SUNNICA ENERGY FARM

Preliminary Environmental Information Report

Chapter 9: Water Environment

Sunnica Ltd

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Contents

Tables

9. Flood Risk, Drainage and Water Resources

9.1. Introduction

9.1.1. This chapter identifies the potential impacts on the water environment from the construction, operation and decommissioning of the Scheme. The water environment includes surface waterbodies (e.g. rivers, streams, ditches, canals, lakes and ponds, etc.), groundwater bodies, as well as flood risk and drainage.

9.1.2. The assessment of impacts on waterbodies considers changes in water quality, physical form and natural processes (i.e. hydromorphology), and water resources. An important consideration is also the impact on the water environment where it is critical for supporting protected aquatic species and the biodiversity and conservation value of water dependent ecological sites that may be designated at a local, national or international level.

9.1.3. This chapter cross-refers to ***Chapter 8: Ecology*** where appropriate. ***Chapter 8: Ecology*** includes details of aquatic ecology surveys and assessments. It is also supported by a draft Flood Risk Assessment (***PEI Report Volume 2: Appendix 9A***) and Water abstraction data provided by the Environment Agency is presented in full in ***PEI Report Volume 2: Appendix 9B***.

9.1.4. This chapter is supported by the following figures in Volume 3:

- Figure 9-1 – Surface Waterbodies and their attributes
- Figure 9-2 – Groundwater Features
- Figure 9-3 – Chalk Groundwater Contours

9.2. Legislation and Planning Policy

9.2.1. A summary of the legislation, planning policy and guidance relevant to the assessment of impacts of the Scheme on the water environment is presented in this section.

Legislation

9.2.2. The main legislation relevant to the Scheme include the following (please note that details of European Directives are not included, just the national legislation that transposes them):

- Water Act 2014 (Ref 9-1);
- Floods and Water Management Act 2010 (Ref 9-2);
- Environment Act 1995 (Ref 9-3);
- Land Drainage Act 1991 (as amended) (Ref 9-4);
- Water Resources Act 1991 (as amended) (Ref 9-5);

- Environment Protection Act 1990 (Ref 9-6);
- Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref 9-7);
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 9-8);
- Environmental Damage (Prevention and Remediation) Regulations 2017 (Ref 9-9);
- Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018) (Ref 9-10);
- Groundwater (England and Wales) Regulations 2009 (Ref 9-11);
- Eels (England and Wales) Regulation 2009 (Ref 9-12);In respect of the effects of climate change on flood risk, this is assessed within the Flood Risk Assessment (FRA) (***PEI Report Volume 2: Appendix 9A***). Climate Change is discussed in ***Chapter 6: Climate Change***;
- NPS EN-3 (Ref 9-20) although this technology specific NPS does not cover solar developments, this document highlights the importance of considering potential impacts on water quality, water resources and flood risk, taking into account climate change;
- NPS EN-5 (Ref 9-21) sets out that applications demonstrate the extent of vulnerability of the proposed development, and how resilient it is, to flooding. This is particularly relevant for the Burwell Substation. This is provided within the FRA (***PEI Report Volume 2: Appendix 9A***) although the electricity networks infrastructure NPS does not expressly cover solar developments, the policy statement highlights the importance of considering potential impacts on water quality, water resources and flood risk, taking into account climate change in accordance with EN-1; and
- NPPF 2019 (Ref 9-22) paragraphs 155 to 165, states that for developments over 1 ha an FRA is required; and paragraph 170 ‘conserving and enhancing the natural environment’ includes a statement that development will be prevented that produces unacceptable levels of water pollution.

9.2.3. Consideration has also been given to:

- The UK Government’s 25 Year Environment Plan (Ref 9-24);
- The UK Government’s Future Water Strategy (2011) (Ref 9-25);
- The Non-statutory technical standards for Sustainable Drainage Systems (SuDS) (Ref 9-26);
- The Building Regulations 2010 Approved Document H (Ref 9-27);
- The Drainage and Waste Disposal (Ref 9-27); and,
- The BRE Digest 365: Soakaway Design and Sewers for Adoption (7th Edition, 2012) (Ref 9-28).

Regional Guidance

9.2.4. At a regional level, water management is coordinated through 10 River Basin Management Plans (RBMPs). Each RBMP is prepared by the Environment Agency for six-year cycles and set out how organisations, stakeholders and communities will work together to improve the water environment. The waterbodies within the study area fall under the Anglian RBMP (Ref 9-29). The most recent plans for Anglian river basin district were updated in December 2015 and will remain in place until after 2021.

National Guidance

9.2.5. The NPPF and the Flood Risk and Coastal Change NPPG (2014) (Ref 9-22 and Ref 9-23) recommends that Local Plans should be supported by a Strategic Flood Risk Assessment and should develop policies to manage flood risk from all sources taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards.

9.2.6. The Planning Inspectorate has produced Advice Note 18: The Water Framework Directive. This contains advice on the preparation and submission of any separate WFD assessment reports by Applications. This note includes advice of bodies to be consulted, and screening, scoping and impact assessment, together information on Article 4.7 derogations.

Local Planning Policy

9.2.7. The following local planning policy and guidance is relevant to this Preliminary Environmental Information (PEI) Report:

- East Cambridgeshire District Council Local Plan Adopted April 2015 (Ref 9-32), with particular reference to Policy ENV 8 (Flood Risk);
- East Cambridgeshire District Council SPD Adopted November 2016 Cambridgeshire Flood and Water (Ref 9-33);
- Forest Heath District Council Core Strategy Adopted 2010 (Ref 9-34), with particular reference to Policy CS-4 (Reduce Emissions, Mitigate and Adapt to future Climate Change) and Spatial Objective ENV2;
- Forest Heath and St Edmundsbury Local Plan: Joint Development Management Policies Document (last updated February 2015) (Ref 9-34), with particular reference to Policy DM6 Flooding and Sustainable Drainage and DM14 Protecting and Enhancing Natural Resources, Minimising Pollution and Safeguarding from Hazards; and
- Ely Group of Internal Drainage Boards has a policy statement on flood protection and water level management. This aims to reduce the risk to people and the developed and natural environment from flooding and coastal erosion.

9.2.8. The above policies identify the need for a site-specific flood risk assessment to inform the assessment of flood risk from all types of flooding to and from the development. They require the assessment to consider the vulnerability of users of the proposed infrastructure, consider the impacts of climate

change and confirm whether or not flood risk is increased elsewhere. In addition, local flood risk management strategies and surface water management plans should be considered when assessing local flood risk within a drainage strategy assessment. The policies also identify measures to mitigate flood risk through sustainable surface water management.

9.2.9. With regard to water quality and water resources, the policies above require consideration of the impacts of pollution from development on the water environment by assessing: waterbodies protected areas under the WFD (Ref 9-18), safeguard zones, water protection zones, source protection zones around potable groundwater abstractions and ecological sites. The policies also encourage mitigation of pollution on the water environment through careful design to facilitate good pollution control practice.

9.2.10. Finally, the following Strategic Flood Risk Assessments (SFRA) are available for the DCO Site, and have been reviewed as part of the FRA presented in ***PEI Report Volume 2: Appendix 9A***:

- Sunnica East Sites A and B – East Cambridgeshire District Council SFRA (Ref 9-37); and
- Sunnica West Sites A and B – Forest Heath District Council SFRA (Ref 9-38).

9.2.11. A SFRA is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change, and to assess the impact that land use changes and development in the area will have on flood risk.

9.3. Assessment Assumptions and Limitations

9.3.1. This preliminary assessment is based on baseline information available at the time of writing this PEI Report and on the Scheme design set out in ***Chapter 3: Scheme Description***. A full assessment is being undertaken as part of the EIA and will be reported in the ES that will be submitted with the DCO submission. This will include the outcome of further site surveys, including hydromorphological walkovers of all watercourses to be crossed by the proposed Cable Route A and B plus high voltage cables within sub-sites.

9.3.2. This is a preliminary description of the water resource receptors within the study area and the likely impacts arising from the Scheme, as assessed at the time of writing. The PEI Report draws on desk study and ecological surveys undertaken between 2018 and 2020.

9.3.3. There have been limited site visits to the complete DCO site due to site access restrictions. This includes any site visits, for hydromorphological survey of watercourses that may be affected by the Scheme, and in particular crossed by the installation of new power cables. An initial site visit from public rights of way was undertaken in early 2019 to some locations. Therefore, the assessment reported in this chapter of any potential effects to hydromorphology have been carried out based on desk study information and professional judgement, including the application of embedded mitigation measures in the assessment.

9.3.4. No ground investigation has been undertaken at a pre-consent level, so detailed site information of groundwater levels is not known at this stage. A ground investigation will be undertaken to inform the full ES.

9.3.5. Existing and forthcoming surveys (general walkover of all relevant waterbodies and hydromorphological surveys of watercourses that may be crossed by the installation of new power cables) will inform the ongoing development of the draft Landscape and Ecology Management Plan (LEMP) (Outline LEMP is presented in ***PEI Report Volume 2: Appendix 10I***. A draft FRA is presented in ***PEI Report Volume 2: Appendix 9A***.

9.3.6. This chapter cross-refers to ***Chapter 8: Ecology*** where appropriate. Within ***Chapter 8: Ecology***, Table 8-1, there is a summary of field surveys undertaken to date, with details on which further surveys required for the ES Stage. These include: phase 1 habitat, terrestrial habitats and flora, aquatic surveys including scoping and ditch surveys noting the presence of any invasive non-native species, bats, badger, riparian mammals (including invasive non-native species), wintering (non-breeding) birds, breeding birds, reptiles, amphibians, including Great Crested Newts, fish, terrestrial invertebrates, and aquatic macro-invertebrates,

9.3.7. At the time of writing the full details and methodologies of the cable route construction and installation below watercourse crossings has not been confirmed. It has been confirmed that all watercourses will be crossed using underground techniques (e.g. boring, micro-tunnelling or moling techniques that would not disturb the watercourse). However, construction methods including the size and depths of any launch or receiving pits are yet to be confirmed. Assumptions have been made based on the likely bed depth (which will be confirmed relative to bank height/ground levels, which will be estimated more accurately during future ground truthing walkovers for the ES) and the fact that a minimum head room of 1.5m below the bed should be maintained (i.e. approximate estimated excavations to 4m below ground level may be required based on estimations).

9.3.8. The solar PV panels will be off set from watercourses by a minimum of 10m (as described in the Framework Construction Environmental Management Plan presented in ***PEI Report Volume 2: Appendix 16C***). This would ensure the majority of construction activities for these panels would take place a minimum of 10m from surface watercourses. The purpose of this buffer reduces the risk of any pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences) should they be required.

9.3.9. Flood resistance and resilience measures will be included within the design of the Burwell Substation Extension, and for any solar stations that are located in higher flood risk zones if they cannot be sufficiently elevated. National Grid has its own design guidelines which include flood resistance and resilience measures. At the time of writing we have not yet been provided with this information. However, this will be incorporated within the ES, following liaison with National Grid.

9.3.10. At the time of writing no response had yet been received from East Cambridgeshire District Council regarding any Private Water Supplies (PWS) in the area.

9.3.11. The River Lark tributary 1 is assumed to not be continuous northwards from Sunnica East Site B. The watercourse is not shown on online digital OS mapping. It is assumed that this watercourse may resurface in the area of the moat feature, WB1 (see Figure 9-1), as the groundwater contours in this area are 8-10m AOD, and the land topography is in the region of 8m AOD in this area. This will be confirmed through a future site visit and review of surface water sewer maps for this location and reported in the ES.

9.3.12. As part of the full environmental impact assessment, the risk from surface water drainage to surface or groundwater bodies will be assessed according to the Simple Index Approach presented in the C753 The SuDS Manual (9-54). Given the very low risk the need for treatment measures is minimal. Given the availability of space it is not anticipated that there would be any issues providing any treatment of diffuse pollutants, should the Simple Index Approach assessment identify a need.

9.3.13. The two operational office / warehouse blocks will be situated on Sunnica East A and Sunnica West B for management and maintenance of the DCO site. These will contain welfare facilities for up to five permanent members of staff (i.e. low volumes of foul drainage will be generated). At this point in time it is not known how any wastewater will be managed. Options may include connecting to the nearest available public sewer or a self-contained independent non-mains domestic storage and / or treatment system. The alternative where this is not possible, would be for a self-contained foul drainage system to a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

9.4. Assessment Methodology

Study Area

9.4.1. For the purposes of this assessment, a general study area of approximately 1 km around the DCO Site has been considered in order to identify water bodies that are hydrologically connected to the DCO Site and potential works associated with the Scheme that could cause direct impacts.

9.4.2. Given that watercourses flow and water quality and flood risk impacts may propagate downstream, where relevant the assessment also considers a wider study area to as far downstream as a potential impact may influence the quality or quantity of the water body (which in this case is typically for a few kilometres). Professional judgement has been applied to identify the extent to which such features are considered.

Sources of Information

Desktop Research

9.4.3. The water environment baseline conditions have been determined by a desk study of available DCO Site and Scheme information, and a range of online data sources including:

- Online Ordnance Survey (OS) maps viewed to identify any surface waterbodies within 1 km of the Scheme (Ref 9-39);
- Online aerial photography (Ref 9-40);

- Part 1: Anglian river basin district RBMP (Ref 9-29);
- Environment Agency Catchment Data Explorer tool (Ref 9-41);
- British Geological Survey (BGS) Borehole and Geology Mapping (Ref 9-42);
- Multi-agency geographical information for the countryside website (Ref 9-43);
- National Rivers Flow Archive (Ref 9-44);
- The Cranfield University Soilscape website (Ref 9-45);
- The Met Office website (Ref 9-46);
- Environment Agency's Water Quality Archive website (Ref 9-47);
- Environment Agency chalk aquifer reports prepared by Entec (2007 & 2008) (Ref 9-48);
- AECOM FRA (***PEI Report Volume 2: Appendix 9A***)

9.4.4. The FRA presented within ***PEI Report Volume 2: Appendix 9A*** provides further details of relevant catchment and flood risk data.

9.4.5. In addition, further information and data have been obtained directly from the Environment Agency (water quality, resources, pollution incidents, abstraction licences, water activity permits, and biological data) and from East Cambridgeshire District Council (ECDC) and Forest Heath District Council (FHDC) regarding Private Water Supplies (PWS). At the time of writing, no information has been received from ECDC (August 2020).

Surveys

9.4.6. At this stage, only an initial site walkover survey has been undertaken (in January 2019) from publicly accessible locations due to access restrictions along the cable routes; no survey work has been undertaken. It is proposed to undertake general and hydromorphological surveys of the DCO Site and to visit the location of all proposed watercourse crossings by the cable routes at a later stage to inform the full ES.

Impact Assessment Methodology

Source-Pathway-Receptor Approach

9.4.7. Based on professional judgement and experience of other similar schemes, a qualitative assessment of the likely significant effects on surface water quality and water resources has been undertaken.

9.4.8. The predominantly qualitative assessment of the likely significant effects has considered the construction, operation, and decommissioning phases, as well as cumulative effects with other developments. It is based on a source-pathway-receptor approach. For an impact on the water environment to exist the following is required:

- An impact source (e.g. such as the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part

of a water body, or the change to water volume or flow rate within a watercourse);

- A receptor that is sensitive to that impact (i.e. waterbodies and the services they support); and
- A pathway by which the two are linked.

9.4.9. The first stage in applying the source-pathway-receptor approach is to identify the causes or 'sources' of potential impact from a development. The sources have been identified through a review of the details of the Scheme, including the size and nature of the development, potential construction methodologies and timescales.

9.4.10. The next step in the model is to undertake a review of the potential receptors, that is, the water environment receptors themselves that have the potential to be affected. Waterbodies, including their attributes, have been identified through desk study and site surveys.

9.4.11. The last stage of the model is, therefore, to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. This has been undertaken in the context of local conditions relative to water receptors within the study area, such as topography, geology, climatic conditions and the nature of the impact (e.g. the mobility of a liquid pollutant or the proximity to works that may physically impact a water body).

Hydromorphology

9.4.12. At this stage, and due to access restrictions, potential hydromorphological impacts have been qualitatively appraised based on desk study and a review of the proposed works that may affect the physical form of water bodies. Please note that for the full impact assessment to be presented in the ES, hydromorphological (surface water) impacts will be further assessed following a geomorphological walkover to better define the baseline catchment characteristics, watercourse typology, flow regime and sediment transport regime of potentially affected watercourses. Consideration will also be given to how the Scheme is likely to impact upon these processes and will determine whether the WFD objectives for the watercourses are impacted in a detrimental way as a result of the proposed works. Where appropriate mitigation or enhancement measures will be proposed in consultation with the Environment Agency and LLFA. Effects will be described according to the method for determining effect significance described from paragraph 9.4.20 onwards.

Flood Risk Assessment

9.4.13. A site-specific FRA has been prepared for the DCO Site. This is presented within ***PEI Report Volume 2: Appendix 9A***. The FRA has been prepared in accordance with the requirements of the National Planning Framework, 2019 and the accompanying Planning Practice Guidance (Ref 9-22), regional and local policy, and taking into account future climate change. The proposed use of the Scheme would be classed as ‘Essential Infrastructure’. The existing site use being classified, at worst, as ‘Less Vulnerable’. It includes a full review of the flood risk to the DCO Site, and identifies preventative measures to mitigate flood risk from all sources, if necessary. It also demonstrates how the Sequential Test and Exception Test have been met.

Drainage Strategy

9.4.14. A surface water drainage strategy has been prepared to support the DCO application and is included in the FRA presented in ***PEI Report Volume 2: Appendix 9A***. The drainage strategy comprises of a concept design of the system, proposing above ground conveyance and attenuation features, to mimic the natural flow regime as far as practicable whilst reducing flood risk. The assessment includes:

- Estimation of surface water attenuation and storage techniques; and
- Potential locations for above ground surface water attenuation and conveyance features.

Water Framework Directive Assessment

9.4.15. A preliminary qualitative assessment of the compliance of the Scheme against the WFD objectives for those WFD water features which are within or close to the DCO Site (Preliminary WFD Assessment) has been undertaken as part of the PEI Report report. It considers the impact of relevant aspects of the Scheme on WFD waterbodies. This includes the evaluation of the potential construction, operational and decommissioning phase impacts of Scheme on hydromorphological, biological and physico-chemical parameters with respect to the WFD objectives of no deterioration and failure to prevent improvement. It also takes into account any impact on those mitigation or improvement measures that the Environment Agency has already proposed for waterbodies that are not already at Good Ecological Status / Potential or better. It also considers where there are opportunities for environmental enhancement that could support improving water body status. The Preliminary WFD assessment is based on readily available DCO Site and Scheme information. No site-specific surveys have been possible at this stage due to access restrictions.

Matters Scoped out of the Assessment

9.4.16. It is proposed to scope out any assessment of potential impact on public potable water supply from the impact assessment; the reasons for this are set out below.

9.4.17. All water companies are required by the Government to produce a Water Resources Management Plan (WRMP) to show how they plan to maintain a secure supply of water to all their customers over the next 25 years. Anglian Water's WRMP (Ref 9-49) aims to ensure that they can continue to meet customer demand in the future whilst having a minimum impact on the environment. Anglian Waters WRMP was published in December 2019. The DCO Site is within the Newmarket Water Resource Zone.

9.4.18. The Newmarket Water Resource Zone is listed as having a medium deficit in water supply, with all water treatment works in the area being under 10 megalitres per day (Ml/day) capacity. They are aiming to have 93% of households metered by the end of 2020, and by 2045 to reduce leakage by 42%.

9.4.19. The DCO site contains solar PV technology and no residential usage and thus will have a negligible impact on local potable water supplies. Therefore,

it is proposed to scope out any assessment of potable water supply from the EIA.

Determining the Significance of Effects

9.4.20. The significance of effects will be determined using the principles of the guidance and criteria set out in the Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment (Ref 9-50) and LA 104 (Ref 9-51) adapted for this assessment to take account of hydromorphology. Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project and it provides a robust and well tested method for predicting the significance of effects. The criteria that will be used to determine receptors importance is presented in Table 9-1.

9.4.21. In accordance with the stages of the methodology, there are three stages to the assessment of effects on the water environment, which are as follows:

- A level of importance (low to very high) is assigned to the water resource receptor based on a combination of attributes (such as the size of the watercourses, WFD designation, water supply and other uses, biodiversity, and recreation etc.) and on receptors to flood risk based on the vulnerability of the receptor to flooding;
- The magnitude of potential and residual impact (classed as negligible, minor, moderate or major adverse / beneficial) is determined based on the criteria listed in Table 9-2 and the assessor's professional judgment. Embedded or standard mitigation measures are taken into account in the initial assessment, but any other mitigation is not considered until the assessment of residual effects; and
- A comparison of the importance of the resource and magnitude of the impact (for both potential and residual impacts) results in an assessment of the overall significance of the effect on the receptor using the matrix presented in Table 9-3. The significance of each identified effect (both potential and residual) is classed as very large, large, moderate, slight or neutral and either beneficial or adverse significance.

Table 9-1 Criteria to Determine Receptor Importance (Adapted from LA113) (Ref 9-50)

Importance	*General criteria*	*Surface Water*	*Groundwater*	*Hydromorphology* [Note 2]	*Flood Risk*
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	EC Designated Salmonid / Cyprinid fishery; Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m^3/s; site protected / designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site. Critical social or economic uses (e.g. public water supply and navigation).	Source Protection Zone (SPZ) 1; Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation; Groundwater locally supports GWDTE; Water abstraction: >1,000m^3/day	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Floodplain or defence protecting more than 100 residential properties from flooding; Flood Zone 3a and/or 3b; Essential Infrastructure or highly vulnerable development.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 < 1.0m^3/s; Major Cyprinid Fishery; Species protected under EC or UK habitat legislation. Critical social or economic uses (e.g. water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction.	Principal Aquifer providing locally important source supporting rover ecosystem; SPZ2; Groundwater supports GWDTE; Water abstraction: 500-1,000m^3/day.	Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/or indirect channel, floodplain, bank modifications and/or catchment development pressures.	Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding; Flood Zone 2; More vulnerable development.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value or is of regional importance.	Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP. May be designated as a local wildlife site (LWS) and support a small / limited population of protected species. Limited social or economic uses.	Secondary Aquifer providing water for agricultural or industrial use with limited connection to surface water SPZ 3; Water abstraction: 50-499m^3/day.	Shows signs of previous alteration and/or minor flow / water level regulation but still retains some natural features, or may be recovering towards conditions indicative of the higher category.	Floodplain or defence protecting 10 or fewer industrial properties from flooding; Flood Zone 2; Less vulnerable development.
Low	The receptor is tolerant of change without detriment to its character, is low	Surface water sewer, agricultural drainage ditch; non-aquifer WFD Class 'Poor' or undesignated in its	Generally Unproductive strata. Water abstraction: <50m^3/day	Substantially modified by past land use, previous engineering works or flow / water level	Floodplain with limited constraints and low probability of flooding of

	environmental value, or local importance.	own right. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.		regulation. Watercourses likely to possess an artificial cross-section (e.g. trapezoidal) and will probably be deficient in bedforms and bankside vegetation. Watercourses may also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches will fall into this category.	residential and industrial properties; Flood Zone 1; Water compatible development.
Negligible	The receptor is resistant to change and is of little environmental value	Not applicable.	Not applicable.	Not applicable.	Not applicable.

Note 1: Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor and in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, a watercourse may be below Good Ecological Status, this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the Environmental Permitting (England and Wales) Regulations 2016 and the Water Resources Act 1991 (as amended), and future WFD targets also need to be considered.

Note 2: Based on the water body 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from EA conservation status guidance (Environment Agency, 1998a; 1998b (Ref 9-52 and Ref 9-53) as LA113 (Ref 9-50) does not provide any criteria for morphology.

9.4.22. The magnitude of impact will be determined based on the criteria in Table 9-2 taking into account the likelihood of the effect occurring. The likelihood of an effect occurring is based on a scale of certain, likely or unlikely. Likelihood has been considered in the case of the assessment of potential impacts to water bodies only, as likelihood is inherently included within the flood risk assessment.

