage of materials			
		Impact from thermal dynamic (heat pollution) from cables			
Hydrogeological (aquifers, Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and bedrock/superficial deposits)	Medium to Very High	Impacts to groundwater recharge arising from the introduction of temporary impermeable areas	Negligible	Minor	Not Significant
		Impacts from contamination involving potential harmful materials from batteries whilst being installed onto, replaced or removed from within the Order Limits			
		Impacts from spills and sediment/pollutant mobilisation on water environment from potential new contaminants	Negligible	Minor	Not Significant
		Impacts from thermal dynamics (heat pollution) associated with cables	Negligible	Minor	Not Significant
Water supplies (public/private)	Very High to Medium	Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events	Low	Minor	Not Significant
Water Resource Zones	Medium to High	Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events	Low	Minor	Not Significant
Source Protection Zones (private water supplies)	Medium	Impacts from spills and sediment/pollutant mobilisation on water environment from potential new contaminants	Negligible	Minor	Not Significant

Receptor	Sensitivity	Description of Impact	Magnitude of Impact	Scale and Nature of Effect (with Embedded Mitigation)	Significant/Not Significant
Operational Phase					
Hydrological (watercourses and designated sites)	Very Low to Very High	Impacts on the water environment from potential new contaminants in surface water runoff from the Project Substations, National Grid Substation and BESS	Negligible	Minor	Not Significant
Hydrological (watercourses, designated sites) contd.	Very Low to Very High	Impacts from contamination involving potential harmful materials from batteries whilst being installed onto, replaced or removed from within the Order Limits, and replacement/cracking of Solar PV Arrays due to antecedent conditions or vandalism	Negligible	Minor	Not Significant
		Impacts from contaminated firewater in the unlikely event of a fire at the BESS, National Grid Substation and Project Substations			
		Impacts from thermal dynamics (heat pollution) associated with cables			
		Impacts from the reduction in agricultural chemical and/or fertiliser application and associated nutrient loading	High	Major	Significant
Hydrogeological (aquifers, GWDTEs, bedrock and superficial deposits)	Medium to Very High	Impacts to groundwater recharge from the introduction of impermeable areas at the Project Substations, National Grid Substation and BESS	Negligible	Minor	Not Significant
		Impacts from contaminated firewater in the unlikely event of a fire at the BESS, National Grid Substation and Project Substations			
		Impact from thermal dynamics (heat pollution) associated with cables			
Water supplies (public/private)	Very High to Medium	Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events	Low	Minor	Not Significant
Water Resource Zones	Medium to High	Impacts on water supplies from potential increase in water demand for Scheme works, especially during summer or drought events	Low	Minor	Not Significant

Receptor	Sensitivity	Description of Impact	Magnitude of Impact	Scale and Nature of Effect (with Embedded Mitigation)	Significant/Not Significant
Source Protection Zones (private water supplies)	Medium	Impacts from spills and sediment/pollutant mobilisation on water environment from potential new contaminants	Negligible	Minor	Not Significant

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