Table 9-2 Magnitude of Impact Criteria (Adapted from LA113) (Ref 9-51)

Magnitude of Impact	*Description*	*Examples*
High Adverse	Results in a loss of attribute and/ or quality and integrity of the attribute.	Loss of a fishery; decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high.
Medium Adverse	Results in impact on integrity of attribute, or loss of part of attribute.	Partial loss of a fishery; measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium.
Low Adverse	Results in some measurable change in attribute's quality or vulnerability.	Measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk.
Very Low	Results in impact on attribute, but of insufficient magnitude to affect the use or integrity.	Negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity.
Low Beneficial	Results in some beneficial impact on attribute or a reduced risk of negative impact occurring.	Measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk.
Medium beneficial	Results in moderate improvement of attribute quality.	Measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status.

		Change in flood risk to receptor from medium to low.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.	

9.4.23. The following significance categories have been used for both potential and residual effects:

- **Negligible**: An imperceptible effect or no effect to a water resources receptor;
- **Beneficial**: A beneficial / positive effect on the quality of a water resource receptor; or
- **Adverse**: A detrimental / negative effect on the quality of a water resources receptor.

9.4.24. In the context of this assessment, an effect can be temporary or permanent, with effects quantified temporally as being short-term (0-5 years), medium term (6-10 years) and long-term (>10 years).

9.4.25. At a spatial level, 'local' effects are those affecting the DCO Site and neighbouring receptors, while effects upon receptors beyond the vicinity of the DCO Site are considered to be at a 'regional' level. Effects which affect different parts of the country, or England as a whole, are considered being at a 'national' level.

9.4.26. The importance of the receptor (Table 9-1) and the magnitude of impact (Table 9-2) are determined independently from each other and are then used to determine the overall significance of effects (Table 9-3). Options for mitigation will be considered and secured where possible to avoid, minimise and reduce adverse impacts, particularly where significant effects may have otherwise occurred. The residual effects of the Scheme with identified mitigation in place will then be reported. Effects of moderate or greater are considered significant in planning terms.

Table 9-3 Matrix for Assessment of Significance

Importance of Receptor	*Magnitude of Impact*				
	High	**Medium**	**Low**	**Very Low**	**No change**
Very High	Major	Major	Major	Minor	Neutral
High	Major	Major	Moderate	Minor	Neutral
Medium	Major	Moderate	Minor	Negligible	Neutral
Low	Moderate	Minor	Negligible	Negligible	Neutral
Very Low	Minor	Negligible	Negligible	Neutral	Neutral

9.5. Stakeholder Engagement

9.5.1. Consultation to date has been outlined in Table 9-4 which are correct at the time of writing (August 2020). This is based on the Scoping Opinion from the Planning Inspectorate. Engagement with the Environment Agency and LPAs for relevant data has also been undertaken and is discussed in the baseline sections of this chapter. It is anticipated that further discussions will take place with statutory consultees on specific issues during the EIA and preparation of the ES.

Table 9-4 Main Matters Raised During Consultation

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
Planning Inspectorate		
Ref 4.4.1: affects from flooding – grid connection. The inspectorate agrees that grid connections can be scoped out as a receptor. The ES should make it clear whether grid connections A, B or both are scoped out. Furthermore, the ES should clarify whether grid connection only refers to the cables or includes other ancillary structures.	The grid connections do not include any ancillary structures. No assessment of operational phase flood risks from the cable routes is included. However, consideration of construction phase impacts is included. The FRA examines risk of flooding from, and to, the entire DCO Site.	Table 15 and Table 16 in the FRA, in ***PEI Report Volume 2: Appendix 9A*** Baseline for these are included Chapter 9 Section 9.6
Ref 4.4.2: study area: the ES should clarify whether the wider study area "of up to 2 km downstream of the Scheme" will be implemented for all watercourses, or only Internal Drainage Board (IDB) and Water Framework Directive (WFD) watercourses. The ES should provide justification that "2km downstream of the scheme" is sufficient to assess the full extent of likely significant effects to arise from contamination events.	The assessment now considers a wider study area to as far downstream as a potential impact may influence the quality or quantity of the waterbody (which for the DCO Site and this Scheme is typically for a few kilometres). This is based on professional judgement and taking into account the nature of the works, the likely rate of downstream propagation, dispersion and dilution effects, and the application of mitigation measures.	Chapter 9, Study Area (Flood Risk, Drainage and surface water) paragraphs 9.4.1 and 9.4.2 discuss the potential propagation of impacts downstream
Ref 4.4.3: Sunnica East Site – Flood Zone Table 9-1 (in the fluvial flood risk comments) states that the Sunnica East Site is located within Flood Zone 1. This appears to contradict the Environment Agency (EA) Flood Map for Planning website (ref. 94 in the Scoping Report), as land in the west of Sunnica East Site (behind the Kennet-Lee Brook label on Figure 9-1) shows land within Flood Zone 2 and Flood Zone 3. Within the ES, flood zones within the site should be described accurately, and the clarity of figures should not be hindered by labels.	Sunnica East Site now has new boundaries and is divided into East Site A and East Site B. Flood risk has been assessed for both sites, and includes that for the Lee Brook and the River Lark.	Included in ***PEI Report Volume 2: Appendix 9A***, Table 12 Chapter 9 (Flood Risk, Drainage and surface water) Sunnica East Site A flood risk is assessed in paragraphs 9.8.13 to 9.8.16. Sunnica East Site B flood risk is assessed in paragraphs 9.8.28 to 9.8.31.

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
Ref 4.4.4: River Flow direction: The description of the flow direction of the River Kennet – Lee Brook is not consistent. Paragraph 9.4.14 and Figure 9-1 indicate the river flows northwards, but paragraph 9.4.13 states the river "flows south and west of the Sunnica East Site". The ES should describe the river flow direction using clear and consistent language.	Within the scoping report this text was stating where the River Kennet was in relation to the site, rather than flow direction. The description has been rewritten in this chapter of this report.	Sunnica East Site, Surface Waterbodies description, Chapter 9 states the river if flowing northwards through Sunnica East A area to the River Lark.
Ref 4.4.5: River Snail water quality: The aspect Chapter omits a description of the River Snail's water quality. The River is likely to be impacted by the Scheme as it is located within the north-west of the Sunnica West (North) site and Figure 9-1 shows Cable Route B (Options 1 and 2) may have to cross the River. The ES should include a baseline description of the River Snail's water quality. Any significant adverse effects to the River's water quality should be assessed and appropriate mitigation secured as necessary	Water quality information included within the PEI Report, Sunnica West Site B, section 'surface water quality '	Data on the water quality of the River Snail has been obtained from the Environment Agency. This is summarised in Chapter 9 Table 9-7.
Ref 4.4.6: Hydromorphological impacts: The Scoping Report does not state how the assessment of potential hydromorphological impacts arising from cables crossing waterbodies or drainage will be undertaken. The ES should set out a description of the methodology used and assess impacts from underground cables on existing field drainage and groundwater flow regimes. The Applicant should make effort to agree the approach to this assessment with relevant consultation bodies.	For each of the area locations there is a baseline description of relevant hydromorphology and qualitative assessment at this stage. Once full access is obtained site specific surveys will be undertaken and the results used to refine this initial assessment presented in this chapter of the PEI Report.	For baseline see Chapter 9 Section 9.6.
Ref 4.4.7: Potential effects – operation: Effects on infiltration rates has not been addressed within the Scoping Report. The Scheme has the potential to impact infiltration rates due to diverting rainwater into drains and by changing the flow of rainwater reaching the soil. The ES should assess impacts associated with the alteration of infiltration rates where significant effects are likely to occur.	The assessment considers changes to the rainfall recharge distribution to the aquifer. Overland runoff is considered in the drainage strategy alongside the Flood Risk Assessment to inform the assessment. The surface water drainage will mimic the natural regime using SuDS principles.	See Chapter 9 'Aquifer Designations (all sites)'
Ref 4.4.8: surface water drainage strategy: Details of the location and design parameters of Sustainable Drainage Systems (SuDS) and attenuation ponds should be included within the ES and presented on a figure(s). The ES should set out how the delivery of SuDS and attenuation ponds will be secured through the DCO. The Scoping Report paragraphs 2.3.4 and 2.3.5 discuss surface water drainage and states, "a new drainage system… to be	A drainage strategy has been prepared alongside the FRA with this information and to inform the impact assessment presented in this Chapter. No below ground drainage has been proposed.	See ***PEI Report Volume 2: Appendix 9A***. Chapter 9, the Embedded Design Mitigation Section presents the SuDS solutions included within the design.

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
constructed" and "new sections of drainage will be constructed". The ES should clarify whether the "new drainage" is to be part of the SuDS and a figure(s) depicting the design parameters and locations of the "new drainage" should be included in the ES. The ES should also include an assessment of the likely significant effects that may arise from the construction and usage of the "new drainage" and set out how the delivery of the "new drainage" will be secured through the DCO.		
Ref 4.4.9: Exception Test: The Scoping Report states that the Scheme should not require an Exception Test as it is situated within Flood Zone 1. However, as illustrated on Drawing 2-1A to 2-1D, the Proposal also lies within Flood Zones 2 and 3. Therefore, an Exception Test should be carried out and included within the ES. The Exception Test should consider the need for the Proposed Development to remain operational during a worst-case flooding event. If the Proposed Development should remain in operation, the ES should describe how the Proposed Development would remain safe and operational during a worst-case flood event. Consideration should also be given for the potential failure of the flood defences in the surrounding area, and the impact this would have on worst-case flood events. Furthermore, consideration should be given to the potential for flood defences within the surrounding area to fail and how the Scheme would be resilient to the resulting likely significant effects that may arise.	The Exception Test has been considered as part of the FRA to inform the design development and is presented in ***PEI Report Volume 2: Appendix 9A***. Inappropriate development has been moved out of fluvial floodplains where practicable. The FRA looks at the SFRA breach model for both the Q100 year and Q100 year + climate change events.	Section 5.3, within ***PEI Report Volume 2: Appendix 9A***, FRA.
Ref 4.4.10 Assessment of significant effects: The assessment of significant effects is to be based on a source-pathway-receptor model. As stated in paragraphs 9.6.11 and 9.6.12, an impact source could be loss, or damage to all or part of the water body. However, changes to water volume and flow rates are not included as impact sources. The ES should consider including changes to water volume and flow rates as an impact source within the source-pathway-receptor model.	Water volume and flow rates are also potential impacts to waterbodies. These are assessed within this Chapter, and stated as a potential impact source within paragraph 9.4.8. The drainage strategy mimics the natural greenfield runoff rates, but will reduce existing flood risk where practicable.	Chapter 9 'Summary of Effects' Sections 9.8, each development site and Tables 9-13 to 9-20 outline the assessment of potential impacts, and their effects on the receptors. These include the potential for the impact and effect from changing volume and flow rate within the surface watercourses.

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
Ref 4.4.11 Design manual for roads and bridges (DMRB) HD45/09 – effect category: For the assessment of effects, the Scoping Report paragraph 9.6.12 states that the effect category will be in accordance with HD45/09. The ES should clarify what is meant by the "effect category" and state the section being referred to in HD45/09.	This has been superseded by DMRB LA113. (Ref 9-50). The methodology to determine receptor importance is contained within Table 9-1, the Magnitude of impact is defined in Table 9-2, with the combination of the above used to assess the significance (Table 9-3).	Chapter 9, Tables 9-1, 9-2 and 9-3
Ref 4.4.12 Fenland SAC: It is noted that the Fenland SAC is designated in part due to calcareous, peat or clay-silt soil and is situated adjacent to the Scheme. The Scoping Report omits reference to protective measures necessary to ensure that the Fenland SAC will not be significantly affected by the Scheme. The ES should include a description of the measures necessary to protect the Fenland SAC; and state how such measures will be secured.	A Habitats Regulation Assessment (HRA) is provided in ***PEI Report Volume 2: Appendix 8L*** and considers the potential impact on the Fenland SAC. This scoping comment has been included in this chapter due to the relevance of potential construction phase pollution risks and changes in hydrology to the conservation of this designated nature conservation site. Relevant pollution prevention measures are included in this chapter to ensure that this site is protected from these risks. Please refer to Section 9.7 Embedded Mitigation Measures. Protective measures during the construction of the DCO Scheme are also detailed in the CEMP (***PEI Report Volume 2: Appendix 16C***).	Chapter 9, Section 9.7 'Embedded Design Mitigation' includes standard mitigation which will be used site wide within a CEMP (***PEI Report Volume 2: Appendix 16C***) in order to protect all water resource receptors and those sites dependent on them. 'Summary of Effects' sections for Sunnica West development sites and Table 9-15 to 9-17.
Ref 4.4.13 Cumulative effects: The aspect Chapter omits details on how the cumulative effects will be assessed. This should be addressed in the ES with regards to the potential cumulative effect arising from the Scheme and other developments including the Worlington Quarry.	A description of the methodology used to assess cumulative effects for the Scheme is included in Chapter 5: EIA Methodology. Cumulative effects on water receptors and flood risk are assessed within in this Chapter.	Section 9.11 (Cumulative Effects) of this Chapter.
Anglian Water		
Anglian Water would welcome further discussions prior to submission of the DCO.	Consideration of the need to discharge foul flows from the Scheme and any flood risk associated with existing sewers will be included within the ES. Anglian Water has not yet been consulted	Chapter 9.

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
	to provide asset plans at this stage.	
Existing water pipes and foul sewers in the area.	Plans will be obtained and taken into account in the final FRA to support the DCO application at the ES stage of the assessment.	This will be undertaken at the ES stage.
All sources of flooding need taking into account.	All sources of flooding have been assessed and included within the FRA	FRA (***PEI Report Volume 2: Appendix 9A***)
Any requirement for supplies of potable or raw water should be via application to Anglian Water	Further discussions will be held with Anglian water concerning supplies of potable or raw water for the two proposed operational site office/warehouse blocks.	This will be undertaken at the ES stage, as stated in Chapter 9
East Cambridgeshire District Council		
Climate change resilience to be addressed	The FRA (***PEI Report Volume 2: Appendix 9A***) and Chapter 6 Climate Change considers the potential impact of climate change.	The FRA (***PEI Report Volume 2: Appendix 9A***) considers the potential impact of climate change. Scope of Works within FRA ***PEI Report Volume 2: Appendix 9A***
Environment Agency		
Supports the production of an FRA, and states what the FRA needs to include	The FRA has been produced to relevant guidelines	FRA (***PEI Report Volume 2: Appendix 9A***)
A number of licensed groundwater abstractions are located within the proposed redevelopment footprint. In addition, our records show unlicensed groundwater abstractions for agriculture and domestic uses were previously present in the area. Please note that certain water supplies do not require a licence and therefore may not be known to the Environment Agency, and our records may not be up-to-date. The locations of private domestic sources may be held by the Local District Council on the register required by the Private Water Supplies Regulations 1991. Also, the regional use of groundwater in this area makes the site highly vulnerable to pollution.	The assessment in this chapter considers the groundwater resource including abstractors.	Chapter 9, Section 9.6 and ***PEI Report Volume 2: Appendix 9B***
According to Chapter 9 Flood Risk, Drainage and Surface Water, the potential impacts from construction and decommissioning activities have been considered to affect surface water quality	The assessment in this Chapter considers the surface water and groundwater quality.	The potential effect on groundwater quality, licensed abstractions ad SPZs has been

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
and 'local water supplies' including private water supplies. The potential impacts on groundwater quality, licensed abstractions and source protection zones should also be considered given the environmental sensitivity of the site.		considered within the assessment for each site. Please refer to Chapter 9, Section 9.8.
Potential contamination should be given due consideration together with any impacts of the development on groundwater and surface water quality it may have during construction and operation. Piling or other ground improvement methods could have an adverse impact on the groundwater quality within the Chalk Aquifer beneath the site or provide preferential pathways for contaminant migration to the Aquifer during construction and after the completion of the development.	The assessment in this Chapter considers construction methods and contamination.	Chapter 9, 'Summary of Effects' sections for each development site and Table 9-13 to 9-20.
We consider any infiltration Sustainable Drainage System (SuDS) greater than 2.0m below ground level to be a deep system and are generally not acceptable. All infiltration SuDS require a minimum of 1.2m clearance between the base of infiltration SuDS and peak seasonal groundwater levels.	The SuDS systems have been designed to be no more than 600mm in depth to provide freeboard as part of the drainage strategy. There are no detailed ground investigations to provide the groundwater levels at this stage in the assessment process. Ground investigation will be undertaken at an appropriate time during the post-consent design development stage.	The proposed drainage strategy has been designed for no more than 600mm in depth. A geotechnical investigation will be carried out at the next stage of the assessment.
Soakaways must not be constructed in contaminated ground where they could re-mobilise any pre-existing contamination and result in pollution of groundwater. Soakaways and other infiltration SuDS need to meet the criteria in our Groundwater Protection Position Statements G1 and G9 to G13.	No known contaminated land – agricultural greenfield sites. We are providing shallow detention basins within the drainage strategy, there will be no deep construction for soakaways. No known historic landfill sites are within the DCO Site.	Not applicable.
Only clean water from roofs can be directly discharged to any soakaway or watercourse. Systems for the discharge of surface water from associated hard-standing, roads and impermeable vehicle parking areas shall incorporate appropriate pollution prevention measures and a suitable number of SuDS treatment train components.	The Pollution indices in the SuDS Manual (Ref. 9-54) have been reviewed within the drainage strategy and the FRA.	This will be confirmed within the drainage strategy at the ES stage of the assessment.
Ministry of Defence (MoD)		
The application site also occupies the birdstrike safeguarding zones, the principal concern of the MoD with regards to birdstrike safeguarding and the solar farm	The drainage strategy does not include any permanent bodies of natural water; it	Not applicable.

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
is during the construction and decommissioning phase of the development. Large areas of earthworks have the potential to result in a temporary attractant for hazardous birds. Bare earth and temporary ponding and puddling has the potential to attract birds hazardous to air traffic. The potential drainage scheme may also attract hazardous birds if it results in areas of standing water. Therefore, the MoD would require details of any drainage scheme once finalised.	mimics the natural regime as far as is practicable. The risk of increased birdstrikes has been assessed in Chapter 8 Ecology and Chapter 16 Major Accidents and Disasters.	
Public Health England		
Additional points specific to emissions to water When considering a baseline (of existing water quality) and in the assessment and future monitoring of impacts these: • should include assessment of potential impacts on human health and not focus solely on ecological impacts • should identify and consider all routes by which emissions may lead to population exposure (e.g. surface watercourses; recreational waters; sewers; geological routes etc.) • should assess the potential off-site effects of emissions to groundwater (e.g. on aquifers used for drinking water) and surface water (used for drinking water abstraction) in terms of the potential for population exposure • should include consideration of potential impacts on recreational users (e.g. from fishing, canoeing etc) alongside assessment of potential exposure via drinking water	The Private Water Supply Abstractions have been requested from West Suffolk Council and East Cambridgeshire Council. Water abstractions data was obtained from the Environment Agency. The assessment considers any potential impacts on a source – pathway - receptor basis, and includes the PWSs received from the local authorities. The potential for pollution waterbodies (surface and groundwater) has been included within the assessment. With pollution prevention being included within the CEMP (***PEI Report Volume 2: Appendix 16C***)	Chapter 9, section 'Aquifer Designations (all sites)' and ***PEI Report Volume 2: Appendix 9B***
Suffolk County Council / West Suffolk Council		
Section 9 of the scoping report is satisfactory, and SCC Flood and Water management do not wish to add anything at this time. An FRA and Drainage Strategy (FRA/DS) will be submitted as part of the ES, which is fine.	FRA/DS to be submitted with the ES	FRA (***PEI Report Volume 2: Appendix 9A***)
Given the locations of Sunnica (East), we will expect the site to utilise infiltration type drainage to dispose of its surface water. But please make sure the FRA/DS assesses all areas of hardstanding and all building types of the development i.e. substations and battery compound and not just the main solar farm itself. BRE 365 infiltration testing has been referenced in the scoping report and we will expect data gathered from these tests to form the basis of the FRA/DS.	The drainage strategy utilises infiltration techniques to mimic natural drainage and incorporates all development areas as part of the DCO Scheme. No Ground Investigation is available with infiltration testing at this stage. The Drainage strategy has been informed by known geological mapping, which	The drainage strategy will be confirmed within the ES stage of the assessment

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
	indicates the infiltration potential.	
All watercourses affected by the cable route may need land drainage consent from SCC.	The requirement for consents will be presented within the Application.	ES stage assessment
It is noted that the Burwell Substation Extension site is located in Flood Zones 2 and 3. Given the importance of the substation extension to the scheme it is expected that any operational risks to the substation from flooding are fully considered.	This is included within the FRA, and presented in this PEI Report	The baseline flood risk for the Burwell Substation is presented in Chapter 9 paragraph 9.6.152. Assessment of likely impacts and effects are presented in section 9.8
Cambridgeshire County Council (Lead Local Flood Authority)		
Full FRA required	FRA/DS to be submitted with the ES	FRA (***PEI Report Volume 2: Appendix 9A***)
Constructions or alterations within an ordinary watercourse (temporary or permanent) require consent from the Lead Local Flood Authority under the Land Drainage Act 1991. Ordinary watercourses include every river, drain, stream, ditch, dyke, sewer (other than public sewer) and passage through which water flows that do not form part of Main Rivers (Main Rivers are regulated by the Environment Agency). The applicant should refer to Cambridgeshire County Council's Culvert Policy for further guidance: https://www.cambridgeshire.gov.uk/business/planning-and-development/water-minerals-and-waste/watercourse-management/	Section 9.7 states that as part of the embedded design mitigation boring or tunnelling techniques will be used to install power cables beneath watercourses. The cables will be beneath the bed of all watercourses and are not therefore expected to cause obstruction to any ordinary watercourse.	Chapter 9, Paragraph 9.7.8
Please note the council does not regulate ordinary watercourses in Internal Drainage Board areas.	Comment Noted	Chapter 9, Paragraph 9.7.8
Parts of this site fall within the Swaffham Internal Drainage Board (IDB) district which is part of the Ely Group of IDBs. Under the Land Drainage Act 1991, any person carrying out works on an ordinary watercourse in an IDB area requires Land Drainage Consent from the IDB prior to any works taking place. This is applicable to both permanent and temporary works. Note: In some IDB districts, Byelaw consent may also be required.	Comment Noted. Discussions with all relevant drainage authorities will be commenced regarding their requirements	Chapter 9, Paragraph 9.7.8.
Surface water and groundwater bodies are highly vulnerable to pollution and the impact of construction activities. It is essential that the risk of pollution (particularly during the construction phase)	This chapter presents a baseline of environmental receptors and conducts a risk assessment under construction and operation.	Chapter 9, Summary of Effects' sections for each development site

Main matter raised	*How has the concern been addressed*	*Location of response in chapter*
is considered and mitigated appropriately. It is important to remember that flow within the watercourse is likely to vary by season and it could be dry at certain times throughout the year. Dry watercourses should not be overlooked as these watercourses may flow or even flood following heavy rainfall.	Mitigation measures are presented in this chapter as well as the CEMP (***PEI Report Volume 2: Appendix 16C***).	and Table 9-13 to 9-20.
Swaffham Internal Drainage Board		
The three proposed energy sites are not within an Internal Drainage District. However, the proposed cable route to the substation site in Burwell will pass through the Swaffham Internal Drainage District. It would appear that the cable will cross several of the Board's Main Drains. Under our Byelaws, the applicant will require the prior consent of this Board before works take place. Therefore, the Board has no objections to this scheme in principle, providing the relevant consents are obtained.	The requirement for consents will be presented within the DCO application.	Chapter 9, Paragraph 9.7.8 provides a brief summary of potential consents.

9.6. Baseline Conditions

9.6.1. This section provides a description of the current Scheme baseline and identifies the sensitive receptors and their individual importance (value). The Scheme is located within the Cam and Ely Ouse Management catchment of the Anglian RBMP (Ref 9-29). The Sunnica East site A, Sunnica East Site B and Sunnica West site A are within the Lark Operational catchment, with Sunnica West Site B and the cable routes passing westwards into the Cam and Ely Ouse operational catchment.

9.6.2. Please note that for groundwater, the geology underlying each Site is described in turn, and then due to the catchment and regional scale of the aquifers, the aquifer characteristics and groundwater flow is discussed following each site's description applicable to the Scheme as a whole in the section entitled 'Aquifer Designations (all sites)', in paragraph 9.6.144 onwards.

Existing Baseline

Sunnica East Site A

Topography, Soils, Land Use and Climate

9.6.3. The eastern portion of the site is approximately 5 – 10m Above Ordnance Datum (AOD), with the western portion being approximately 5 – 15m AOD. Land use across the site is predominantly arable farming.

9.6.4. According to the Met Office weather station at Mepal (which is around 12 km to the northwest) for the period 1981 to 2010, the site is likely to receive around 575mm of rainfall each year, and it is raining on around 110 days per

year (Ref 9-46). In the context of the UK this typical annual rainfall is very low, with the west of the UK experiencing over 800mm typically.

9.6.5. Information from a site at Moulton was received from the Environment Agency, this is located approximately 7km southeast of the Sunnica East Site A, and rainfall in the years 2013 – 2018 was in the range 513mm to 770mm, with an average of 604mm.

9.6.6. From the Soilscape website (Ref 9-45) the soils in the area of the site comprises both freely draining slight acid but base-rich soils, and freely draining lime rich loamy soils.

Surface Waterbodies

9.6.7. Sunnica East Site A is within the Lee Brook catchment which drains into the River Lark and into the River Great Ouse downstream of Ely. The Lee Brook flows through Sunnica East Site A. The Lee Brook catchment is within the Environment Agency Lark catchment reporting unit.

9.6.8. The Sunnica East Site A is located within the 'River Kennett – Lee Brook' waterbody (downstream of Freckenham – water body GB105033043020) (the whole of Sunnica East Site A). The River Kennett is also designated as a Main River and is flowing northwards through to the Sunnica East Site A to the River Lark. The confluence is located approximately 200m north of the northern extent of Sunnica East Site A.

9.6.9. The River Lark is also designated under the WFD as waterbody GB105033043052 of the Anglian RBMP. It is also heavily modified (i.e. a waterbody which as a result of physical alterations by human activity is substantially changed in character). The River Lark is located adjacent to the Sunnica East Site A.

9.6.10. At NGR TL 66585 73989 and NGR TL 66582 73838 there are two artificial water storage lagoons that appear to be connected to Lee Farm.

Surface Water Quality and Flow

9.6.11. The River Kennett – Lee Brook (GB105033043020, downstream Freckenham) is currently at Poor Ecological Potential with a target of Good Ecological Potential by 2027. Macrophytes and phytobenthos (combined), fish and hydrological regime are all failing to be at good status. Causes are thought to include physical modification for land drainage and barriers for fish, the presence of Invasive Non-Native Species (INNS) (North American signal crayfish Pacifastacus leniusculus), and groundwater and surface water abstraction (agriculture and water industry).

9.6.12. Data from the Environment Agency show there is water quality monitoring information on the River Lark (at Judes Ferry 1 km downstream from Worlington, 28 Determinands, monitored between January 2013 – December 2018). Monitoring has also been undertaken at Beck Bridge, where Beck Road crosses the Kennett-Lee Brook (12 Determinands, monitored January 2012 – December 2018).

9.6.13. The National River Flow Archive website (Ref 9-44) shows that there is a flow gauging station on the Lee Brook at Beck Bridge (Station Ref 33023) approximately 1.3 km northwards (and downstream) of Freckenham. The

location of the gauging station is where Beck Road crosses the Lee Brook within the southern area of Sunnica East Site A. The catchment area for this gauging station is 1.2 km^2 at the location, with the elevation being just 3.9m AOD. The catchment itself is low in altitude in the northern section, increasing in elevation to approximately 122m AOD in the southern reaches. This is a rural chalk catchment, containing mixed agricultural land uses. The rainfall in the area is 579mm per year (standard average annual rainfall (SAAR) 1961-1990). The Q95 flow (i.e. that which is exceeded 95% of the time) is 0.017m^3/s (period of measurement 1962-2018).

Surface Water Abstractions

9.6.14. Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their Attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Sunnica East Site A there are abstractions from the Kennett - Lee Brook and also on the River Lark north of the site. These abstractions are all for spray irrigation direct, or for spray irrigation storage, with the exception of one abstraction license on the Kennett - Lee Brook to the east of Sunnica East Site A, which is for 'transfer between sources' (License Number 6/33/38/*S/0057 Thornalley & Sons).

Consented Discharges

9.6.15. Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their Attributes. There are no recorded discharge consents within 1 km of the boundary of Sunnica East A.

Groundwater

9.6.16. The Sunnica East Site A consists of land east and west of the Lee Brook. Adjacent to Lee Brook the site is underlain by River Terrace Deposits, comprising sand and gravel; alluvium, comprising sand, clay, silt and gravel; as well as peat, underlain by Zig Zag Chalk. The river terrace deposits in this area are in the order of 3m thick.

9.6.17. West of the Lee Brook Sunnica East Site A is directly underlain by Zig Zag Chalk. East of the Lee Brook the Sunnica East Site A is underlain by Head deposits, comprising clay, silt, sand and gravel, underlain by Zig Zag Chalk. At the northern extent, the Sunnica East Site Ais underlain by the Totternhoe Stone and West Melbury Marly Chalk with small areas of chalk overlain by peat or Head deposits.

Hydromorphology

9.6.18. The Kennet – Lee Brook is characterised by a heavily modified, lowland watercourse with an over straight planform. The watercourse has a low gradient and flows through a thin band of superficial alluvial deposits within an unconfined valley. Superficial deposits close to the confluence with the River Lark are shown as Peat. Bedrock through this reach is chalk. The earliest available historic mapping dates back to 1885 where the Kennet-Lee Brook is already shown to be in its current alignment. Given the surrounding land use it is considered likely that realignment occurred before that date to make room for agriculture. Aerial imagery indicates that the watercourse is

over straight and uniform suggesting little in the way of morphological or flow variation.

9.6.19. The River Lark through this reach is characterised by a heavily modified, lowland watercourse with a passively meandering planform. The watercourse has a low gradient and flows through a thin band of peat (superficial geological deposits) within an unconfined valley, overlying bedrock geology of chalk. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping.

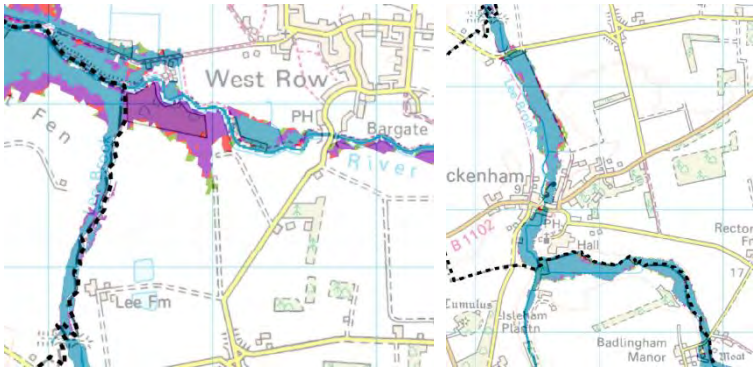
Flood Risk

9.6.20. The flood risk for Sunnica East Sites A is summarised from the FRA (***PEI Report Volume 2: Appendix 9A***) in Table 9-5.

Table 9-5 Flood Risk for Sunnica East Site A

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low (Majority) Medium – high (North West side)	**Source: Environment Agency *Flood Zone Dataset*** The majority of the site lies in Flood Zone 1, however, Flood Zones 2 and 3a are shown to encroach into the site's north west corner; from the Lee Brook (Main River) west of the site in a north/south direction, and north from the River Lark (Main River). **Source: Forest Heath District Council (*FHDC)& St Edmonsbury (SE) Strategic Flood Risk Assessment (SFRA 2009) (Ref 9-38)*** SFRA mapping corroborates the Environment Agency mapping above. Flood Zones 2 and 3 are shown to be within a defined Flood Warning Area, with properties within the catchment of the River Lark shown to be benefiting from flood defences. **Source: *FHDC SFRA 2011 (Ref 9-38)*** No further information provided for the area. **Source: East Cambridgeshire District Council (*ECDC) SFRA 2017 (Ref 9-37)*** SFRA mapping corroborates the Environment Agency mapping above. However, the SFRA also identifies Flood Zone 3b is present along the Lee Brook. The areas of Flood Zones 2 and 3 encroaching into the site's northern boundary from the River Lark retain that designation. The SFRA climate change mapping shows a slight modification in the location of Flood Zone 3a encroachment; however, this is a negligible increase in extent of this zone. Flood defences are also shown running down the Lee Brook from the River Lark, designed to the 1 in 10 year event **Summary:** The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b is identified along the Lee Brook running through the west of the site in a north/south direction and bordering its north west boundary. The Flood Zone 2 and 3a areas continue along the northern boundary of the site's north east corner originating from the River Lark. Development should not be permitted within the Flood Zone 3b area, unless it is water compatible or essential infrastructure as set out in Table 1 of the NPPF PPG. Refer to figures below for relevant map extracts.

ECDC 2017 (Ref 9-37)Flood Zone mapping – Flood Zone 3b (Purple), Flood Zone 3 (Dark Blue), Flood Zone 2 (Light Blue)



ECDC 2017 (Ref 9-37) Climate Change mapping – 1 in 100 year (Blue), 1 in 100 year +CC

Tidal	Low	Not in a Tidal area
Pluvial (Surface Water)	Very Low	**Source: *GOV.uk Flood Risk from Surface Water; FHDC SFRA 2011 (Ref 9-38); ECDC SFRA 2017 (Ref 9-37)*** All reference sources indicate that patches of the site are susceptible to surface water flooding; however, flooding is generally very localised and generally shallow (low risk). Some larger patches are located within the north eastern portion of the site which are at a high risk. Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. However, the majority of the site is at very low risk of surface water flooding.
Groundwater	Low (East side) - Medium (North West side)	***Source: FHDC&SE SFRA 2009 (Ref 9-37 and Ref 9-38)*** No mapping available at the time of writing this report. However, Figure 5-3 of the SFRA displays no record of groundwater flooding on the site, and the Environment Agency response; Ref EAn/2019/136538, dated 30 August 2019, also states they have no records of groundwater flooding. **Source: *FHDC SFRA 2011 and ECDC SFRA 2017 (Ref 9-37 and Ref 9-38)***

		Figure 8-2 and Appendix E of the SFRA displays groundwater risk mapping showing the eastern half of the site to be within 1 km by 1 km grid squares of 0% to <25% risk of groundwater emergence. The western portion of the site graduates from 0% in the south to >=50% <75% in the north in proximity to the River Lark.
Sewers	Low	**Source:** ***FHDC&SE SFRA 2009 and FHDC SFRA 2011(Ref 9-37 and Ref 9-38)*** To date no sewer records have been received to note potential sewers in the vicinity of the site. The Forest Heath Water Cycle Study has no records of flooding near the site. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m^3) or other artificial sources. The site is at very low risk of flooding from artificial sources.

Sunnica East Site B

Topography, Soils, Land Use and Climate

9.6.21. The topography of the site varies from approximately 40m AOD down to 10m AOD in the east section, southeast of Worlington, to 10-15m AOD in the remainder of the site.

9.6.22. Land Use across the site is predominantly arable farming.

9.6.23. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5.

9.6.24. From the Soilscape website (Ref 9-45) the soils in the area of the site comprises both freely draining lime rich loamy soils, freely draining slightly acid sandy soils, freely draining slight acid but base rich soils, and freely draining sandy Breckland soils.

Surface Waterbodies

9.6.25. Sunnica East Site B is mainly located within 'Lark downstream Mill Street Bridge' waterbody (GB105033043052), with a small section of the southern area within the Kennet-Lee Brook Waterbody (GB105033043020, downstream of Freckenham). The closest area of the site to the River Lark are the northern areas of the site. The River Lark is located some 750m north from the site boundary (see Figure 9-1).

9.6.26. The southern portion of Sunnica East Site B is located with the 'Kennett – Lee Brook' waterbody (upstream of Freckenham – water body GB105033042990) (area to northwest of Red Lodge).

9.6.27. The closest area of the site to the Lee Brook are the southern sections of the site. The Lee Brook is approximately 180m south from the southern boundary of Sunnica East Site B.

9.6.28. Within the site boundary and surrounded by land parcels E19, E21 and E22 (See Figure 3-1) there is a water storage reservoir at NGR TL 68557 70790 (see also Figure 9-1).

9.6.29. Within the site boundary, and north of land parcel E23 at NGR TL 69070, 73030, is an area set aside for ecological enhancement (see Figure 3-1). This

contains several existing offline ponds in marshy ground. These are referred to as WB2 in ***Chapter 8: Ecology*** (see also Figure 9-1).

9.6.30. Outside of the site boundary at NGR TL 69533 71740 there are a couple of small lagoons on the site of the Worlington Quarry (Hanson). It is suspected that these are used for managing runoff containing high concentrations of fine sediment (based on observations of discolouration of the water on online aerial imagery). These waterbodies appear to be isolated from the Scheme with no obvious flow pathways and thus will not be considered any further.

9.6.31. Outside of the site boundary but immediately downstream of land parcel E25 with a connecting drainage ditch is an agricultural pond (NGR TL 69394 72559) (see Figure 3-1 and Figure 9-1).

9.6.32. Outside of the site boundary, south of Worlington, and 100m north of the site boundary at TL69170 73496 is a feature labelled as 'Moat'. This is referred to as WB1 in ***Chapter 8: Ecology*** (see also Figure 9-1). The eDNA surveys in the area showed a positive for Great Crested Newts. The closest plot for construction would be E23 and is approximately 470m south of the 'Moat' site (see Figure 3-1 and Figure 9-1).

9.6.33. Outside the site boundary, to the north of Golf Links Road, approximately 250m of the site boundary for land parcel E30 (at approximately NGR TL 70380 73400), is a lagoon for water storage (see Figure 3-1 and Figure 9-1).

9.6.34. Outside of the site boundary, an offline pond south of the River Kennet is located at NGR TL 68060, 70600. This is referred to as WB10 in ***Chapter 8: Ecology***. This is located approximately 380m southwest of land parcel E19 (see Figure 3-1 and Figure 9-1).

9.6.35. Outside of the site boundary at NGR TL 67880 70780 there is an online lake/moat feature close to Badlingham Manor. This is located approximately 500m west of land parcel E19 and downstream on the River Kennett (see Figure 3-1 and Figure 9-1).

9.6.36. Finally, outside of the site boundary but immediately downstream of land parcel E26 at NGR TL 69778 73144 there is a large pond that is believed to be associated with the Royal Worlington and Newmarket Golf (see Figure 3-1 and Figure 9-1).

9.6.37. Other waterbodies are present within the 1 km study area, but due to distances to site being over 500m and their lack of hydrological connectivity, they are not considered any further.

Surface Water Quality and Flow

9.6.38. A description of the surface water quality for the southern portion of the location within the 'Kennett – Lee Brook' waterbody (upstream of Freckenham – water body GB105033042990) (area to northwest of Red Lodge) is contained in paragraph 9.6.11 above within Sunnica East Site A. The flow and catchment characteristics for the River Kennett-Lee Brook are given above in paragraph 9.6.13. The location of the flow monitoring station is located approximately 3 km downstream from Sunnica East Site B, therefore flow conditions will be similar, but are likely to be lower within the watercourse close to Sunnica East Site B as it is higher in the catchment where flows will be less.

9.6.39. Data from the Environment Agency shows the River Kennett is monitored at the A11 Road Bridge, upstream of, and east, on the River Kennett. The monitoring data has 12 determinands and monitored between January 2013 to December 2018.

9.6.40. The River Lark (downstream of Mill Street Bridge, water body reference GB105033043052) is currently at Moderate Ecological Potential, its target status. This water body is failing to meet good status due to high phosphate levels because of sewage discharges from the water industry. Physical modifications have also been identified by the Environment Agency in connection to 'urban and transport' and 'local and central government development'.

9.6.41. For the River Lark, within the National River Flow Archive website, there has been flow monitoring on the Lark at Isleham (Station Ref 33004) situated approximately 5 km northwestwards (and downstream) of Worlingham. The catchment area is 466 km^2 at the flow monitoring location, with the elevation being just 2.4m AOD. The catchment itself is low in altitude in the northern western section, increasing in elevation to approximately 124m AOD in the southern reaches of the catchment. This is a rural chalk catchment, with predominantly arable agricultural land use. The rainfall in the area is 585mm per year (SAAR 1961-1990). The Q95 flow (that which is exceeded 95% of the time) is 0.439m^3/s (period of measurement 1936-1986). The River Lark is located 750m north of the site, and the monitoring station is located 5 km downstream. The River Lark closer to the site is likely to have lower flow conditions than that monitored on the Lark at Isleham, as it is higher in the catchment.

9.6.42. Two smaller ordinary watercourses tributaries of the River Lark rise to the south of Worlington. One, labelled as '*River Lark Trib 1*' on Figure 9-1 appears to rise at a surface water pond, labelled and referred to as WB5. This is located approximately 1 km south of WB1 in Worlington. This then flows in a northerly direction and enters Sunnica East Site B along the eastern edge of land parcel E23 (see Figure 3-1). From Ordnance Survey mapping the path of the watercourse northwards is unclear, as the watercourse is not mapped shortly after it exits the northern border of Sunnica East Site A. It is assumed that as the geology in the area is chalk, the flow may infiltrate to ground at this point and does not continue northwards on the surface. However, this will be confirmed during future site surveys.

9.6.43. To the east of the above, '*River Lark Trib 2*' as labelled on Figure 9-1 rises in an area labelled on OS mapping as Coldwell Head, to the east of Newmarket road. The water body is referred to as WB4 in ***Chapter 8: Ecology***. There is a pumping station marked in the area. The watercourse flows northeast, then north and enters the River Lark north of Worlington.

Surface Water Abstractions

9.6.44. Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes are detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Sunnica East Site B there are abstractions to the north from the River Lark, and to the south from the

Kennett-Lee Brook. These abstractions are all for spray irrigation direct, or for spray irrigation storage.

Consented Discharges

9.6.45. Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1 km of the boundary of Sunnica East B there is one recorded discharge consent. This is located downstream of the site on the Kennett-Lee Brook to the south of the site. This is for discharge from a domestic property within Baddingham Manor area.

Groundwater

9.6.46. Sunnica East Site B is underlain by River Terrace Deposits, comprising sand and gravel, and Holywell Nodular Chalk and New Pit Chalk (undifferentiated) in part, while in other areas the site is directly overlying chalk. Melbourn Rock outcrops between Holywell Nodular Chalk and New Pit Chalk (undifferentiated) and Zig Zag Chalk.

9.6.47. Part of the site south of Worlington is underlain by Head deposits comprising clay, silt, sand and gravel, overlying chalk. The Head Deposits in this area are in the order of 4m thick.

Hydromorphology

9.6.48. River Lark Tributary 1 flows through superficial deposits of alluvium, river terrace deposits and head deposits, overlying chalk bedrock. The watercourse is artificially straight, characteristic of a drainage ditch. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel, created to aid land drainage. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel.

9.6.49. River Lark Tributary 2 is an over straight watercourse, characteristic of an agricultural drainage ditch. No superficial deposits are shown for this watercourse, overlying chalk bedrock. The watercourse is artificially straight indicating historic modification. Historic mapping is available as far back as 1885 and the watercourse is present following the same course as the contemporary channel.

Flood Risk

9.6.50. Review of the FHDC&SE SFRA 2009 [Ref 9-37Ref 9-38] shows Sunnica East Site B within Flood Zone 1 and at low risk from all sources. Pluvial risk in Sunnica East Site B is not materially different to that outlined in Site A and is to be managed similarly.

Sunnica West Site A

Topography, Soils, Land Use and Climate

9.6.51. The topography of the site in the east being approximately 30m AOD sloping down to the west and 20m AOD, with the southern block land sloping towards the north from 25 to 20m AOD. An area of land in the western extent of Sunnica West Site A increases to approximately 35m just to the southeast of Snailwell. The Land Use across the site is predominantly arable farming.

9.6.52. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5.From the Soilscape website (Ref 9-45) the soils in the area of the site comprises mainly both freely draining slightly acid but base rich soils, with an area of freely draining slight acid but base rich soils and an area of shallow lime rich soils over chalk or limestone to the south of the site.

Surface Waterbodies

9.6.53. The Sunnica West Site A is within the Environment Agency Lower Cam catchment reporting unit.

9.6.54. The majority of the Sunnica West Site A is within the Lee Brook catchment (water body reference GB105033042970) situated on the northwestern boundary of the main portion of the site. There may be a small online pond that is associated with the headwaters of this watercourse where it rises to the south of Chippenham Park. This pond will be considered as part of the impact assessment of Lee Brook.

9.6.55. In the Dane Hill area of the Sunnica West Site A, this is part of the Kennett-Lee Brook catchment area (water body reference: GB105033042990). The closest areas of this site to the River Kennett are land parcels W15 and W16, which are approximately 1.3km away (see Figure 3-1 and Figure 9-1). These land parcels appear to be drained by a small watercourse (henceforth referred to as the 'Dane Hill Watercourse), but the direction of flow and its connectivity beyond the site boundary is uncertain until a site visit can be undertaken. It appears to rise just to the south close to The Willows and flow north towards the A11 junction with the B1058 where a ditch along the A11 southbound on slip may join it. It is possible that flows are intercepted by the A11 drainage system.

9.6.56. On the Dane Hill watercourse is an online pond, referred to as WB28 in ***Chapter 8: Ecology*** (see also Figure 9-1). This is located within land parcel W15 at approximately NGR TL 68620 67990 (see Figure 3-2).

9.6.57. There is a 3.8-hectare (ha) water storage reservoir located approximately 300m to the northeast of the Sunnica West Site A boundary (land parcel W03) at NGR TL 65842 67967, adjacent to Foxburrow Plantation. This waterbody is not hydrologically connected to the Sunnica West Site A and thus will not be impacted and so is not considered any further.

9.6.58. A small online pond is located close to where the Lee Brook rises around NGR TL 66325 67800. This is located 175m west of the site boundary close to land parcel W08 (see Figure 3-2). As this waterbody is upstream of where Lee Brook borders the site, this is not hydrologically connected to the Sunnica West Site A, and thus will not be considered any further.

9.6.59. Further north there is a small lake within Chippenham Park, labelled on the OS maps as 'the Canal' at NGR TL 66430 68680, but this waterbody is also not hydrologically connected to the Sunnica West Site A and thus will also not be considered for any further detailed assessment.

9.6.60. In the centre of the Sunnica West Site A but outside of the DCO boundary is La Hogue Hall (NGR TL 67705 68072) and La Hogue Farm (NGR TL 67946 68011). There are small ponds associated with both properties, but these ponds are isolated features either within the property grounds or set within

an area of woodland. In both cases there does not appear to be any flow pathways with the Scheme and they will not be considered any further detailed assessment.

9.6.61. Finally, there are a number of small but isolated ponds located around the Dane Hill Farmhouse (NGR TL 68890 68280), referred to as WB 27 in ***Chapter 8: Ecology*** (see also Figure 9-1), two ponds north of the B1085 (east and west of the A11), and pond features west of Snailwell. However, as with the other ponds nearby these appear to be isolated and not connected to the Sunnica West Site A, and thus no impacts are predicted, and they will not be considered any further detailed assessment.

Surface Water Quality and Flow

9.6.62. Lee Brook (water body reference GB105033042970) is an approximately 4 km long WFD heavily modified waterbody that is currently at Moderate Ecological Potential, its target status. Reasons for not being at Good Ecological Potential include a degraded hydrological regime and phosphate that are associated with reduced flows from surface water abstraction for agriculture, local and central government and water industry, and sewage discharges from water industry.

9.6.63. Kennett-Lee Brook catchment area (water body reference: GB105033042990) is currently at Moderate status, its target status. Reasons for not being at Good Ecological Potential include macrophytes and Phytobenthos combined, and phosphate that are connected with agricultural and rural land management and the water industry.

9.6.64. The flow and catchment characteristics for the River Kennett-Lee Brook and Lee Brook are given above in paragraph 9.6.13 .

Surface Water Abstractions

9.6.65. Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Sunnica West Site A there are no abstractions, abstractions in the area to the west are noted under Sunnica West Site B, paragraph 9.6.80.

Consented Discharges

9.6.66. Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1 km of the boundary of Sunnica West Site A there is one recorded discharge consent. This is located east of the site boundary in the area of the village of Kennett. This is for discharge from a domestic property within the village area.

Groundwater

9.6.67. The Sunnica West Site A is underlain by River Terrace Deposits and Holywell Nodular Chalk and New Pit Chalk (undifferentiated). The River Terrace Deposits consist of sand and gravel and this area are in the order of 5m thick. The eastern part of Sunnica West Site A that sits either side of the A11 is underlain by Lowestoft Formation comprising Till deposits overlying Chalk. The Till deposits in this area are in the order of 30m thick.

9.6.68. A pipeline associated with the Lodes-Granta river augmentations scheme crosses the Site, transporting groundwater abstracted to the south of the Site to discharge points around Chippenham Fen to the north of Site.

Hydromorphology

9.6.69. Lee Brook is a heavily modified watercourse and is over straight, over wide and incised through the study reach. The watercourse flows through a band of alluvium and peat, overlying bedrock of chalk in a low gradient, unconfined valley. The flow regime is considered likely to be uniform with little variation and a lack of bedforms. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping.

9.6.70. Dane Hill watercourse is artificially straight, particularly in the lower reaches, and follows the contours of Dane Hill. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel with little/ no morphological or flow variation, created to aid land drainage through historic plantations. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel. Historic mapping shows the watercourse connecting to a series of land drainage ditches to the east, with no apparent connection to the River Kennett.

Flood Risk

9.6.71. The flood risk for Sunnica West Sites A is summarised in Table 9-6 and is from the FRA (***PEI Report Volume 2: Appendix 9A***):

Table 9-6 Flood Risk for Sunnica West Site A

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low (Majority), Medium – High (West side)	***Source: Environment Agency Flood Zone Dataset*** The majority of the site lies in Flood Zone 1, however, an area of Flood Zones 2 and 3a encroaches into the site from an ordinary watercourse along the site's northern boundary (a tributary of the Lee Brook). These Flood Zones then extend further into the site in a south easterly direction perpendicular to the ordinary watercourse for approximately 1.6km. ***Source: ECDC SFRA 2017*** SFRA mapping corroborates the Environment Agency mapping. However, an area of Flood Zone 3b is shown in proximity to the ordinary watercourse as shown in Figure below Climate change mapping in Figure 4 shows no major difference in Flood Zone 3a area in proximity to the ordinary watercourse, however the 1.6km encroachment in a south east direction is not shown. As such, a worst-case approach will be used for this assessment. ***Summary***: The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b is located in proximity to an ordinary watercourse along the northern boundary of the site overlaying Flood Zones 2 and 3a. The Flood Zone extends further into the site in a south easterly direction for 1.6km, designated as Flood Zone 2 and 3a. Development should not be permitted within the Flood Zone 3b area , unless it is water compatible or essential infrastructure as set out in Table 1 of the NPPF PPG

ECDC 2017 Flood Zone (Left) and Climate Change (Right) mapping

Tidal	Low	Not in a Tidal area
Pluvial (Surface Water)	Very Low	***Source: GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017*** Both reference sources indicate that areas of the site are susceptible to surface water flooding however, flooding is localised and generally shallow (low risk). The majority of the site is at very low risk of surface water flooding.
Groundwater	Low (East side), Medium - High (West side)	***Source: ECDC SFRA 2017*** Appendix E of the SFRA displays groundwater risk mapping showing the eastern quarter of the site to be within 1 km by 1 km grid squares of 0% to <25% risk of groundwater emergence. This risk level increases westward to >=75%. ***Source: BGS and MAGIC maps*** The ground makeup of the site therefore has the potential to have a relatively good infiltration capacity making shallow infiltration SuDS a possibility, subject to further ground investigation, groundwater monitoring and infiltration testing. The majority of the site lies in a Source Protection Zone III, with a portion of the site in the west-eastern corner designated Source Protection Zone II. Therefore, any infiltration techniques must ensure mitigation measures are put in effect to protect these zones.
Sewers	Low	***Source: ECDC SFRA 2017*** To date no sewer records have been received to note potential sewers in the vicinity of the Site. The Anglian Water DG5 register was not available at the time of writing this report. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m3) or artificial sources of flooding. The site is at very low risk of flooding from artificial sources and reservoirs.

Sunnica West Site B

Topography, Soils, Land Use and Climate

9.6.72. The topography of the Sunnica West Site B is flat with a gentle rise to the southeast from around approximately 15m AOD to 20m AOD. Land Use across the site is predominantly arable farming.

9.6.73. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5.From the Soilscape website (Ref 9-45) the soils in the majority of the site comprises shallow lime-rich soils over chalk or limestone, with an area of Fen peat soils in the north west, and freely draining slightly acid but base-rich soils in the east.

Surface Waterbodies

9.6.74. The Sunnica West Site B is within the River Snail catchment, which drains to the Soham Lode and then into the River Great Ouse upstream of Ely. It is within the Environment Agency Cam Lower catchment reporting unit.

9.6.75. The Sunnica West Site B is adjacent to the River Snail, with the Chippenham Fen Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC) and Ramsar to the north. These ecological sites are associated with wet ground and are considered to be a Groundwater Dependent Terrestrial Ecosystem (GWDTE). There are small ponds and various ditches on the designated site that drain to the River Snail (e.g. an online pond at NGR TL 63770 68630 which appears to be the rising of a tributary to the River Snail. The River Snail is a Main River and designated under the WFD as part of Soham Lode WFD water body (reference GB105033042860). There is also a trout farm including a series of small ponds at a site within Snailwell, although this receptor appears to be upstream of the Sunnica West Site B.

9.6.76. Two ponds included within the ecology surveys, referred to as WB16 and WB17 (at NGR TL 63270 68450 and TL 63030 68300 respectively) within ***Chapter 8: Ecology*** (see also Figure 9-1) are located 280m west and 590m west of Sunnica West Site B boundary. However, these appear to be isolated and not connected to the Sunnica West Site B, and thus no impacts are predicted, and they will not be considered for any further detailed assessment.

Surface Water Quality and Flow

9.6.77. Soham Lode waterbody (GB105033042860) is heavily modified and is currently at Moderate Status, its target status. Reasons for not being at Good Ecological Potential include mitigation measures assessment, and phosphate related to agriculture and land management and the water industry.

9.6.78. Data on water quality within the River Snail was received from the Environment Agency. Monitoring Site 36M22 has information on 18 determinants collected on 35 occasions between January 2013 and November 2018. Table 9-7 below summarises the monitoring information.

Table 9-7 Summary of Water quality: River Snail

Determinand	*Min*	*Max*	*Average*
Alkalinity to pH 4.5 as CaCO3	191	252	237.33
Ammonia un-ionised as N	0.00012	0.00075	43.00
Ammoniacal Nitrogen as N	0.03	0.153	0.04
BOD: 5 Day ATU	1	3.26	1.15
Chemical Oxygen Demand: - {COD}	10	252	190.90
Chloride	20.6	91.8	27.58
Chlorophyll: Acetone Extract	0.54	4.4	1.35

Determinand	*Min*	*Max*	*Average*
Conductivity at 25 C	555	924	634.23
Nitrate as N	5.72	18.2	7.72
Nitrite as N	0.0066	0.101	0.02
Nitrogen, Total Oxidised as N	5.73	18.3	7.74
Orthophosphate, reactive as P	0.01	0.826	0.08
Oxygen, Dissolved as O2	7.29	10.8	8.76
Oxygen, Dissolved, % Saturation	66.6	97.5	79.51
pH	7.29	7.76	7.54
Silica, reactive as SiO2	14.4	19.4	17.91
Solids, Suspended at 105 C	3	22.2	4.70
Temperature of Water	7.7	14.6	11.02

Source: Environment Agency Monitoring at River Snail Road Bridge

9.6.79. For the River Snail, the National River Flow Archive website provides details of a flow gauging station on the Snail at Fordham (Station Ref 33050) situated just south of Fordham village (and downstream of Sunnica West Site B). The catchment area of the gauging station is 61 km^2 at the location, with the elevation being 9.7m AOD. The catchment itself is low in altitude in the northern section, increasing in elevation to approximately 118m AOD in the southern/ south eastern reaches of the catchment. This is a predominantly rural chalk catchment, with predominantly arable agricultural land use, with the town of Newmarket within the centre of the catchment. The rainfall in the area is 577mm per year (SAAR 1961-1990). The Q95 flow (that which is exceeded 95% of the time) is 0.106m^3/s (period of measurement 1960-2018).

Surface Water Abstractions

9.6.80. Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Sunnica West Site B, there are abstractions from the River Snail upstream and downstream of the site, together with abstractions from the watercourse bordering the north of the site. These abstractions are all for spray irrigation direct, or for spray irrigation storage, with the exception of one abstraction license on a tributary of the River Snail approximately 300m north of, and downstream of, the site boundary. This is for general farming and domestic use (License Number 6/33/36/*S/0168 Fordham Abbey Farms).

Consented Discharges

9.6.81. Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1 km of the boundary of Sunnica West B there are numerous recorded discharge consents. These include

discharges from domestic property, waste collection/ treatment/ disposal/ materials recovery, and wastewater treatment works.

Groundwater

9.6.82. The Sunnica West Site B is underlain by Zig Zag Chalk and West Melbury Marly Chalk in the western part of the site in the River Snail valley, and also crosses the chalk hardground unit, Melbourn Rock. The eastern part of the Sunnica West Site B is underlain by Holywell Nodular Chalk.

9.6.83. In the western part of site River Terrace Gravels consisting of sand and gravel overlie chalk, and alluvium deposits comprising clay, silt, sand and gravel overlie the river terrace deposits. The alluvium and river terrace deposits in this area are in the order of 4m thick.

9.6.84. Immediately to the north of Sunnica West Site B is Chippenham Fen, which is surrounded by an outcrop of Totternhoe Stone, within this area are peat deposits and West Melbury Marly Chalk.

Hydromorphology

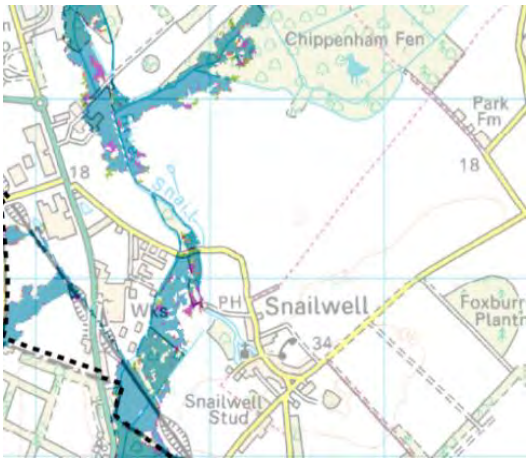
9.6.85. The River Snail in the vicinity of the site is classified by a heavily modified watercourse flowing superficial deposits of alluvium and river terrace deposits, overlying bedrock of chalk. The width of the alluvial deposits suggest that the natural typology of the watercourse was more sinuous than its contemporary form. Historic mapping is available as far back at 1885 and shows the watercourse in its current alignment. Based on historic land use it is likely that the watercourse was modified to service mills in the area.

Flood Risk

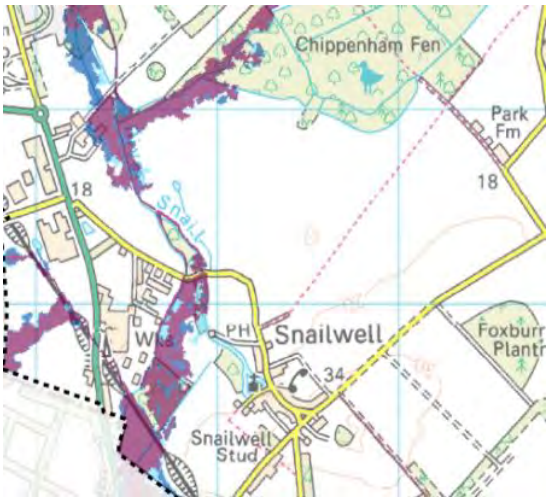
9.6.86. The Flood risk for Sunnica West Site B is summarised in Table 9-8 below and is from the FRA (***PEI Report Volume 2: Appendix 9A***):

Table 9-8 Flood Risk for Sunnica West Site B

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low (Majority) Medium – high (North West side)	***Source: Environment Agency Flood Zone Dataset*** The majority of the site lies in Flood Zone 1, however, an area of Flood Zones 2 and 3a encroaches from the River Snail, running alongside the south western and north western boundaries of the site. **Source: *East Cambridgeshire District Council (ECDC) Level 1 and Level 2 Strategic Flood Risk Assessment, October 2017*** SFRA mapping corroborates the Environment Agency mapping. However, Flood Zone 3b is present overlaying large parts of the Flood Zone 3a areas. The SFRA climate change mapping, shows the Flood Zone 3a extents effectively matching that of the Flood Zone 2. **Summary:**



The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b from the River Snail is located along the south western and north western boundaries of the site. Development should not be permitted within the Flood Zone 3b area , unless it is water compatible or essential infrastructure as set out in Table 1 of the NPPF PPG,



ECDC 2017 Flood Zone (Left) and Climate Change (Right) mapping

Tidal	Low	Not in a Tidal area
Pluvial (Surface Water)	Very Low	**Source: *GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017*** Both reference sources indicate that areas of the site are susceptible to surface water flooding however, flooding is localised and generally shallow (low risk). Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. The majority of the site is at very low risk of surface water flooding.
Groundwater	Low (East side) - Medium (West side)	**Source: *ECDC SFRA 2017*** Appendix E of the SFRA displays groundwater risk mapping showing the majority of the site lies within 1 km by 1 km grid squares of >=50% to >75%. A small area to the north of the site and east of the A11 displays a lower risk (<25%). **Source: *BGS and MAGIC maps*** The ground makeup of the site therefore presents limited potential for infiltration SuDS but may be suitable for shallow infiltration SuDS. However, this is subject to further ground investigation, groundwater monitoring and infiltration testing. The site lies in a Source Protection Zone III. Therefore, any infiltration techniques must ensure mitigation measures are put in effect to protect this zone.

Sewers	Low	**Source:** ***ECDC SFRA 2017*** To date no sewer records have been received to note potential sewers in the vicinity of the Site. The Anglian Water DG5 register was not available at the time of writing this report. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m^3) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources.

Grid Connection Route A

Topography, Soils, Land Use and Climate

9.6.87. Grid Connection Route A, slopes northwards from approximately 20m AOD down to 15m AOD in the area of the Kennett-Lee Brook crossing. Land Use across the site is predominantly arable farming.

9.6.88. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5..

9.6.89. From the Soilscape website (Ref 9-45) the soils in the southern part of the grid connection route are freely draining slightly acid sandy soils, passing into freely draining slightly acid but base-rich soils for the northern half.

Surface Waterbodies

9.6.90. The Grid Connection Route A corridor for Grid Connection Route A passes between the Sunnica West Site A (south of Chippenham) and Sunnica East Site B. The route from the Sunnica West Site A within the Kennet-Lee Brook waterbody, crosses agricultural land and the River Kennett, a Main River, and passes into the 'Lark downstream of Mill Street Bridge' waterbody (upstream of Freckenham – water body GB105033042990).

9.6.91. A large water storage lagoon is located approximately 300m east of Grid Connection Route A, at approximately NGR TL 68770, 69960. This is referred to in ***Chapter 8: Ecology*** as WB9 (see also Figure 9-1). As this appears not to be connected to the River Kennet and is upstream of the Grid Connection crossing of the River Kennet, this is not considered for any further detailed assessment.

Surface Water Quality and Flow

9.6.92. Grid Connection Route A passes between the Sunnica West Site A and Sunnica East Site B. This route crosses the River Kennett waterbody (GB105033042990).

9.6.93. The River Kennett – Lee Brook (GB105033042990, upstream of Freckenham) is currently at Moderate Ecological Potential because of phosphate, macrophytes and phytobenthos (combined), and a degraded hydrological regime. The reasons for not achieving good status are diffuse and point pollution from sewage water treatment and agriculture (phosphate), groundwater abstractions from the water industry, and barriers for fish movement. The Environment Agency has set a lower objective for this water body of Bad Overall Potential by 2015.

9.6.94. Flow and catchment characteristics for the River Kennett – Lee Brook are given above in para 9.6.13.

Surface Water Abstractions

9.6.95. Details of surface water abstractions were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of Grid Connection Route A, there are two abstractions licences. Both are located downstream on the Kennett-Lee, with one being for spray irrigation direct, and one for spray irrigation – storage.

Consented Discharged

9.6.96. Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1 km of the boundary of Grid Connection Route A there is one discharge consent to the north and downstream of the crossing of the River Kennett. This is for a discharge from a domestic property in the area of Baddingham Manor.

Groundwater

9.6.97. Grid Connection Route A is underlain by River Terrace Deposits and Holywell Nodular Chalk and New Pit Chalk (undifferentiated). The route crosses the Kennett Brook where alluvium in the order of 1.3m thick overlies chalk.

Hydromorphology

9.6.98. The River Kennet through this reach is characterised by a heavily modified, lowland watercourse with a passively sinuous planform. The watercourse has a low gradient and flows through a thin band of alluvial deposits within an unconfined valley. Historic mapping indicates that the planform through this reach was straightened between 1892 and 1914. Present day (i.e. 2020) online ordnance survey mapping suggests that it is possible that some of the meander cut off channels remain in situ, but this has not been confirmed yet by a site walkover. The River Kennett in the vicinity of the crossing location has a wooded riparian zone and therefore potential to create flow variation within the channel through the presence of large woody material.

Flood Risk

9.6.99. The flood risk for Grid Connection Route A is summarised in Table 9-9 below and is from the FRA (***PEI Report Volume 2: Appendix 9A***):

Table 9-9 Flood Risk for Grid Connection Route A

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low	**Source: Environment Agency *Flood Zone Dataset, ECDC SFRA 2017*** The majority of site is situated within Flood Zone 1, however, an area of Flood Zones 2 and 3a crosses the connection route – the floodplain of the River Kennet, and the River Kennett itself.. **Source: *East Cambridgeshire District Council (ECDC) Level 1 and Level 2 Strategic Flood Risk Assessment, October 2017*** SFRA mapping corroborates the Environment Agency mapping. However, Flood Zone 3b is present overlaying large parts of the Flood Zone 3a areas.

Climate change mapping shows the Flood Zone 3a extents effectively matching that of Flood Zone 2.

Summary:

The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b from the River Kennet is near the site. Development should not be permitted within the Flood Zone 3b area , unless it is water compatible or essential infrastructure as set out in Table 1 of the NPPF.

ECDC 2017 Flood Zone (Left) and Climate Change (Right) mapping

Tidal	Low	Not in a Tidal area
Pluvial (Surface Water)	Very Low	**Source: *GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017*** Both sources indicate that areas of the site are susceptible to surface water flooding; however, flooding is localised and generally shallow (low risk). A higher risk area adjacent to the connection route, approximately 160m perpendicular to the B1085 is shown. This is considered a larger depression. The majority of the site is at very low risk of surface water flooding.
Groundwater	Low	**Source: *ECDC SFRA 2017*** Appendix E of the SFRA displays groundwater risk mapping showing that the majority of the site lies within 1 km by 1 km grid squares of 0% groundwater risk. The lower portion of the site increases in risk shown as >=25% <50% groundwater risk.
Sewers	Low	**Source: *ECDC SFRA 2017*** To date no sewer records have been received to note potential sewers in the vicinity of the Site. The Anglian Water DG5 register was not available at the time of writing this report. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m^3) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources.

9.6.100. The Grid Connection Route B, once constructed, will have no residual flood risk associated with it, as it will be buried. The tables below for Routes A and B assess the construction phase and will inform the future construction method statements and risk assessments to ensure flood risk is taken into account and mitigated during construction to avoid increasing the risk of flooding from all sources to nearby areas or downstream (measures will also be described in the CEMP, which is presented in ***PEI Report Volume 2: Appendix 16C***).

Grid Connection Route B

Topography, Soils, Land Use and Climate

9.6.101. Grid Connection Route B crosses flat lying land, between approximately 5m AOD near Burwell to 10-15m AOD as the route approaches Snailwell.

9.6.102. Land use across the site is predominantly arable farming.

9.6.103. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5..

9.6.104. From the Soilscape website (Ref 9-45) the soils in the eastern part of the grid connection route are freely draining slightly acid but base rich soils, passing into shallow lime rich soils over chalk or limestone for the majority of the route.

Surface Waterbodies

9.6.105. West of the River Snail, small streams form the Burwell Lode in the area of the Grid Connection Route B between Sunnica West Site B and Burwell.

9.6.106. Grid Connection Route B passes westwards to the Burwell National Grid Substation Extension, it begins at the eastern extent in the Soham Lode, New River and Burwell Lode river catchments.

9.6.107. On leaving Sunnica West Site B Grid Connection Route B first crosses the River Snail (see Figure 9-1), which flows in a north-west direction from Snailwell and is a Main River and watercourse that is part of the Soham Lode WFD water body (reference GB105033042860).

9.6.108. The Catch Water Drain and numerous unnamed small drains are connected with the Main Rivers and WFD waterbodies New River (GB105033042780) and Burwell Lode (GB105033042720), in the western extent of the study area, north of Burwell. These two watercourses flow in a north-west direction to the River Cam. This area is within the Swaffham Internal Drainage Board[1], who consider it to be part of the 'South Level Fens'.

9.6.109. The South Level Fens area of the Swaffham Internal Drainage Board District comprises mainly of high-grade agricultural land much of which is below mean sea level and considerably below 'flood level' and is therefore reliant on pumped drainage for its existence. The drains' water levels are terraced / controlled from the upper reaches by a number of structures that drain to the Upware Pumping Station. From here surplus land drainage water is discharged to the River Cam.

9.6.110. There are several surface waterbodies in the study area for Grid Connection Route B. There is a surface waterbody within woodland within the area of the Grid Connection Route B. This is referred to in ***Chapter 8: Ecology*** as WB18, NGR TL62246 69210 (see also Figure 3-2 and Figure 9-1). Adjacent to the northern boundary of the Grid Connection Route B is a large surface water body at NGR TL60800 65580. This is referred to in ***Chapter 8: Ecology*** as WB22 (see also Figure 3-2 and Figure 9-1). Northwards from WB22 it appears there is a drain connecting northwards to WB21, an online pond east of Crowhall Farm. This is located some 450m northwards from Grid Connection Route B (see also Figure 3-2 and Figure 9-1).

[1] http://www.elydrainageboards.co.uk/internal-drainage-boards/swaffham/

9.6.111. Other surface waterbodies in the study area appear not to be connected or are upstream of Grid Connection Route B and are not considered for any further detailed assessment.

Surface Water Quality and Flow

9.6.112. The Soham Lode is a heavily modified WFD waterbody (GB105033042860) that is at Moderate Ecological Potential, its target status. The reason for not being at a higher status is elevated phosphates, likely due to sewage discharge from the water industry. Physical modifications are due to local and central government, recreation and agriculture (mitigation implementation).

9.6.113. The New River (GB105033042780) heavily modified WFD waterbody is at Moderate Ecological Potential, with a target of Good Ecological Potential by 2027. The main reasons for not meeting its target are a degraded hydrological regime. Physical modification is due to reasons connected to agriculture, local and central government and recreation.

9.6.114. The Burwell Lode is a heavily modified WFD waterbody (GB105033042720) that is currently at Moderate Ecological Potential, exceeding its target status of Poor Ecological Potential by 2015. The reasons for not being at a higher status are due to failing to meet good chemical status. This is due to the Priority Hazardous Substances Mercury and its compounds with the sources thought to be due to transport drainage and atmospheric deposition. Physical modification is due to reasons connected to agriculture, local and central government and recreation.

9.6.115. Data received from the Environment Agency show that there is water quality monitoring data for New River (12 determinands, monitored 2013-April 2017), Snailwell Drain (20 determinands, monitored January 2013 to December 2018), and Soham Lode (52 determinands, monitored January 2013 to December 2018).

9.6.116. Flow and catchment characteristics for Soham Lode (River Snail) are given above in paragraph 9.6.79.

9.6.117. There are no monitoring stations available for flow for New River or Burwell Lode. However, the catchment area of New River at Fordham Abbey is approximately 25 km^2, increasing in elevation to the south, and containing the western portions of Newmarket town in its middle section.

9.6.118. Burwell Lode catchment, just upstream of the confluence with New River, has a catchment area of approximately 48 km^2. The catchment stretches south-eastwards and is a predominantly rural catchment, and contains the residential areas of Burwell, Swaffham Prior and Reach.

Surface Water Abstractions

9.6.119. Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Grid Connection Route B there are 6 abstractions. These are all for spray irrigation direct, or for spray irrigation storage.

Consented Discharges

9.6.120. Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes. Within 1 km of the boundary of Grid Connection Route B there are discharge consents for a Wastewater Treatment Works, a pumping station and a discharge from a domestic property north of Burwell.

Groundwater

9.6.121. The Grid Connection Route Bis underlain by Zig Zag Chalk and West Melbury Marly Chalk west of the River Snail, and also crosses the chalk hardground units, Melbourn Rock and Totternhoe Stone. There are small areas of River Terrace Deposits, consisting of sand and gravel, and peat overlying the Chalk.

9.6.122. As Grid Connection Route B crosses the River Snail, River Terrace Deposits consisting of sand and gravel overlie chalk, and alluvium deposits comprising clay, silt, sand and gravel overlie the river terrace deposits. The alluvium and river terrace deposits in this area are in the order of 4m thick.

9.6.123. East of the River Snail the Grid Connection Route B is underlain by Holywell Nodular Chalk and Melbourn Rock. Where the Grid Connection Route B links to Sunnica West Site A it is underlain by River Terrace Deposits, overlying Holywell Nodular Chalk and New Pit Chalk (undifferentiated).

Hydromorphology

9.6.124. Burwell Lode is an artificial drainage ditch, straight incised and embanked with no hydromorphological value. The watercourse flows through peat, overlying chalk in a low gradient, unconfined channel. The flow regime is considered likely to be uniform throughout with an absence of bedforms, although this has not been verified. Channel modifications pre-date earliest available OS mapping, however it is considered likely that this watercourse is a completely artificial ditch, created for the purposes of agricultural land drainage.

9.6.125. New River flows through a wide area of peat, overlying bedrock of chalk in a low gradient, unconfined valley. The watercourse is a heavily modified watercourse and is over wider, artificially straight through the study area. Embankments along the length of the watercourse have severed lateral connectivity and the flow regime is considered likely to be uniform with little variation and a lack of bedforms, although this has not yet been verified by a walkover survey (which will be undertaken when full access is available during preparation of the Environmental Statement). Historic mapping indicates that the watercourse has followed the same planform since 1885, and modification predates this mapping.

Flood Risk

9.6.126. The flood risk for the Grid Connection Route B is summarised in Table 9-10 and is from the FRA (***PEI Report Volume 2: Appendix 9A***):

Table 9-10 Flood Risk for Grid Connection Route B

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low	**Source: Environment Agency *Flood Zone Dataset*** The route is situated largely within Flood Zone 1 but passes through areas of Flood Zones 2 and 3a. The western extent, an area in the centre and the western connection to the Sunnica West Site B is within Flood Zones 2 and 3a. The western extent is within an area of Defended Flood Zone 3a and the edge of the Sunnica West Site B is designated Flood Zone 3b. SFRA climate change mapping appears to indicate large reductions in the Flood Zone 3a area. It is currently unclear as to the reasons for this; as such, until this is confirmed with the EA, a worst-case approach will be used for this assessment.  ECDC 2017 Flood Zone mapping  ECDC 2017 Climate Change mapping The SFRA also shows that the site is not within the Fenland flood defence breach model for Q100 year and Q100 year + Climate Change extents.
Tidal	Low	**Source: *ECDC SFRA 2017*** Not within the Tidal Hazard Mapping (Tidal Great Ouse Breach Modelling) for Q200 and Q200 + Climate Change breach extents.
Pluvial (Surface Water)	Low	**Source: *GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017*** Both reference sources indicate patches of the site which are susceptible to surface water flooding, however, flooding is localised and generally shallow (low risk). Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. The majority of the connection route is at low risk of surface water flooding.
Groundwater	Medium - High (Majority)	**Source: *ECDC SFRA 2017*** Appendix E of the SFRA displays groundwater risk is shown to be generally high (>75%) west of Sunnica West Site B, lowering in some areas to >=50% <75%, however, low risk (<25%) between Sunnica West Sites' A and B.

Sewers	Low	**Source:** ***ECDC SFRA 2017*** To date no sewer records have been received to note potential sewers in the vicinity of the Site. The Anglian Water DG5 register was not available at the time of writing this report. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m^3) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources.

9.6.127. Grid Connection Route B will have no residual flood risk associated with it, as it will be buried. The tables below for Routes A and B assess the construction phase and will inform the construction method statements and risk assessments to ensure flood risk is taken into account and mitigated during construction to avoid increasing the risk of flooding from all sources to nearby areas or downstream (measures will also be described in the CEMP, which is presented in ***PEI Report Volume 2: Appendix 16C***).

Burwell National Grid Substation Extension

Topography, Soils, Land Use and Climate

9.6.128. The land within the area of the National Grid Substation Extension is low lying approximately 5m AOD. The Land Use across the site is that associated with a Substation.

9.6.129. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5.

9.6.130. From the Soilscape website (Ref 9-45) the soils in the area of the Burwell Substation are shallow lime-rich soils over chalk or limestone.

Surface Water

9.6.131. Burwell National Grid Substation extension area is contained within the Burwell Lode (GB105033042720) waterbody as described within Grid Connection Route B.

9.6.132. Within the National Grid Sub-Station located to the west of Burwell, there are three locations being considered for the location of new infrastructure associated with this Scheme. Two of these are in the western area of the site and furthest from the surface watercourse located on the eastern boundary. The third location is within the east of the current sub-station site and is adjacent to the eastern boundary, adjacent to the drain drawing north to Burwell Lode, which is located 700m north of the site.

Surface Water Quality and Flow

9.6.133. The surface water quality for Burwell Lode (GB105033042720) waterbody is as described within Grid Connection Route B. The Burwell Lode catchment is described above in paragraph 9.6.117.

Surface Water Abstractions

9.6.134. Details of surface water abstractions were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes and detailed in full in ***PEI Report Volume 2: Appendix 9B***. Within 1 km of the boundary of Burwell National Grid

Substation there are 16 abstractions. These are all for spray irrigation direct, or for spray irrigation storage.

Consented Discharges

9.6.135. Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes. Within 1 km of the boundary of National Grid Substation there are discharge consents from within the site itself for air conditioning. Within the study area of 1km there are discharge consents for Wastewater Treatment Works, a pumping station and a domestic property.

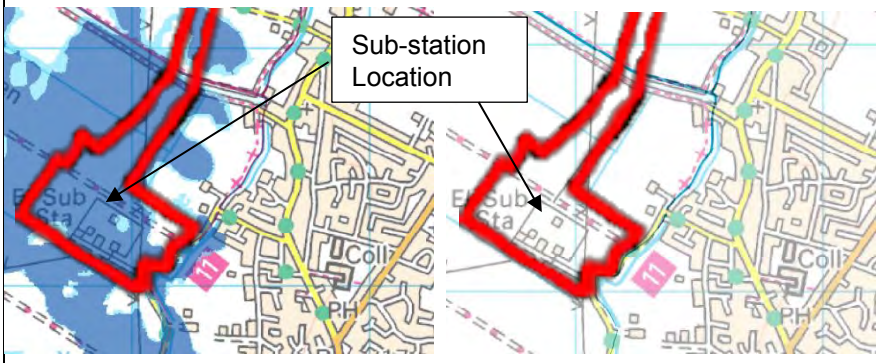
Groundwater

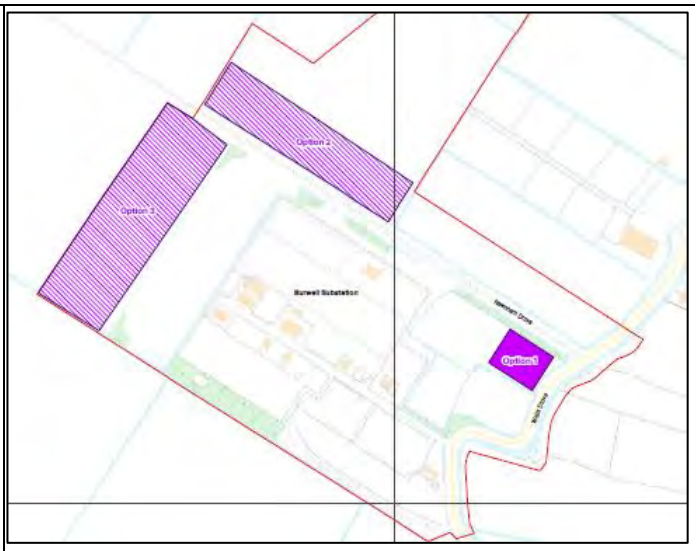
9.6.136. The substation is underlain by West Melbury Marly Chalk. There are small areas of peat overlying the Chalk.

Flood Risk

9.6.137. The flood risk for the Burwell Substation is summarised in Table 9-11 and is from the FRA (***PEI Report Volume 2: Appendix 9A***):

Table 9-11 Flood Risk for Burwell National Grid Substation Extension

Flood Risk Source	*Flood Risk Level*	*Comments*
Fluvial	Low	**Source:Environment Agency *Flood Zone Dataset, Accessed, ECDC SFRA 2017*** The site is shown to be majority in Defended Flood Zone 3a. However, SFRA climate change maps appear to indicate large reductions in Flood Zone 3a area. It is currently unclear as to the reasons for this; as such, until this is confirmed with the EA, a worst-case approach will be used for this assessment. The SFRA also shows that the site is not within the Fenland flood defence breach model for Q100 year and Q100 year + Climate Change extents. The below images indicates the flood risk, including climate change, from the ECDC SFRA.  ECDC 2017 Flood Zone (Left) and Climate Change (Right) mapping
Tidal	Low	**Source: *ECDC SFRA 2017*** Not within the Tidal Hazard Mapping (Tidal Great Ouse Breach Modelling) for Q200 and Q200 + Climate Change breach extents.
Pluvial (Surface Water)	Very Low - Low	**Source: *GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017*** Both reference sources indicate patches of the site which are susceptible to surface water flooding, however, flooding is localised and shallow (low risk). The majority of the site is at very low risk of surface water flooding.
Groundwater	High	**Source: *ECDC SFRA 2017*** Appendix E of the SFRA displays groundwater risk is shown to be high (>75%).
Sewers	Low	**Source: *ECDC SFRA 2017*** To date no sewer records have been received to note potential sewers in the vicinity of the Site. The Anglian Water DG5 register was not available at the time of writing this report. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. However, sewer mapping, once received, will be used to confirm this assumption.
Artificial Sources	Very Low (residual)	The site is not within or near any registered reservoirs (assumed with volumes >10,000m^3) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources. Locations of the preferred substation location and alternative locations are shown below:



The preferred location for the sub-station extension lies mostly in Flood Zone 1, with approx. 15% in Defended Flood Zone 3a, according to the online flood map for planning and the ECDC SFRA (2017). Alternative locations, however, lie entirely in Defended Flood Zone 3a.

The River Great Ouse has a tidal flood defence level of between 1 in 500 year and 1 in 1000 year. The Great Ouse Tidal River Baseline Report (2017), incorporated within the ECDC SFRA mapping, indicates the sub-station site is also not at risk of tidal flooding, or at risk of a tidal breach, for the 1 in 200 year plus climate change event.

In addition, the ECDC SFRA includes flood risk mapping that includes climate change allowances, based on the current allowances provided by the Environment Agency (65% allowance at the Upper End for the Anglian River Basin Management Plan area). As noted in Table 9-11, the site is not at risk of flooding.

Sea Level Rise

9.6.138. The River Great Ouse tidal defences provide a high level of defence and it is not anticipated that significant benefit would be gained from raising the defences further to account for sea level rise (The Great Ouse Tidal River Strategy, 2009). The Burwell Substation site is not within the modelled tidal and non-tidal breach extents; however, it has been estimated, using the Agency's online sea level rise tables for the Anglian River Basin area, sea level could rise by up to approx. 800mm by the year 2080. Liaison with the National Grid and Environment Agency will be undertaken to establish the current tidal flood extent level, and to apply the sea level rise value, to confirm the level of risk to the sub-station and the proposed extension.

9.6.139. The sub-station site will have no structures that would be occupied; with staff generally attending only at times of inspection and maintenance. Any building compound would be located within Flood Zone 1, considering current climate change mapping. Sea level is predicted to rise with climate change and mitigation will be incorporated to ensure the sub-station is designed and constructed to remain operational and safe in times of flood, and to ensure there is no increase in flood risk as a result of development, including allowance for sea level rise, complying with the NPPF.

9.6.140. National Grid, who has extensive infrastructure on the site already, has a flood risk contingency plan, as part of the National Grid Substation Flood Defence Framework (NGFDF) (2019). It has identified all vulnerable sub-

stations and implemented plans to provide protection and mitigation for the next 30 to 80 years. Along with a constant monitoring programme of weather and flood alerts, it is considered the Burwell sub-station will be well catered for flood defence mitigation.

9.6.141. The flood risk to structures and the risk to people is considered low when incorporating sea level rise.

Water Pollution Incidents (All Sites)

9.6.142. The Environment Agency have confirmed there are no records of water pollution incidents within the area at Category 3 or worse.

Drinking Water Protected Areas (Surface Water), and Drinking Water Safeguard Zones (All Sites)

9.6.143. None of the sites are located within Drinking Water Protected areas (surface water) or Drinking Water Safeguard Zones (Surface water or Groundwater). The nearest Drinking Water Protected area (surface water) is approximately 4km north east of the Sunnica East boundary near Mildenhall. The nearest Drinking Water Safeguard Zones (Groundwater) is approximately 5 km east at Risby.

Aquifer Designations (All Sites)

9.6.144. The Grid Connection Routes A and B and Sunnica East and West Sites A and B are underlain by the Chalk, classified as a Principal aquifer. The chalk strata dip toward the south east as part of the northern limb of the London Basin syncline. The hardbands within the Chalk can act as preferential flow horizons, which include Melbourn Rock and Totternhoe Stone.

9.6.145. In places described above, the Chalk aquifer is overlain by River Terrace Deposits, classified as a Secondary A aquifer.

9.6.146. The alluvium in the River Kennet and River Snail valleys is not explicitly classified as an aquifer but where overlying the gravels they are part of the deposits classified as a Secondary A aquifer.

9.6.147. The connectivity between aquifers is not known but the Chalk aquifer can be expected to be in hydraulic continuity with the gravel aquifers depending on the presence of silt and clay horizons. Alluvium may confine chalk/gravel groundwater levels in the river valleys potentially limiting chalk groundwater discharge depending on the proportion of clay in the alluvium locally. The Lowestoft Formation Till deposits are classified as unproductive and confine groundwater in underlying aquifers.

9.6.148. Groundwater flow in the Chalk aquifer is understood to flow to the north west (Ref 9-35, Ref 9-36) toward the River Great Ouse, at an elevation of approximately 5-20m AOD from the Sunnica East A site in the north to the Sunnica West A site in the south.

9.6.149. Groundwater levels are estimated to be approximately 15-20mAOD at Sunnica West Site A and the Grid Connection Route A, and approximately 8-9mAOD at Sunnica West Site B. Along the Grid Connection Route B and Burwell substation groundwater levels are estimated to be approximately 4-8mAOD. At Sunnica East Site A groundwater levels are estimated to be

approximately 2-5mAOD, and at Sunnica East Site B approximately 6-9mAOD

9.6.150. Chalk groundwater contouring (1995 annual average representing typical conditions Ref 9-35) near the site does not indicate groundwater converging on the River Snail or River Kennett, indicating that Chalk aquifer groundwater does not provide baseflow in the area, at least between low to average groundwater levels, and is limited to certain river reaches rather than accreting across the full length of the river. Ground elevation along the river valleys of the Kennett, and Lee Brook also indicates that the river bed is likely to be above the Chalk aquifer water table until the lowest reaches near the confluence with the River Lark. Similarly, the River Snail river bed is likely to be above the Chalk aquifer water table until the lowest reaches after joining the Soham Lode.

9.6.151. These streams are likely to be supported by groundwater storage in the gravel and alluvial aquifers and Chalk aquifer baseflow in the upper catchment areas. Accretion profiles developed from spot flow gauging in 2006 (Ref 9-35, Ref 9-36) indicates a small gain in baseflow as the River Snail crosses the chalk hardbands, indicating some preferential flow along these horizons to surface discharge points, but the majority of Chalk aquifer groundwater flows to the north west to discharge at springs near the base and edge of the Chalk outcrop approximately 5 km north west.

9.6.152. There are several Environment Agency groundwater monitoring boreholes in the vicinity of the sites screened in the Chalk aquifer. TL67/099 is situated between the River Snail and River Kennett, and north of Chippenham Fen. TL67/077 is situated east of the River Kennett. TL66/087 is situated west of the River Snail between Landwade and Burwell.

9.6.153. TL67/099 monitoring shows groundwater to be typically approximately 12m below ground level, fluctuating generally between 3-5m AOD. However, groundwater levels here have been on a declining trend and may be influenced by abstraction. TL67/077 monitoring shows groundwater to be typically approximately 7m below ground level, fluctuating generally between 6-7m AOD. TL66/087 monitoring shows groundwater to be typically approximately 19.5m below ground level, fluctuating generally between 8-9m AOD. Therefore, groundwater level fluctuation is generally within 2m in the area.

9.6.154. Chippenham Fen SSSI is part of Fenland SAC, and is situated less than 100m north east of Sunnica West Site B. It is a wetland habitat comprising fen, fen grassland, and basic flush on peat soils as well as calcareous grassland, open grassland, woodland and open water.

9.6.155. Chippenham Fen SSSI is considered to be fed by Chalk groundwater. As the SSSI is surrounded by Totternhoe Stone, this hardband may be a conduit for Chalk groundwater to discharge in the area, creating saturated conditions allowing the fenland habitat to develop.

9.6.156. Chippenham Fen is at an elevation of 12m AOD and therefore groundwater is anticipated to be at least 5m below ground in the area, so upward flow under pressure along this hardband at depth is a possible mechanism for groundwater discharge in this location. The lower permeability marly nature

of the Lower Chalk units in this area may cause confinement of groundwater such that it may flow under pressure via high permeability hardbands.

9.6.157. Although within 100m, Sunnica West Site B is not considered to be up hydraulic gradient based on Chalk groundwater contours (Ref 9-35), with groundwater flow to the north west. Sunnica West Site A is likely to be up gradient and is situated approximately 2 km south east.

9.6.158. The site is underlain by the Cam and Ely Ouse Chalk Groundwater Body (GB40501G400500), which is classified as Poor status. Both quantitative and qualitative elements are classified Poor. All quantitative elements are classified as Poor except the Saline Intrusion test. Chemical status is Poor due to failures of the Drinking Water Protected Area and General Chemical Test elements.

9.6.159. Numerous groundwater abstractions are located around the margins of the sites, in particular to the west of Sunnica East Site A associated with a source protection zone (SPZ). The SPZ1 and 2 are outside of the scheme areas except for a small area in the north west of Sunnica West Site A and the Grid Connection Route to Sunnica West Site B.

9.6.160. ***PEI Report Volume 2: Appendix 9B*** presents the Environment Agency licensed abstractions within 500m of the nearest site boundary. There are 63 abstractions within 500m and 95 within 1km. There are 13 licences within the scheme boundary area.

9.6.161. ***PEI Report Volume 2: Appendix 9B*** presents the private water supply abstractions within 500m of the nearest site boundary registered with West Suffolk and East Cambridgeshire local authorities. There are 5 abstractions registered with West Suffolk Council within 500m. There are 4 abstractions registered with East Cambridgeshire Council within 500m.

Aquatic Ecology and Nature Conservation Sites (All sites)

9.6.162. There are several SSSIs, SACs, NNRs, LNRs and Ramsar sites in the study area that are believed to be water dependent and thus relevant to this assessment:

- Chippenham Fen and Snailwell Poor's Fen SSSI (in favourable status), Fenland SAC and Chippenham Fen NNR and Ramsar Site, is directly adjacent to the north of the Sunnica West Site B;
- Brackland Rough SSSI is a damp valley woodland located approximately 200m north of Grid Connection Route B, and over 350m north of the Sunnica West Site B;
- Cherry Hill and The Gallops, Barton Mills SSSI (currently in unfavourable declining condition), and Barton Mills LNR, approximately 1 km east of the Sunnica East Site A;
- Red Lodge Heath SSSI (currently in unfavourable recovering condition), approximately 600m south-east of the Sunnica East Site B; and,
- Snailwell Meadows SSSI, connected to River Snail (in unfavourable recovering condition), approximately 50m south of the Sunnica West Site B and 500m south of Grid Connection Route B.

9.6.163. The importance of waterbodies will be determined taking account of any relevant ecological nature conservation designation, but also aquatic protected species that may be present. Current information on the potential for aquatic protected species to be present is described in ***Chapter 8: Ecology***, of this PEI Report.

Future Baseline

Surface Water

9.6.164. Some of the surface WFD waterbodies are predicted to improve in the future, with the aim generally to meet Good Ecological Potential by 2027. Some are already at their target objective (i.e. the River Lark downstream of Mill Bridge, Lee Brook, and Soham Lode). Indeed, there is a general trend for water quality improvements over time in response to improved regulation and treatment practices. However, the current receptor importance criteria presented in Table 9-1 is largely based on the presence or not of various attributes (e.g. Drinking Water Protected Area, designated nature conservation site or WFD designation) and flow (i.e. the size of the watercourse). The application of these criteria is therefore not sensitive to more subtle changes or improvements in water quality as may be experienced over time. Thus, no significant changes to current baseline conditions are predicted for the future baseline as the principle reasons for differences in waterbody importance are unlikely to change.

Groundwater

9.6.165. The future baseline will be largely the same as the current baseline. The Cam and Ely Ouse Chalk groundwater body is currently at Poor status and there is no time objective to reach Good status. Improvements in surface water status and wetlands are planned such that the groundwater body elements ‘Quantitative GWDTEs’ and ‘Quantitative Dependent Surface Water Body Status’ tests have an objective to be Good by 2027. However, the groundwater body overall remains at Poor status.

Flood Risk

9.6.166. Climate change is predicted to alter the future fluvial flood risk and thus it is important that it is taken into account by FRA. Climate change resilience has been accounted for within the proposed SuDS drainage strategy, accommodating current government climate change projections (refer to ***PEI Report Volume 2: Appendix 9A*** for further information).

9.6.167. The Scheme will not alter the current baseline as described above. The drainage strategy will ensure no detrimental impact on the surface water runoff from the Site following its construction. Therefore, no significant adverse changes to current baseline conditions are predicted for the future baseline.

Summary of Waterbody Importance

9.6.168. Table 9-12 provides a summary of the waterbodies that may be impacted by the Scheme, a description of their attributes, and states the importance of the waterbody as used in this preliminary impact assessment. The importance of waterbodies will be kept under review as further information and data becomes available. Please note that separate importance classifications are

provided for water quality and morphological aspects of waterbodies as it is not always appropriate to have the same rating (e.g. a waterbody may be heavily modified or event artificial and thus have a low morphology importance, but the water quality may be high by virtue of supporting protected species or other important potable or socio-economic and recreational uses).

Table 9-12 Importance of Attributes

Waterbody	*Description of Attributes*	*Importance*
River Kennett – Lee Brook waterbody (GB105033043020)	Currently on Poor Ecological Potential (Target of Good for 2027). Q95 Flow recorded downstream of 0.017m^3/s used for Abstractions for irrigation.	High
River Lark (Lark downstream of Mill Street Bridge waterbody (GB105033043052)	Currently at Moderate Ecological Potential, its target status. Q95 flow monitored at 0.439m^3/s 5 km northwest of Worlingham. Abstractions for spray irrigation.	High
River Lark Tributary 1, and River Lark Tributary 2	First order tributary with little or no biodiversity interest and socio-economic uses (based on limited available information). Potentially ephemeral in its nature. These watercourses are not designated as WFD waterbodies in their own right. River Lark Tributary 1 does flow close to pond WB1, which may support GCN, but this pond is thought to be offline.	Low (subject to future surveys to confirm)
Lee Brook (GB105033042970)	Currently at Moderate Ecological Potential, its target status. Q95 Flow recorded downstream of 0.017m^3/s. used for Abstractions for irrigation.	High
Kennett-Lee Brook catchment area (GB105033042990)	Currently at Moderate Ecological status, its target status. Q95 Flow recorded downstream of 0.017m^3/s. used for Abstractions for irrigation.	High
Dane Hill watercourse	First order tributary with little or no biodiversity interest and socio-economic uses (based on limited available information). Potentially ephemeral in its nature. This watercourse is not designated as a WFD waterbody in its own right, and connectivity to other WFD locally is uncertain. It is within the Kennett-Lee Brook catchment.	Low (subject to future surveys to confirm)
River Snail within the Soham Lode Catchment waterbody (GB105033042860) and its tributary draining the Chippenham Fen	Currently at Moderate Ecological status, its target status. The Q95 flow (that which is exceeded 95% of the time) is 0.106m^3/s. Abstractions for spray irrigation.	High
New River (GB105033042780)	Currently at Moderate Ecological Potential, with a target of Good Ecological Potential by 2027. No flow information.	High
Burwell Lode (GB105033042720)	Currently at Moderate Ecological Potential, exceeding its target status of Poor Ecological Potential by 2015.	Moderate

Waterbody	*Description of Attributes*	*Importance*
Pond 'Moat' referred to as WB1 in ***Chapter 8: Ecology***	Positive eDNA survey for GCN	High
Other water storage lagoons/ponds in the study area	Ecology surveys for GCN eDNA were all negative for those surveyed (except for WB1 above)	Low
Cam and Ely Ouse Chalk Groundwater Body (GB40501G400500)	Both quantitative and qualitative elements are classified Poor. Objective Good by 2027 for Quantitative GWDTEs test and Dependent Surface Water Body Status test.	High
Flood Risk Sunnica East Site A River Lark Lee Brook	The majority of the site is Flood Zone 1. There are areas of Flood Zone 2/3 associated with the Lee brook and River Lark encroach onto Sunnica East Site A. River Lark fluvial flood zone contains properties benefitting from flood defences. Lee Brook fluvial flood zone contains agricultural land usage.	River Lark: Low Lee Brook: Low
Flood Risk Sunnica East Site B River Lark Lee Brook	Both as above.	River Lark: Low Lee Brook: Low
Flood Risk Sunnica West Site A Lee Brook Kennett-Lee Brook	The majority of the site is Flood Zone 1. Fluvial Flood Zones 2/3 associated with both watercourses. The fluvial flood zone mapping shows agricultural land usage within the areas potentially affected.	Lee Brook: Low Kennett-Lee Brook: Low
Flood Risk Sunnica West Site B River Snail	The majority of the site is Flood Zone 1. Majority of site is fluvial Flood Zone 1, but flood zone 2/3 encroach on northern area of the site from the River Snail. Some areas of industrial estate are contained within the associated fluvial Flood Zone 2/3.	River Snail: Medium
Flood Risk Grid Connection Route A River Kennet	The majority of the site is Flood Zone 1. The route crosses the River Kennet fluvial flood zones Flood Zone 2/3. The areas at risk of flooding contain agricultural land.	River Kennet: low
Flood Risk Grid Connection Route B River Snail New River Burwell Lode	The route is largely Flood Zone 1, but passes through areas of Flood Zone 2/3 associated with River Snail, New River, and Burwell Lode (defended Flood Zone 3a). River Snail floodplain contains some industrial properties. New River fluvial floodplain contains agricultural land use, and Burwell Lode contains some farming properties.	River Snail: Medium New River: Low Burwell Lode: Medium
Burwell Sub Station Extension	Mainly contained within Flood Zone 1, with approximately 15% in Defended Flood zone 3a.	Burwell Lode flood plain area: Medium
Hydromorphology Sunnica East Site A River Kennet-Lee Brook	The Kennet–Lee Brook is characterised by a heavily modified, lowland watercourse with an over straight planform. The watercourse has a low gradient and flows through a thin band of superficial alluvial deposits within an unconfined valley. Superficial deposits close to the confluence	High (precautionary pending future surveys)

Waterbody	Description of Attributes	Importance
	with the River Lark are shown as Peat. Bedrock through this reach is chalk. The earliest available historic mapping dates back to 1885 where the Kennet-Lee Brook is already shown to be in its currently alignment. Given the surrounding land use it is considered likely that realignment occurred to make room for agriculture.	
Hydromorphology Sunnica East Site A River Lark	The River Lark through this reach is characterised by a heavily modified, lowland watercourse with a passively meandering planform. The watercourse has a low gradient and flows through a thin band of peat (superficial geological deposits) within an unconfined valley, overlying bedrock geology of chalk. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping.	High (precautionary pending future surveys)
Hydromorphology Sunnica East Site B River Lark Tributary 1	River Lark Tributary 1 flows through superficial deposits of alluvium, river terrace deposits and head deposits, overlying chalk bedrock. The watercourse is artificially straight, characteristic of a drainage ditch. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel, created to aid land drainage. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel.	Medium (precautionary pending future surveys)
Hydromorphology Sunnica East Site B River Lark Tributary 2	River Lark Tributary 2 is an over straight watercourse, characteristic of an agricultural drainage ditch. No superficial deposits are shown for this watercourse, overlying chalk bedrock. The watercourse is artificially straight indicating historic modification. Historic mapping is available as far back as 1885 and the watercourse is present following the same course as the contemporary channel.	Medium (precautionary pending future surveys)
Hydromorphology Grid Connection Route A River Kennett	The River Kennet through this reach is characterised by a heavily modified, lowland watercourse with a passively sinuous planform. The watercourse has a low gradient and flows through a thin band of alluvial deposits within an unconfined valley. Historic mapping indicates that the planform through this reach was straightened between 1892 and 1914. Present day (2020) OS mapping suggests that it is possible that some of the meander cut off channels remain in situ but this has not been confirmed. The River Kennett in the vicinity of the crossing location has a wooded riparian zone and therefore potential to create flow variation within the channel through the presence of large woody material.	High (precautionary pending future surveys)
Hydromorphology Grid Connection Route B Burwell Lode	Burwell Lode is an artificial drainage ditch, straight incised and embanked with no hydromorphological value. The watercourse flows through peat, overlying chalk in a low gradient, unconfined channel. The flow regime is considered likely to be uniform throughout with an absence of bedforms, although this has not been verified. Channel modifications pre-date earliest available OS	High (precautionary pending future surveys)

Waterbody	Description of Attributes	Importance
	mapping, however it is considered likely that this watercourse is a completely artificial ditch, created for the purposes of agricultural land drainage	
Hydromorphology Grid Connection Route B New River	New River flows through a wide area of peat, overlying bedrock of chalk in a low gradient, unconfined valley. The watercourse is a heavily modified watercourse and is over wider, artificially straight through the study reach. Embankments along the length of the watercourse have severed lateral connectivity and the flow regime is considered likely to be uniform with little variation and a lack of bedforms although this has not been verified. Historic mapping indicates that the watercourse has followed the same planform since 1885, and modification predates this mapping.	High (precautionary pending future surveys)
Hydromorphology Sunnica West Site A Lee Brook	Lee Brook is a heavily modified watercourse and is over straight, over wide and incised through the study reach. The watercourse flows through a band of alluvium and peat, overlying bedrock of chalk in a low gradient, unconfined valley. The flow regime is considered likely to be uniform with little variation and a lack of bedforms. Historic mapping indicates that the watercourse has followed the same planform since 1885, and likely predates this mapping.	High (precautionary pending future surveys)
Hydromorphology Sunnica West Site A Dane Hill Watercourse	Dane Hill watercourse is artificially straight, particularly in the lower reaches, and follows the contours of Dane Hill. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel with little/ no morphological or flow variation, created to aid land drainage through historic plantations. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel. Historic mapping shows the watercourse connecting to a series of land drainage ditches with no apparent connection to the River Kennett.	Medium (precautionary pending future surveys)
Hydromorphology Sunnica West Site B Grid Connection Route B River Snail	The River Snail in the vicinity of the site is classified by a heavily modified watercourse flowing superficial deposits of alluvium and river terrace deposits, overlying bedrock of chalk. The width of the alluvial deposits suggest that the natural typology of the watercourse was more sinuous than its contemporary form. Historic mapping is available as far back at 1885 and shows the watercourse in its current alignment. Based on historic land use it is likely that the watercourse was modified to service mills in the area.	High (precautionary pending future surveys)

9.7. Embedded Design Mitigation

9.7.1. The Scheme has been designed, as far as possible, to avoid and minimise impacts and effects on the water environment through the process of design development, and by embedding measures into the design of the Scheme.

9.7.2. A number of standard and embedded measures have been identified, which would be implemented by the contractor to manage the impacts and reduce the effects that the construction of the Scheme would have on the water environment.

Standard Mitigation

9.7.3. The construction of the Scheme will take place under a Construction Environmental Management Plan (CEMP). The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. An Framework CEMP is provided in ***PEI Report Volume 2: Appendix 16C*** and provides the framework for the detailed CEMP, which will be updated following the final recommendations of the Environmental Statement and would be produced in advance of construction works following receipt of the DCO consent.

9.7.4. They will comprise good practice methods that are established and effective measures to which the development will be committed through the development consent. The measures within the document will focus on managing the risk of pollution to surface waters and the groundwater environment. It will also consider the management of activities within floodplain areas (i.e. kept to a minimum and with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable).

9.7.5. The CEMP will be reviewed, revised and updated as the project progresses towards construction to ensure all potential impacts and residual effects are considered and addressed as far as practicable, in keeping with available good practice at that point in time. The principles of the mitigation measures set out below are the minimum standards that the Contractor will implement. However, it is acknowledged that for some issues, there are multiple ways in which they may be addressed and methods of dealing with pollutant risk will be continually reviewed and adapted as construction works progress (e.g. the management of construction site runoff containing excessive levels of fine sediments).

9.7.6. The CEMP will be standard procedure for the Scheme and will describe the principles for the protection of the water environment during construction. The CEMP will be supported by a Water Management Plan (WMP) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. The potential for adverse impacts would be minimised by the adoption of the general mitigation measures outlined below, which will be described in the Water Management Plan and CEMP.

9.7.7. The construction of the Scheme will be undertaken in accordance with good practice as detailed below. Where not disapplied through the DCO, temporary and permanent consents would be obtained where necessary from the Environment Agency for works affecting the Main Rivers. However, it is acknowledged that underground techniques will be used to install power cables beneath watercourses which will not impact the channel or the bed. The depth below the river bed will be a minimum of 1.5m.

9.7.8. Where not disapplied through the DCO, Land Drainage consents will be applied for where necessary on the ordinary watercourses from the local authority and the Swaffham IDB.

9.7.9. The Principal Contractor will comply with any conditions imposed by any relevant permissions.

Management of Construction Site Runoff

9.7.10. Mitigation measures are described in detail below and would be adhered to during the construction phase of the Scheme. They apply equally to all components of the Scheme.

9.7.11. The construction of the Scheme would be in accordance with good practice as detailed by the guidance documents to listed in the earlier section 'Other Relevant Policy, Standards and Guidance.'

9.7.12. The measures outlined below, which are included in the CEMP (see ***PEI Report Volume 2: Appendix 16C***), will be required for the management of fine particulates in surface water runoff as a result of the construction activities:

- All reasonably practicable measures will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse, arising from construction activities. The measures will accord with the principles set out in industry guidelines including the CIRIA report 'C532: Control of water pollution from construction sites' (Ref. 11.19) and CIRIA report C648 Control of water pollution from linear construction sites' (Ref. 11.18). Measures may include use and maintenance of temporary lagoons, tanks, bunds and fabric silt fences or silt screens as well as consideration of the type of plant used;
- A temporary drainage system will be developed to prevent runoff contaminated with fine particulates from entering surface water drains without treatment. This will include identifying all land drains and waterbodies on the DCO Site and ensuring that they are adequately protected using drain covers, sand bags, earth bunds, geotextile silt fences, straw bales, or proprietary treatment (e.g. lamella clarifiers);
- Site drainage, including surface runoff and dewatering effluents, will be discharged to sewers where possible and relevant permissions will be obtained from the sewerage or statutory undertaker. Discharge to watercourses will only be permitted where discharge consent or other relevant approval has been obtained (where necessary);
- DCO Site drainage will provide appropriate pollution control measures as agreed with the sewerage undertaker or the Environment Agency as appropriate. Holding or settling tanks, separators and other measures as may be required, will be provided and maintained;
- The relevant sections of BS 6031: Code of Practice for Earthworks (Ref. 11.15) will be followed for the general control of site drainage;
- Where practical, earth works will be undertaken during the drier months of the year. When undertaking earth moving works periods of very wet

weather will be avoided, where practical, to minimise the risk of generating runoff contaminated with fine particulates. However, it is likely that some working during wet weather periods will be unavoidable, in which case other mitigation measures (see below) will be implemented to control fine sediment laden runoff. Water may also be required to dampen earthworks during dry weather to reduce dust impacts, and any runoff generated will need to be appropriately managed by the Contractor in accordance with the pollution prevention principles described in this chapter;

- To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20m from watercourses on flat lying land. Where this is not practicable, and it is to be stockpiled for longer than a two-week period, the material will either be covered with geotextile mats, seeded to promote vegetation growth, or runoff prevented from draining to a watercourse without prior treatment;
- Appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff will be provided. Construction site runoff will either be treated on site and discharged under a Water Discharge Activity Permit from the Environment Agency to Controlled Waters (potentially also including infiltration to ground) or to the nearest public sewer with sufficient capacity for treatment following discussions with Anglian Water, or removed from site for disposal at an appropriate and licenced waste facility;
- Equipment and plant are to be washed out and cleaned in designated areas within the DCO Site compound where runoff can be isolated for treatment before disposal as outlined above.
- Mud deposits will be controlled at entry and exit points to the DCO Site using wheel washing facilities and / or road sweepers operating during earthworks activities or other times as required;
- Debris and other material will be prevented from entering surface water drainage, through maintenance of a clean and tidy site, provision of clearly labelled waste receptacles, grid covers and the presence of site security fencing; and
- The WMP will include details of pre, during and post-construction water quality monitoring. This will be based on a combination of visual observations and reviews of the Environment Agency's automatic water quality monitoring network.

Management of Spillage Risk

9.7.13. The measures outlined below will be implemented to manage the risk of accidental spillages on site and potential conveyance to nearby waterbodies via surface runoff or land drains.

9.7.14. The following mitigation measures relating to the control of spillages and leaks will be included in the CEMP and adopted during the construction works:

- Fuel will be stored and used in accordance with the Control of Substances Hazardous to Health Regulations 2002 (Ref. 11.53), and the Control of

Pollution (Oil Storage) (England) Regulations 2001 (Ref. 11.54). Particular care will be taken with the delivery and use of concrete and cement as it is highly corrosive and alkaline;

- 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);
- Any plant, machinery or vehicles will be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site if possible or only at designated areas within the DCO Site compound. Only construction equipment and vehicles free of all oil/fuel leaks will be permitted on site. Drip trays will be placed below static mechanical plant;
- All washing down of vehicles and equipment will take place in designated areas and wash water will be prevented from passing untreated into watercourses;
- All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses, and away from drains as far as reasonably practicable. Vehicles will not be left unattended during refuelling;
- As far as reasonably practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses;
- All fixed plant used on the Site will be self-bunded;
- Mobile plant is to be in good working order, kept clean and fitted with plant 'nappies' at all times;
- The WMP will include details for pollution prevention and will be prepared and included alongside the CEMP. Spill kits and oil absorbent material will be carried by mobile plant and located at high risk locations across the DCO Site and regularly topped up. All construction workers will receive spill response training and tool box talks;
- The DCO Site will be secure to prevent any vandalism that could lead to a pollution incident;
- Construction waste / debris are to be prevented from entering any surface water drainage or water body;
- Surface water drains on public roads trafficked by plant or within the construction compound will be identified and, where there is a risk that fine particulates or spillages could enter them, the drains will be protected (e.g. using covers or sand bags) or the road regularly cleaned by road sweeper;
- Suitable facilities for concrete wash water (e.g. geotextile wrapped sealed skip, container or earth bunded area) will be adequately contained, prevented from entering any drain, and removed from the Site for appropriate disposal at a suitably licenced waste facility; and

- Water quality monitoring of potentially impacted watercourses will be undertaken to ensure that pollution events can be detected against baseline conditions and can be dealt with effectively.

9.7.15. In addition, any site welfare facilities will be appropriately managed, and all foul waste disposed of by an appropriate contractor to a suitably licenced facility if it is not possible to connect to the public sewer.

Management of Flood Risk

Flood Risk

9.7.16. A CEMP will incorporate measures to prevent an increase in flood risk or pollution during the construction works, in addition to the provision of temporary settlement and drainage measures as detailed above.

9.7.17. Construction works undertaken adjacent to, beneath and within watercourses will comply with relevant guidance during demolition and construction, including Environment Agency and Defra guidance documents.

9.7.18. The CEMP will incorporate measures aimed at preventing an increase in flood risk during the construction works. Examples of measures that will be implemented within the Scheme area include:

- Topsoil and other construction materials will be stored outside of the 1 in 100 year floodplain extent. If areas located within Flood Zone 2 are to be utilised for the storage of construction materials, this would be done in accordance with the applicable flood risk activity regulations, if required;
- Connectivity will be maintained between the floodplain and the adjacent watercourses, with no changes in ground levels within the floodplain as far as practicable; and
- During the construction phase, the Contractor will monitor weather forecasts on a monthly, weekly and daily basis, and plan works accordingly. For example, works in the channel of any watercourse will be avoided or halted were there to be a significant risk of high flows or flooding.
- The construction laydown area site office and supervisor will be notified of any potential flood occurring by use of the Floodline Warnings Direct or equivalent service.

9.7.19. The Contractor will be required to produce an Emergency Response Plan which will provide details of the response to an impending flood and include:

- A 24-hour availability and ability to mobilise staff in the event of a flood warning;
- The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period where there is a forecast risk that the site may be flooded;
- Details of the evacuation and site closedown procedures;
- Arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas;

- The Contractor will sign up to Environment Agency flood warning alerts and describe in the Emergency Response Plan the actions it will take in the event of a flood event occurring. These actions will be hierarchal meaning that as the risk increases the Contractor will implement more stringent protection measures;
- If water is encountered during below ground construction, suitable de-watering methods will be used. Any groundwater dewatering required in excess of the exemption thresholds will be undertaken in line with the requirements of the Environment Agency (under the Water Resources Act 1991 as amended) and the Environmental Permitting Regulations (2016); and
- Safe egress and exits are to be maintained at all times when working in excavations. When working in excavations a banksman is to be present at all times.

Management of Risk to Morphology of Waterbodies

9.7.20. A pre-works morphology survey (as described in the Framework CEMP presented in ***PEI Report Volume 2: Appendix 16C***) of the channel of each watercourse to be crossed by high voltage cables will be undertaken. This is to ensure there is a formal record of the condition of each watercourse prior to commencement of works to install cables beneath the channel. Although cables will be installed using non-open cut techniques, the survey is a precautionary measure so that should there be any unforeseen adverse impacts there is a record against which any remedial action can be determined.

Design

9.7.21. The Scheme will preserve access through the Sunnica West Site A for the Lodes-Granta augmentation scheme pipeline.

9.7.22. No solar PV panels or other infrastructure will be located within fluvial Flood Zone 3b extents. However, there may be solar PV panels within Flood Zone 3a and 2. These will be raised on higher struts to mitigate any flood risk to them. The solar PV panel struts will not materially affect the floodplain volume or the flow of flood waters.

9.7.23. Underground boring techniques will be used to install power cables beneath watercourses encountered along the grid connection routes. Techniques such as boring, micro-tunnelling or moling will be used to avoid direct physical impacts to waterbodies. The cable depth below the bed of all watercourses will be a minimum of 1.5 m. Overall, although this approach will require the temporary excavation of launch and receiving pits either side of the watercourses, this approach will avoid any direct adverse impacts to watercourses from construction works. Once installed there will not be any long-term potential impacts (i.e. the risk of the cables being exposed above the bed of the watercourse.

9.7.24. Flood resistance and resilience measures will be included within the design of the Burwell Substation Extension, for whichever of the three potential sites is chosen. National Grid has its own design guidelines which include flood resistance and resilience measures which would be complied with.

9.7.25. Two operational office/warehouse blocks will be constructed for use during operation within works area E33 on Sunnica East A (located towards the eastern boundary of the site), and works area W17 within Sunnica West B (located in the central area of the site) (as shown in Figures 3-1 and 3-2). The provision of a potable water supply and foul water connections would be discussed with Anglian water prior to the submission of the DCO.

Drainage Strategy

9.7.26. The Drainage Strategy (see ***PEI Report Volume 2: Appendix 9A***) proposes to attenuate surface water runoff from the DCO Site, whilst minimising flood risk to the Sites and surrounding areas. In accordance with planning policy guidance from the LLFA (Cambridgeshire LLFA and Suffolk LLFA) (Ref 9-30) runoff from the DCO Site would ensure no increase in surface water discharge rates.

9.7.27. The Surface Water Drainage Strategy (***PEI Report Volume 2: Appendix 9A***) has been developed to mimic natural drainage as far as practicable using SuDS, and to provide a number of other benefits to ecological habitat creation (See ***Chapter 8: Ecology).***

9.7.28. Individual solar PV panels will be held above the ground surface on four struts. This will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the DCO Site's impermeable area will remain consistent with its pre-development state. However, runoff from the solar PV panels will alter the existing routing of runoff. To prevent ponding occurring round the panels, a series of boundary (and some routing) swales will be constructed to convey surface water runoff to detention basins.

9.7.29. Attenuation in the form of detention basins and swales has been incorporated to control any increase in the rate of flow towards the receiving watercourses. The rate of runoff from each development location within the whole DCO Site would ensure nil detriment in terms of no increase in runoff rate from the DCO Sites to the receiving watercourses.

9.7.30. The impermeable area of permanent compound areas and battery storage systems and substations are not yet confirmed, and the Surface Water Drainage Strategy (see ***PEI Report Volume 2: Appendix 9A***) currently assumes 50% of the total area will be impermeable. Increases to existing runoff will be balanced by swales and detention basins to encourage natural infiltration.

9.7.31. No culverting or realignments of watercourses are required for the Scheme.

Foul Drainage

9.7.32. The two operational office / warehouse blocks will be situated on Sunnica East A and Sunnica West B for management and maintenance of the DCO site. These will contain welfare facilities for the c. up to five permanent members of staff (i.e. low volumes of foul drainage will be generated).

9.7.33. At this point in time it is not known how any wastewater will be managed. Options may include connecting to the nearest public sewer or a self-contained independent non-mains domestic storage and / or treatment system.

9.7.34. As the Scheme develops Anglian Water will be consulted on whether a connection can be made to the public sewer for the two locations, as this would be the preferred option.

9.7.35. The alternative where this is not possible, would be for a self-contained foul drainage system to a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

9.7.36. A third option may involve a direct discharge of treated effluent to a watercourse, but this would require much more detailed assessment and a permit from the Environment Agency. At this point in time, it is considered that this option is not viable, and it is not considered any further. Should it be required in the future it would be considered by the Environment Agency under the water discharge activity regime in accordance with the Environmental Permitting (England and Wales) Regulations 2016 which ensures the effects of any such discharge would be appropriately regulated.

9.7.37. As there would be no discharge of foul water to a watercourse, and only small volumes would either be discharged directly to the nearest public sewer or indirectly via a suitable waste management contractor, no further assessment of foul waste from the Scheme is proposed. This will be reviewed as the EIA progresses.

Leaks from Solar PV Panel

9.7.38. The DCO Site will have an Environmental Management Plan in place for the operation and maintenance of the Scheme. The EMP includes measures to regulate the environmental effects of the operational phase of the Site, and to ensure any maintenance activities take place in a way to avoid, and minimise any potential environmental impacts. This includes measures to manage the risk from pollution from small leaks and spillages from proposed infrastructure and maintenance activities.

9.7.39. The Environmental Management Plan for the Scheme will include a regular schedule for visual inspection of the panels. This would ensure that the structural integrity of the panels will be regularly observed. In this way, any panels which required maintenance / replacement would be removed before there was any leakage of chemicals from the sealed units.

9.8. Assessment of Likely Impacts and Effects

9.8.1. A number of activities during construction, operation, and decommissioning phases are likely to generate impacts, which have the potential to affect the water environment, if unmitigated. The impacts and effects (both beneficial and adverse) are outlined in the sections below. The proposed activities have been assessed following consideration of the embedded mitigation measures as described in Section 9.7.

Construction (2023)

Sunnica East Site A

Surface Water

9.8.2. The greatest risks of adverse impacts during construction are in the vicinity of Lee Brook. The Sunnica East Site A is formed of two areas either side of the Lee Brook, which flows in a northerly direction between them. The boundary of the two sites of the Sunnica East Site A include two crossings of Lee Brook for high voltage cables. As the construction would take place beneath the bed of the watercourse, there would be no construction within the channel of the watercourse. Nevertheless, a pre-works survey (as described in the Framework CEMP presented in ***PEI Report Volume 2: Appendix 16C***) of the channel would be undertaken and if there were any indirect impacts, these would be remediated appropriately. Lee Brook flows into the River Lark immediately downstream of the Sunnica East Site A, and thus the River Lark may also be indirectly impacted (there is approximately 175m of scrub, trees and grassland with a flat gradient between the River Lark and the boundary to the Sunnica East Site A) and direct water quality impacts during construction are unlikely. Finally, surrounded by the proposed solar PV development within the eastern half of Sunnica East Site A are two artificial water storage lagoons serving Lee Farm.

9.8.3. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse impacts on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.4. During construction, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard implementation measures will help avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.5. The potential for adverse impacts on surface water quality of Lee Brook and the River Lark from construction site runoff and the risk of chemical spillages during construction, with embedded mitigation being implemented, has been assessed as temporary and very low. On the high importance Lee Brook, this results in a temporary minor effect, a negligible effect on the low importance River Lark and a negligible impact on the Lee Farm water storage lagoons. All effects are considered not significant.

9.8.6. No construction works are proposed within the channel of the Lee Brook which is flowing adjacent to the site. The potential for impacts on the morphology of the channel of the Lee Brook, and downstream River Lark, has been assessed as no change. This results in a neutral impact, which is not considered significant.

Groundwater

9.8.7. The groundwater receptors identified as potentially at risk from the Scheme are:

- Baseflow and water quality in River Kennett, Lee Brook, and River Lark; and
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.8. With reference to ***Chapter 3: Scheme Description*** the solar PV panels will be mounted upon a metal structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw). Other structures such as the battery compound and substation will be placed on a concrete slab approximately 0.2m thick with some individual and smaller structures requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.9. In the Sunnica East Site A, Chalk aquifer groundwater may be encountered at approximately 4m in depth, so it is unlikely that the struts will be positioned below the water table. Depending on land elevation, it is considered that only in the far north of Sunnica East Site A is there the possibility that the strut foundations may be set into groundwater. As no continuous foundation is in the design, and the Chalk aquifer is of significant thickness (approximately 50m thinning to the north), the shallow, regularly spaced discrete strut foundations are not considered to cause an impediment to groundwater flow. In this area groundwater is anticipated to discharge to the River Lark. No significant impediment to baseflow in the River Lark is anticipated.

9.8.10. No structures are to be built within the gravel and alluvial aquifers in the Lee Brook valley, and therefore there will be no effect on groundwater flow in the secondary aquifers supporting the Lee Brook.

9.8.11. The effect of rainwater infiltrating the ground via runoff from solar panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.12. Based on current information, the Sunnica East Site A is not known to have a history of potentially contaminating uses, though it is understood there are historic landfill pits in the area. There are no Environment Agency registered historical landfill sites.

9.8.13. The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. However this will be confirmed in the ES after investigating the locations and history of landfill sites. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.14. There will be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore will be above the water table. Excavation will cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there will be negligible impact to groundwater. The DCO Site does not have a history of potentially contaminating uses and

therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk from this component of the Scheme.

9.8.15. Therefore, the impact of construction within Sunnica East Site A on groundwater, is considered to result in a temporary no change impact, which would result in a neutral effect, which is not considered to be significant.

Flood Risk

9.8.16. With the exception of sections E01, E02, E03 and E05 (see Table 9.5), the remainder of Sunnica East Site A is considered to be at low risk from all sources of flooding. Refer to ***PEI Report Volume 2: Appendix 9A*** for layout and areas with identified flood risk.

9.8.17. Surface water risks are generally shown to have little impact to the proposed development and may be mitigated via the use of above ground SuDS features.

9.8.18. For further information on flood risk, refer to (***PEI Report Volume 2: Appendix 9A***).

9.8.19. During construction, the following adverse impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff (e.g. exacerbation of localised flooding due to deposition of silt, sediment in drains, ditches); and
- Changes in flood risk due to the construction of solar PV panels and site compound and storage facilities, which alter the surface water runoff from the Site.

9.8.20. As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy will ensure that any alteration of surface water runoff as a result of the construction of the solar PV panels, compounds and battery storage units will be mitigated by the construction of swales and detention basins.

9.8.21. Construction activities will take place with a CEMP in place to ensure no exacerbation of localised flooding from deposition of silt or sediment in drainage and ditches.

9.8.22. Therefore, the impact during construction within Sunnica East Site A on flooding and flood risk, to the Scheme and from the Scheme to other developments outside of the Scheme extents, is considered to result in a temporary No Change impact, which would result in a neutral effect, that is not considered significant.

Summary of Effects

Table 9-13 Summary of Magnitude of Impact and Significance of Effect for Sunnica East Site A

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Kennett, Lee Brook, water quality	High	Harm to riverine habitat and water quality due to pollution	Very Low	Minor	No
River Lark	Low	Harm to riverine habitat and water quality due to pollution	Very Low	Negligible	No
Lee Farm Lagoons	Low	Harm to water quality due to pollution	Very Low	Negligible	No
River Kennett, Lee Brook volume and flow rates	High	Potential for changes to volume and flow rates	Very Low	Minor	No
River Kennett, Lee Brook morphology	High (precautionary pending further surveys)	Potential for within channel changes to the watercourses	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk, River Lark and Lee Brook	River Lark: Low Lee Brook: Low	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No Change	Neutral	No

Sunnica East Site B

Surface Water

9.8.23. The greatest risks of adverse impacts during construction are in the northern areas from works either side of the Worlington Tributary of the River Lark 1

and 2. There is also a lesser risk to the River Kennett from the southern areas of the Sunnica East Site B that slopes down towards the river, although the channel is nearly 200m south of the southern boundary and poorly connected due to the lack of minor drains and ditches.

9.8.24. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.25. During construction, all works would be carried out in accordance with the mitigation measures set out in the CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard mitigation measures would avoid or reduce any potential adverse impacts on surface water quality impacts during construction.

9.8.26. The potential for direct impact on surface water quality during construction has been assessed as temporary negligible, on the low importance Worlington Tributaries of the River Lark 1 and 2 and nearby ponds/water storage lagoon, and also on the high importance receptor of the River Kennet, with embedded mitigation measures being implemented. This results in a temporary very low impact on the low importance River Lark, Worlington Tributaries of the River Lark 1 and 2, leading to a negligible effect, and a temporary very low adverse impact on the River Kennet and River Lark, leading to a minor effect. All potential effects are not considered significant.

9.8.27. No construction works are proposed within the channel of any watercourses and thus there will be no morphological impacts.

Groundwater

9.8.28. The groundwater receptors identified as potentially at risk from the Scheme are:

- Baseflow and water quality in River Kennett, Lee Brook, River Lark and their minor tributaries; and
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.29. With reference to ***Chapter 3: Scheme Description*** the solar PV panels will be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw). Other structures such as the battery compound and substation will be placed on a concrete slab approximately 0.2m thick with some other small structures requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.30. Chalk aquifer groundwater may be encountered at approximately 5m depth. Therefore, it is unlikely that the strut foundations will be set into groundwater. Depending on changes in land elevation across the site, in lower lying area if struts were founded below the water table it would be of limited extent. As no continuous foundation is in the design for the solar PV panels, and the

shallow depth of foundations of other structures, and the Chalk aquifer is of significant thickness (approximately 50m thinning to the north), the shallow, regularly spaced discrete strut foundations are not considered to cause an impediment to groundwater flow. In this area groundwater is anticipated to discharge to the River Lark. No significant impediment to baseflow in the River Lark is anticipated.

9.8.31. No structures are to be built within the gravel and alluvial aquifers in the Lee Brook or River Kennett valleys, and therefore there will be no effect on groundwater flow in the secondary aquifers supporting the Lee Brook, the River Kennett, and their minor tributaries.

9.8.32. The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.33. Based on current information, the Sunnica East Site B is not known to have a history of potentially contaminating uses, though it is understood there are historic landfill pits in the area. There is an Environment Agency registered historical landfill sites near the southern boundary west of Red Lodge and the A11 (Middleton Aggregates Ltd), which is outside of the DCO Site.

9.8.34. The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. However, this will be confirmed in the ES after investigating the locations and history of landfill sites. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.35. There will be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore will be above the water table. Excavation will cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there will be negligible impact to groundwater. The DCO Site does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.36. Therefore, the impact of construction within Sunnica East Site B on groundwater, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

Flood Risk

9.8.37. Sunnica East Site B is considered to be at low risk from all sources of flooding. For further information on flood risk, refer to (***PEI Report Volume 2: Appendix 9A***).

9.8.38. During the construction phase the following adverse impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff, e.g. exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches.

- Changes in flood risk due to the construction of solar PV panels, which alter the runoff from the site.

9.8.39. As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy will ensure that any alteration of runoff as a result of the construction of the solar PV panels will be mitigated by the construction of swales and detention basins.

9.8.40. Construction activities will take place with a CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.41. Therefore, the impact of construction within Sunnica East Site B on flooding and flood risk, from and to the development, is considered to result in a temporary no change impact, which result in a neutral effect, that is not considered significant.

Summary of Effects

Table 9-14 Summary of Magnitude of Impact and Significance of Effect for Sunnica East Site B

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Kennett, Lee Brook and their tributaries	High	Harm to riverine habitat and water quality due to pollution	Very low	Minor	No
River Lark	Low	Harm to riverine habitat and water quality due to pollution	Very low	Negligible	No
Various ponds and water storage lagoons	Low	Impact to water quality and potential impact on use of water	Very low	Negligible	No
River Kennett, Lee Brook volume and flow rates	High	Potential for changes to volume and flow rates	No change	Neutral	No
River Kennett, Lee Brook morphology	High (precautionary pending further surveys)	Potential for within channel changes to the watercourses	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk	Lee Brook: Low	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No change	Neutral	No

Sunnica West Site A

Surface Water

9.8.42. The greatest risks of adverse impacts to surface waterbodies during construction are in the northern areas of the Sunnica West Site A, which borders the upper reaches of Lee Brook, which rises to the south of Chippenham Park and flows eastwards along the northern boundary of this site.

9.8.43. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.44. During the construction phase, all works would be carried out in accordance with the embedded mitigation measures set out in the CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard implementation measures would help avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.45. The potential for direct impact on surface water quality during construction has been assessed as temporary very low impact, on a high importance receptor (Lee Brook) and a low importance receptor (Dane Hill Watercourse), which results in a temporary minor and negligible effect, respectively, which is not considered to be significant.

9.8.46. No construction works are proposed within the channel of watercourses and thus no hydromorphological impacts are predicted.

Groundwater

9.8.47. The groundwater receptors identified as potentially at risk from the scheme are:

- Baseflow and water quality in the Lee Brook;
- Chippenham Fen inflow and water quality; and

- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.48. With reference to ***Chapter 3: Scheme Description***, the solar PV panels will be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw). Other structures such as the battery compound and substation will be placed on a concrete slab approximately 0.2m thick with some structures requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.49. The ground level at Sunnica West Site A is approximately 23-26m AOD. The Chalk aquifer water table is estimated to be approximately 6-8m below ground level.

9.8.50. All structures are anticipated to be above the Chalk aquifer water table and therefore will not affect groundwater flow to Chippenham Fen, River Snail, or groundwater abstractions.

9.8.51. The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.52. Based on current information, the Sunnica West Site A is not known to have a history of potentially contaminating uses, though it is understood there are historic landfill pits in the area. There are no Environment Agency registered historical landfill sites.

9.8.53. The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. However, this will be confirmed in the ES after investigating the locations and history of landfill sites. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.54. There will be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore will be above the water table. Excavation will cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there will be negligible impact to groundwater. The DCO Site does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.55. Therefore, the impact of construction within Sunnica West Site A on groundwater, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

Flood Risk

9.8.56. With the exception of W08, W10, W11, W12 and W15, the remainder of the site is situated within Flood Zone 1 and not under fluvial influence. Remaining PV panel areas are considered to present negligible change to existing flood risk and mitigation measures are not likely to be required.

9.8.57. Surface water risks are again shown to have little impact to the proposed development and can be mitigated via the use of above ground SuDS features.

9.8.58. Two solar stations; within (W10) and (W15), are placed within Flood Zone 3, with two more in very close proximity; within (W11) and (W15). These stations will need to be of the enclosed option and raised above predicted flood levels. Any raising is to be completed via stilted feet and considered to pose negligible impact to existing flood zones or floodplain displacement. Development has been moved out of W08 and W12.

9.8.59. For further information on flood risk, refer to (***PEI Report Volume 2: Appendix 9A***).

9.8.60. During the construction phase the following adverse impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff, e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches; and
- Changes in flood risk due to the construction of PV panels which alter the runoff from the site.

9.8.61. As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy will ensure that any alteration of runoff as a result of the construction of the solar panels, compounds and battery storage facilities will be mitigated by the construction of swales and detention basins.

9.8.62. Construction activities will take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.63. Therefore, the impact during construction within Sunnica Site West A on flooding and flood risk, to the Scheme and from the Scheme to other developments outside of the Scheme extents, is considered to result in a temporary negligible impact, which results in a neutral effect, this is not considered significant.

Summary of Effects

Table 9-15 Summary of Magnitude of Impact and Significance of Effect for Sunnica West Site A

Receptor	Importance (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant effect (Yes / No)
Lee Brook	High	Harm to riverine habitat and water quality due to pollution	very low	Minor	No

Receptor	Importance (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant effect (Yes / No)
Dane Hill Watercourse	Low	Harm to riverine habitat and water quality due to pollution	very low	Negligible	No
Lee Brook volume and flow rates	High	Potential for changes to volume and flow rates	no change	Neutral	No
Lee Brook morphology	High (precautionary pending further surveys)	Potential for within channel changes to the watercourses	No change	Neutral	No
Various ponds and water storage lagoons	Low (all)	Impact to water quality and potential impact on use of water	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
Chippenham Fen	High	Harm to wetland habitat due to pollution	No change	Neutral	No
Flood risk	Lee Brook: Low	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No Change	Neutral	No

Sunnica West Site B

Surface Water

9.8.64. The greatest risks of adverse impacts during construction are in the northern and western areas of the Sunnica West Site B, which are closest to a tributary to the River Snail draining from the Chippenham Fen, and the River Snail, respectively. Chippenham Fen is upstream of the Sunnica West Site B and thus surface water impacts will not occur.

9.8.65. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.66. During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the CEMP (***PEI Report Volume 2:***

Appendix 16C). The implementation of standard implementation measures would avoid or reduce any potential adverse impacts on surface water receptors during construction.

9.8.67. The potential for direct impact on surface water quality during construction has been assessed as a temporary very low impact, on the high importance receptors of the River Snail and its tributary from Chippenham Fen, which results in a temporary minor effect, which is not considered significant.

9.8.68. No construction works are proposed within the channel of the River Snail or its tributary which is flowing northwards on the western boundary of the Sunnica West Site B, and its tributary flowing westwards on the northern border of the site. The potential for impacts on the morphology of the channel of the River Snail and its tributary, has been assessed as no change. This results in a neutral impact, which is not considered significant.

Groundwater

9.8.69. The groundwater receptors identified as potentially at risk from the construction phase of the Scheme are:

- Baseflow and water quality in the River Snail;
- Chippenham Fen inflow and water quality; and,
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.70. With reference to ***Chapter 3: Scheme Description***, the solar PV panels will be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw). Other small but permanent structures such as the battery compound and substation will be placed on a concrete slab approximately 0.2m thick with some structures requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.71. The ground level at Sunnica West Site B is approximately 12-15m AOD, with a water table depth at approximately 5-7m below ground level.

9.8.72. All structures are anticipated to be above the Chalk aquifer water table and therefore will not affect groundwater flow to Chippenham Fen, River Snail, or groundwater abstractions.

9.8.73. The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.74. Based on current information, the Sunnica West Site B is not known to have a history of potentially contaminating uses, though it is understood there are historic landfill pits in the area. There are no Environment Agency registered historical landfill sites.

9.8.75. The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. However this will be confirmed in the ES after investigating the locations and history of landfill sites. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.76. There will be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore will be above the water table. Excavation will cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there will be negligible impact to groundwater. The DCO Site does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.77. Therefore, the impact of construction within Sunnica West Site B on groundwater, is considered to result in a no change impact, which results in a neutral effect on all receptors, which is not considered significant.

Flood Risk

9.8.78. With the exception of W01, the remainder of the site (W02) is situated within Flood Zone 1 and not under fluvial influence. For further information, refer to (***PEI Report Volume 2: Appendix 9A***). Refer to Table 9.8 above for flood risk review of W01, and the FRA in ***PEI Report Volume 2: Appendix 9A***.

9.8.79. During the construction phase, the following adverse flood risk impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and
- Changes in flood risk due to the construction of solar PV panels, which alter the runoff from the site.

9.8.80. As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy will ensure that any alteration of runoff as a result of the construction of the solar panels will be mitigated by the construction of swales and detention basins.

9.8.81. Construction activities will take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.82. Therefore, the impact of construction within Sunnica Site West B on flooding and flood risk, from and to the development, is considered to result in a no change impact, which result in a neutral effect, which is not considered significant.

Summary of Effects

Table 9-16 Summary of Magnitude of Impact and Significance of Effect for Sunnica West Site B

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Snail quality and its tributary	High	Harm to riverine habitat and water quality due to pollution	Very low	minor	No
River Snail volume and flow rates	High	Potential for changes to volume and flow rates	No change	Neutral	No
River Snail and its tributary - morphology	High (precautionary pending future surveys)	Potential for within channel changes to the watercourses	No change	Neutral	No
Chippenham Fen	High	Harm to wetland habitat due to changes in hydrogeology and groundwater quality	Negligible	Neutral	No
Various ponds and water storage lagoons	Low (all low)	Impact to water quality and potential impact on use of water	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk	River Snail: Medium	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No change	Neutral	No

Combined Effects on Receptors

Surface water

9.8.83. Sunnica East Site A and Site B, Grid Connection Route A, and parts of Sunnica West Site B are all within the Lee Brook-River Kennett-River Lark

catchment area. Thus, there is the potential for combined effects during construction the phase. However, providing the risk of water pollution is managed effectively on site through standard mitigation measures during construction no in-combination significant effects are anticipated.

Hydromorphology

9.8.84. There are considered to be no effects on the hydromorphology of the receptors. Therefore, no combined effects on receptors are predicted at this stage.

Groundwater

9.8.85. No combined effects on receptors are predicted as each scheme component does not affect groundwater flow and therefore groundwater dependent receptors will not be affected for the scheme components in combination.

Flood Risk

9.8.86. As it is considered there would be a no change impact on flood risk receptors, as no combined effects on receptors are predicted.

Table 9-17 Summary of Magnitude of Impact and Significance of Combined Effect for Sunnica East Site A and Site B, West Site A and West Site B

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Kennett, Lee Brook, River Snail, New River, Burwell Lode	High	Harm to riverine habitat due to pollution	Very low	Minor	No
As above, volume and flow rates	High	Potential for changes to volume and flow rates	No change	Neutral	No
River Kennett, Lee Brook, River Snail, New River, Burwell Lode	High	Potential for within channel changes to the watercourses	No change	Neutral	No
Chippenham Fen	High	Harm to wetland habitat due to pollution	No change	Neutral	No
Groundwater Resource	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No

Receptor	Importance (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant effect (Yes / No)
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood risk	River Lark: Low Lee Brook: Low Kennett Lee Brook: Low River Snail; medium New River: Low Burwell Lode: Medium	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No Change	Neutral	No

Grid Connection Route A

Surface water

9.8.87. Grid Connection Route A links Sunnica East Site A with Site B, and then Sunnica East Site B with Sunnica West Site A. The link between Sunnica East Site A and Site B is remote from any surface waterbodies and no adverse impacts to surface waterbodies are predicted.

9.8.88. The alignment of Grid Connection Route A from Sunnica East Site B to Sunnica West Site A requires a crossing of the River Kennet. An artificial water storage reservoir (Waterbody 9 on Figure 9-1) is located just south of the River Kennett and north of the A11. However, as the distance between this reservoir and the alignment of Grid Connection Route A is more than 200m no impacts are predicted.

9.8.89. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.90. the cables will be installed beneath the channel of waterbodies using techniques that do not require any works in the channel. The cable will cross at least 1.5m below the bed of the watercourse to avoid impacts on the bed of the watercourse, or the banks of the watercourse.

9.8.91. During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard implementation measures

would avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.92. The potential for direct impact on surface water quality during construction has been assessed as temporary very low impact, on a high importance receptor (the River Kennett), which results in a temporary minor adverse effect, that is not considered significant.

9.8.93. Due to the proposed use of techniques for the installation of cabled beneath the bed of the River Kennett, no construction works are proposed within the channel of the River Kennett. The potential for impacts on the morphology of the channel of the River Kennett, has therefore been assessed as no change. This results in a neutral impact, which is not considered significant.

Groundwater

9.8.94. The groundwater receptors identified as potentially at risk from the installation of Grid Connection Route A are:

- Baseflow and water quality in River Kennet, Lee Brook; and,
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.95. Except where crossing under watercourses, the cables will be set into trenches backfilled with gravel at a depth of approximately 2m, and are anticipated to be above the Chalk aquifer water table, with groundwater depth at approximately 3-5m, and therefore will not affect groundwater flow. If the cables were to be below the water table at any location the profile of the cable is insignificant compared to the thickness of aquifer, and therefore will not affect groundwater flow. The trench will be backfilled with gravel and therefore will not affect groundwater flow.

9.8.96. The cables will be installed using best practice methods (as described earlier and in the CEMP presented in ***PEI Report Volume 2: Appendix 16C***) and therefore is not considered to pose a groundwater quality risk.

9.8.97. Construction works to install cables beneath watercourses will involve a temporary pit to enable boring beneath the River Kennett. The depth of this pit will be determined at a later stage depending on bed level relative to surrounding ground levels, noting the requirement to achieve a minimum of 1.5m headroom between the cables and the riverbed. At this stage, it has been assumed that the depth of launch and receiving pits might be up to 4m below ground level.

9.8.98. This creates a risk that groundwater could become contaminated by spillages of oils, fuels, or other construction chemicals, or through sediment mobilisation causing turbidity. However, the works would be very localised and temporary, and through the application of best practice mitigation that will be set out in the CEMP, the impact of constructing and using the temporary pits on groundwater is considered to result in a temporary negligible impact.

9.8.99. There are no Environment Agency registered historical landfill sites along the cable route.

9.8.100. Therefore, the impact of construction within Grid Connection Route A on groundwater is considered to result in a temporary no change impact, result in a neutral effect, that is not considered significant.

Flood Risk

9.8.101. During the construction phase the following adverse impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and
- Changes in flood risk due to the construction of the grid connection route crossing the River Kennett.

9.8.102. As stated within section 9.7 Embedded Design Mitigation, the grid connection route will cross under the River Kennett. This will ensure there will be no impact on the banks and bed of the watercourse, and therefore no effect on the flow regime or flooding potential of the watercourse.

9.8.103. Construction activities in the area of the river will take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.104. Flood risk to the connection routes was scoped out at this stage; however, the FRA in ***PEI Report Volume 2: Appendix 9A*** considers the flood risk from the Grid Connection routes. With the mitigation in place, flood risk is considered low.

9.8.105. Therefore, the impact of construction of Grid Connection Route A on flooding and flood risk, from the development, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

Summary of Effects

Table 9-18 Summary of Magnitude of Impact and Significance of Effect for Grid Connection Route A

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Kennett	High	Harm to riverine habitat and water quality due to pollution	Very low	minor	No
River Kennett, Lee Brook volume and flow	High	Potential for changes to volume and flow rate	No change	Neutral	No
River Kennett	High (precautionary pending future surveys)	Potential for within channel changes to the watercourses	No change	Neutral	No

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
Groundwater Resource – chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk	River Kennet: Low	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No Change	Neutral	No

Grid Connection Route B

Surface water

9.8.106. Grid Connection Route B links land parcels W13 and W14 (see Figure 3-2) with the main Sunnica West Site A, Sunnica Site West A to Site B, and then from the western side of Sunnica West Site B to the proposed Burwell Sub-station, passing to the south of Fordham and to the north of Landwade and Burwell. There is also the requirement to install high voltage cables beneath the A11, with one linking land parcel W15 with the main Sunnica West Site B with a route to the north of La Hogue Farm (see Figure 3-2), where there are a number of small ponds.

9.8.107. The greatest risks of adverse impacts during construction would be as Grid Connection Route B approaches the crossing of the River Snail (Soham Lode waterbody), New River and Burwell Lode Main rivers, together with tributaries and field drains and with land that slopes down to this watercourse crossing. The Grid Connection B will also cross the River Snail, New River and Burwell Lode.

9.8.108. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.109. The methodology for the grid connection route crossing the waterbodies will be via boring or tunnelling techniques. In this way, the cable will cross at least 1.5 m below the bed of the watercourse to avoid impacts on the bed of the watercourse, or the banks of the watercourse.

9.8.110. During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard mitigation measures would

avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.111. The potential for direct impact on surface water quality during construction has been assessed as temporary negligible on all the waterbodies, which are high importance receptors, results in a temporary adverse very low magnitude impact effect, which results in a minor effect that is not considered significant.

9.8.112. Due to the proposed use of boring or tunnelling crossing techniques, no construction works are proposed within the channel of the River Snail, New River, or Burwell Lode (as the cable will cross beneath the bed of the watercourse). The potential for impacts on the morphology of these channels, has therefore been assessed as no change. This results in a no change impact, and a neutral effect, which is not considered significant.

Groundwater

9.8.113. The groundwater receptors identified as potentially at risk from the installation of Grid Connection Route B are:

- Baseflow and water quality in the River Snail, Soham Lode, New River and Burwell Lode;
- Chippenham Fen inflow and water quality; and
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.114. Except where crossing under watercourses, the cables will be set into trenches backfilled with gravel at a depth of approximately 2 m, and are anticipated to be above the Chalk aquifer water table, with groundwater depth at approximately 1-2m in the vicinity of Burwell substation, and up to approximately 7m in the vicinity of Sunnica West BIf the cables were to be below the water table at any location the profile of the cable is insignificant compared to the thickness of aquifer, and therefore will not affect groundwater flow. Near Burwell substation the cable trench has the potential to be marginally below the water table. The trench will be backfilled with gravel and therefore will not affect groundwater flow.

9.8.115. There are no Environment Agency registered historical landfill sites along the cable route.

9.8.116. The cables will be installed using best practice methods (as described earlier and in the CEMP presented in ***PEI Report Volume 2: Appendix 16C***) and therefore is not considered to pose a groundwater quality risk.

9.8.117. Construction works for the installation of cabled beneath watercourses will involve temporary pits to enable launching and receiving boring equipment for the boring or tunnelling crossing techniques that are proposed beneath the River Snail, Soham Lode and Burwell Lode. The depth of this pit will be determined at a later stage depending on bed level relative to surrounding ground levels, noting the requirement to achieve a minimum of 1.5 m headroom between the cables and the river bed. At this stage, it has been assumed that the depth of launch and receiving pits might be up to 4 m below ground level. This creates a risk that groundwater could become

contaminated by spillages of oils, fuels, or other construction chemicals, or through sediment mobilisation causing turbidity. However, the works would be very localised and temporary, and through the application of best practice mitigation that will be set out in the CEMP, the impact of constructing and using the temporary pits on groundwater is considered to result in a temporary no change impact. Therefore, the impact of construction within Grid Connection Route B on groundwater, is considered to result in a temporary no change impact, and a neutral effect, that is not considered significant.

Flood Risk

9.8.118. During the construction phase, the following adverse impacts may occur:

- Temporary changes in flood risk from changes in surface water runoff, e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and
- Changes in flood risk due to the construction of the grid connection route crossing the Rivers Snail, New River and Burwell Lode.

9.8.119. Flood risk to the connection routes was scoped out at this stage; however, the FRA in ***PEI Report Volume 2: Appendix 9A*** considers the flood risk from the Grid Connection routes. With the mitigation in place, flood risk is considered low.

9.8.120. As stated within section 9.7 Embedded Design Mitigation, the grid connection route will cross under the watercourses. This will ensure there will be no impact on the banks and bed of the watercourse, and therefore no effect on the flow regime or flooding potential of the watercourses.

9.8.121. Construction activities in the area of the rivers will take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.122. Therefore, the impact of construction of Grid Connection Route B on flooding and flood risk, from the development, is considered to result in a temporary negligible impact, which result in a neutral effect, that is not considered significant.

Summary of Effects

Table 9-19 Summary of Magnitude of Impact and Significance of Effect for Grid Connection Route B

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
River Snail	High	Harm to riverine habitat and water quality due to pollution	Very Low	Minor	No
River Snail volume and flow rate	High	Potential for changes to volume and flow rate	no change	Neutral	No

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
Chippenham Fen	High	Harm to wetland habitat due to pollution	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk Grid Connection Route B River Snail New River Burwell Lode	River Snail: Medium New River: Low Burwell Lode: Medium	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site	No Change	Neutral	No

Burwell National Grid Substation Extension

Surface water

9.8.123. The greatest risks of adverse impacts are during construction of the National Grid Substation Extension. There are three sites under consideration within the substation area, with one adjacent to a waterbody tributary to Burwell Lode and two located approximately 450 m west from the main drain next to Weirs Drove Road.

9.8.124. The land in this area is flat lying, but construction activities in any land that slopes down towards waterbodies, or that has surface water drainage linking to local drains has the potential to impact water quality within Burwell Lode indirectly.

9.8.125. Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a waterbody there is the potential for direct adverse effects on water quality from deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.126. During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the CEMP (***PEI Report Volume 2: Appendix 16C***). The implementation of standard implementation measures would help avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.127. The potential for direct impact on surface water quality during construction of all three potential locations has been assessed as temporary very low impact, on a high importance receptor, which results in a temporary minor adverse effect, that is not considered significant. This is the same for whichever location is proposed.

9.8.128. No works are proposed within the bank/beds of watercourses for the three potential sites of the National Grid Substation extension. The potential for impacts on the morphology of the channel of the Burwell Lode, has therefore been assessed as no change. This results in a neutral effect, which is not considered significant.

Groundwater

9.8.129. The groundwater receptors identified as potentially at risk from the construction of the Burwell National Grid Sub-Station Extension are:

- Baseflow and water quality in the Burwell Lode; and
- Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.130. The alternative sites proposed for the sub-station present the same risks for groundwater.

9.8.131. The substation foundations will be placed on a concrete slab approximately 0.2 m thick and potentially requiring excavation up to 1 m and filling with a compacted gravel base layer.

9.8.132. These groundworks are anticipated to be above the Chalk aquifer water table and therefore will not affect groundwater flow.

9.8.133. The foundations and structure will be installed using best practice methods (as described earlier and in the CEMP presented in ***PEI Report Volume 2: Appendix 16C***) and therefore is not considered to pose a groundwater quality risk.

9.8.134. Therefore, the impact of construction within Burwell National Grid Substation Extension on groundwater, is considered to result in a temporary no change impact, which results in a neutral effect. This is not considered significant.

Flood Risk

9.8.135. The proposed area for the sub-station extension lies mostly in fluvial Flood Zone 1, with approximately 15% located in Defended Flood Zone 3a. The River Great Ouse has a tidal flood defence level of between 1 in 500 year and 1 in 1000 year. The Great Ouse Tidal River Baseline Report (2017), incorporated within the ECDC SFRA mapping, indicates the sub-station site is also not at risk of tidal flooding, or at risk of a tidal breach, for the 1 in 200 year plus climate change event.

9.8.136. The site is not within the modelled tidal and non-tidal breach extents; however, it has been estimated, using the Agency's online sea level rise tables for the Anglian River Basin area, sea level could rise by up to approximately 800mm by the year 2080. Liaison with the National Grid and Environment Agency will be undertaken to establish the current tidal flood

extent level, and to apply the sea level rise value, to confirm the level of risk to the sub-station and the proposed extension.

9.8.137. The area of the preferred option for the location of the Burwell Substation Extension, lying within the defended Flood Zone 3a, would require mitigation, and will be designed and constructed to remain operational and safe in times of flood, and also to ensure there is no increase in flood risk as a result of the development.

9.8.138. As the existing Burwell Substation is situated in Defended Flood Zone 3a, the proposed extension of the substation will be subject to flood resistance and resilience measures which are part of the National Grid Flood Defence Framework. This is discussed within the FRA, Section 7 within ***PEI Report Volume 2: Appendix 9A***.

9.8.139. No part of the proposed areas of development will be located within functional flood plain, Flood Zone 3b.

9.8.140. With flood resilience and resistance measures being applied to the Burwell National Grid Substation Extension, it is considered that any potential for changes to fluvial flooding potential in the area, or impacts to the development, would be a very low impact resulting in a negligible neutral effect, that is not considered significant.

Summary of Effects

Table 9-20 Summary of Magnitude of Impact and Significance of Effect for Burwell National Grid Substation Extension

Receptor	*Importance (Value)*	*Description of Impact*	*Magnitude of Impact*	*Effect Category*	*Significant effect (Yes / No)*
Burwell Lode	High	Harm to riverine habitat and water quality due to pollution	Very low	Minor	No
Burwell Lode volume and flow rate	High	Potential for changes to volume and flow rate	No change	Neutral	No
Groundwater Resource – Chalk aquifer	High	Loss of resource due to pollution for abstraction and baseflow contribution	No change	Neutral	No
EA licensed abstractions and private water supplies	High	Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes	No change	Neutral	No
Flood Risk	Burlwell Lode: Medium	Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to	Very low	Neutral	No

Receptor	Importance (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant effect (Yes / No)
		or from the site. Flood Resilience and Resistance measures to be used within the design.			

Opening (2025)

Sunnica East Site A

Surface water

9.8.141. During the operational phase, the following impacts may occur without adequate mitigation:

- Impacts on water quality in watercourses from run-off and spillages from new permanent hardstanding and maintenance activities, assuming surface water run-off does ultimately drain to a surface watercourse rather than simply to ground;
- Potential impacts on hydrology as a result of the Scheme. This may include alterations to natural flow pathways from runoff from areas of hardstanding. This may also have a subsequent effect on aquatic habitats and water-dependant nature conservation sites; and
- Reduced chemical loading of watercourses associated with cessation of nitrate, pesticide, herbicide and insecticide applications, which would be beneficial.

9.8.142. During the operational phase, the Sunnica East Site A would operate using best practice and complying with environmental legislation through the application of an OLEMP. Battery sites and solar PV panels are to be located away from watercourses, with surface water drainage controlled by swales and small ponds. As such it is considered the potential for impacts to occur as a result of runoff and spillages from maintenance activities would be very low. This results in a slight adverse effect due to the presence of high importance waterbodies but is not considered to be significant. The OLEMP would include a schedule of regular visual observation of the solar PV panels so that were any to leak these would be identified quickly and the leak could be fixed.

9.8.143. During the operational phase, it is anticipated that with the embedded mitigation of the drainage strategy mimicking natural flow status there would be no effect on flow pathways from runoff from the Scheme.

9.8.144. During the operational phase there would be surface water runoff from the permanent structures. These areas are mainly low risk roof or panel runoff. In addition to permanent structures, there would be runoff from very low trafficked hardstanding areas, where vehicles will access occasionally for the purposes of maintenance and regular observations. During the ES phase of the assessment a CIRIA C753 simple index approach would be carried out. This is a method to assess water quality management to ensure the

components of the treatment train are sufficient for the level of potential risk that any runoff poses. On this basis, the risk of pollution from these areas is considered to be negligible, leading to a neutral effect which is not significant.

9.8.145. Any areas of the site containing oils, such as transformers, would be bunded or have self-contained drainage systems. This would ensure that any leaks are contained and do not enter the surface water drainage system. The OLEMP will contain information about regular observations of the transformers on site to ensure that any leaks into the bunded area are dealt with in a way that is compliant with environmental legislation.

9.8.146. As the land is being taken out of agricultural usage, it is considered there would a decrease in surface water runoff of agricultural additives to the land (be that nutrients in the form of phosphates and nitrates, or from pesticides, herbicides or insecticides). However, in the context of the whole catchment, it is considered this would be not be a great enough change to result in an effect on the watercourses. Therefore, there is considered to be no change in future baseline conditions resulting in a neutral effect, which is not significant.

Groundwater

9.8.147. No risks to the groundwater receptors identified under the construction phase are anticipated from the opening of the Sunnica East Site A, provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. It is possible that the reduction in arable farming across the DCO Site will reduce the need for irrigation of crops as indicated by the large number of water abstraction licences and water storage lagoons. However, it is not possible to quantify this benefit.

9.8.148. Upon opening and during operation, the swales will collect runoff which will infiltrate to the water table. On a local scale, there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.149. Other structures such as building foundations and hardstanding will prevent recharge of rainfall to these footprint areas and will infiltrate the ground adjacent or be routed to swales.

9.8.150. The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment scale will not change and therefore will result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

Flood Risk

9.8.151. The site will be constructed using the surface water drainage strategy in order to ensure no detriment to off-site flooding. Any on-site flooding will be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is, therefore, considered that there would be no change to the current scenarios, resulting in a neutral effect, which is not significant.

Sunnica East Site B

Surface water

9.8.152. It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.115-118 represents those for Sunnica East Site B.

Groundwater

9.8.153. No risks to the groundwater receptors identified under the construction phase are anticipated from the opening of the Sunnica East Site B, provided that the operation is conducted according to best industry practice to manage the risk of chemical spillages. It is possible that the reduction in arable farming across the DCO Site will reduce the need for irrigation of crops as indicated by the large number of water abstraction licences and water storage lagoons. However, it is not possible to quantify this benefit.

9.8.154. Upon operation, the swales will collect runoff which will infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.155. Other structures such as building foundations and hardstanding will prevent recharge of rainfall to these footprint areas and will infiltrate the ground adjacent or be routed to swales.

9.8.156. The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale will not change and therefore will result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

Flood Risk

9.8.157. During the operational phase, the Sunnica East Site B would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site flooding, and any on-site flooding will be mitigated by slightly higher struts on solar PV panels, and routed away from compounds and battery storage facilities. It is, therefore, considered there would be no change to the current scenarios, resulting in a neutral effect, which is not significant.

Sunnica West Site A

Surface water

9.8.158. It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.115-118 represents those for Sunnica West Site A.

Groundwater

9.8.159. No risks to the groundwater receptors identified under the construction phase are anticipated from the opening of the Sunnica West Site A, provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. It is possible that the reduction in arable farming across the DCO Site will reduce the need for irrigation of crops as indicated by the large number of water abstraction licences and water storage lagoons. However, it is not possible to quantify this benefit.

9.8.160. During operation, the swales will collect runoff which will infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.161. Other structures such as building foundations and hardstanding will prevent recharge of rainfall to these footprint areas and will infiltrate the ground adjacent or be routed to swales.

9.8.162. The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale will not change and therefore will result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

Flood Risk

9.8.163. During the operational phase, the site would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site flooding, and any on-site flooding will be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, and a neutral effect which is not significant.

Sunnica West Site B

Surface water

9.8.164. It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.115-118 represents those for Sunnica West Site B.

Groundwater

9.8.165. No risks to the groundwater receptors identified under the construction phase are anticipated from the operation of the Sunnica West Site B, provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. It is possible that the reduction in arable farming across the DCO Site will reduce the need for irrigation of crops as indicated by the large number of water abstraction licences and water storage lagoons. However, it is not possible to quantify this benefit.

9.8.166. Upon opening and during operation, the swales will collect runoff which will infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.167. Other structures such as building foundations and hardstanding will prevent recharge of rainfall to these footprint areas and will infiltrate the ground adjacent or be routed to swales.

9.8.168. The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale will not change and therefore will result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

Flood Risk

9.8.169. During the operational phase, the site would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site

flooding, and any on-site flooding will be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, and a neutral effect which is not significant.

Combined Effects on Receptors

Surface water

9.8.170. Sunnica East Site A and Site B, Grid Connection Route A, and parts of Sunnica West Site B are all within the Lee Brook-River Kennett-River Lark catchment area. Thus, there is the potential for combined effects during the operation phase. However, providing the risk of water pollution is managed effectively at source either through suitable drainage measures on the isolated sites that will require positive drainage systems, no in-combination significant effects are anticipated.

Groundwater

9.8.171. No combined effects on receptors are predicted. None of the development sites will affect groundwater flow, levels and quality, and therefore there are no anticipated effects on the identified receptors as a result of the scheme as a whole.

Flood Risk

9.8.172. The DCO Site will be constructed using the surface water drainage strategy in order to ensure no increase to off-site flood risk, and any on-site flooding will be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, and a neutral effect which is not significant.

Grid Connection Route A

Surface water

9.8.173. No operation phase impacts to the surface water environment have been predicted.

Groundwater

9.8.174. No operation phase impacts to the groundwater environment have been predicted. The gravel-filled trench and cable will not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer, and generally the cable will be above the water table.

9.8.175. The cable route beneath rivers will not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer providing baseflow discharge to the rivers.

9.8.176. Therefore, this is predicted to have a no change impact and a neutral effect.

Flood Risk

9.8.177. No part of the grid connection route are above ground, therefore it is considered there would be a no change impact, with a neutral effect, which is not significant.

Grid Connection Route B

Surface water

9.8.178. No operation phase impacts to the surface water environment have been predicted.

Groundwater

9.8.179. No operation phase impacts to the groundwater environment have been predicted. The gravel-filled trench and cable will not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer, and generally the cable will be above the water table.

9.8.180. The cable route beneath rivers will not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer providing baseflow discharge to the rivers.

9.8.181. Therefore, this is predicted to have a no change impact and a neutral effect.

Flood Risk

9.8.182. No part of the grid connection route is above ground; therefore it is considered there would be a no change to future baseline conditions, resulting in a neutral effect, which is not significant.

Burwell National Grid Substation Extension

Surface water

9.8.183. It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.115-118 represents those for Burwell National Grid Substation Extension for all three of the potential sites.

Groundwater

9.8.184. No risks to the groundwater receptors identified under the construction phase are anticipated from the operation of the Scheme, provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages, which will form part of the Environmental Management Plan. Therefore, this is predicted to have a no change impact and a neutral effect.

Flood Risk

9.8.185. As presented within the construction section, the Burwell Substation Extension within the defended Flood Zone 3a will be mitigated, and will be designed and constructed to remain operational and safe in times of flood, and also to ensure there is no increase in flood risk as a result of the development.

9.8.186. The flood resistance and resilience measures to be employed would result in a no change impact, with a neutral effect, which is not significant.

15 Years Post Opening (2040)

9.8.187. No changes are anticipated for the water environment and flood risk assessment as presented for the Opening (2025) Section.

Decommissioning (2065)

Sunnica East Site A

Surface water

9.8.188. Potential impacts from the decommissioning of Sunnica East Site A are similar in nature to those during construction, as some ground-work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by a Decommissioning Environmental Management Plan. It is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ.

9.8.189. As a result, it is considered that there would be a negligible impact on the waterbodies as outlined under the construction section. This results in a potentially very low impact, and a temporary minor effect due to the high importance of some of these waterbodies, which is not significant.

Groundwater

9.8.190. No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme, as the structures that have been assessed with regard to groundwater flow effects will no longer be present.

It is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. However, some ground works would still be required to remove infrastructure installed. Potential polluting effects would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a no change impact, would result in a neutral effect, that is not considered significant.

9.8.191. If swales are removed and the landscape restored, rain water will infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a no change impact, which would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.192. The decommissioning of the Sunnica East Site A would take place with a Decommissioning Environmental Plan, an in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be a no change to future baseline conditions, resulting in a neutral effect on the receiving waterbodies, that is not significant.

Sunnica East Site B

Surface water

9.8.193. Potential impacts from the decommissioning of Sunnica East Site B are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by a Decommissioning Environmental Management Plan, and in the event of decommissioning. As

a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor effect due to the high importance of some waterbodies, which is not significant.

Groundwater

9.8.194. No risks to the groundwater receptors identified under construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regards to groundwater flow effects will no longer be present.

9.8.195. Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting impacts would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, which would result in a neutral effect, that is not considered significant.

9.8.196. If swales are removed and the landscape restored, rain water will infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a negligible impact, which would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.197. The decommissioning of the Sunnica East Site B would take place with a Decommissioning Environmental Management Plan in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be no change to the future baseline situation, resulting in a neutral effect on the receiving waterbodies, that is not significant.

Sunnica West Site A

Surface water

9.8.198. Potential impacts from the decommissioning of Sunnica West Site A are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These effects would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor effect due to the high importance of some waterbodies, which is not significant.

Groundwater

9.8.199. No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects will no longer be present.

9.8.200. Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, which would result in a neutral effect, that is not considered significant.

9.8.201. If swales are removed and the landscape restored, rain water will infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a negligible impact, which would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.202. The decommissioning of the Sunnica West Site B would take place with a Decommissioning Plan and EMP in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be no change to the baseline situation, with a neutral effect on the receiving waterbodies, that is not significant.

Sunnica West Site B

Surface water

9.8.203. Potential impacts from the decommissioning of Sunnica West Site B are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect as some of these waterbodies are off high importance, which is not significant.

Groundwater

9.8.204. No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects will no longer be present.

9.8.205. Ground works would be required to remove infrastructure installed. Potential polluting effects would be controlled by the EMP in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, would result in a neutral effect, that is not considered significant.

9.8.206. If swales are removed and the landscape restored, rain water will infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a negligible impact, which would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.207. The decommissioning of the Sunnica West Site B would take place with an EMP in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be a no change to future baseline conditions, with a neutral effect on the receiving waterbodies, that is not significant.

Combined Effects on Receptors

9.8.208. No combined effects on receptors are predicted.

Grid Connection Route A

Surface Water

9.8.209. Potential impacts from the decommission of Grid Connection Route A are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. However, in the event of decommissioning the cable routes, these may be left in situ underneath the river crossings. This would minimise potential impacts on the waterbody, the River Kennett.

9.8.210. These impacts would be controlled by a Decommissioning Plan and an EMP in the event of decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect due to the high importance of some waterbodies, which is not significant.

Groundwater

9.8.211. No risks to the groundwater receptors identified under the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects will no longer be present.

9.8.212. Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by an EMP in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.213. The decommissioning of the Grid Connection Route A would take place with a Decommissioning Environmental Management Plan in place to ensure no silts / sediments are deposited within the watercourses. As a result, it is considered there would be a no change to the future baseline situation, with a neutral effect on the receiving waterbodies, that is not significant.

Grid Connection Route B

Surface water

9.8.214. Potential impacts from the decommissioning of Grid Connection Route B are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that

cables installed beneath watercourses would be removed but that they would remain in situ. However, in the event of decommissioning the cable routes, these may be left in situ underneath the river crossings. This would minimise potential impacts on the waterbody, the Rivers Snail, New River, and Burwell Lode.

9.8.215. These impacts would be controlled by a Decommissioning Management Environmental Plan in the event of decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect due to some of these waterbodies being designated as high importance, which is not significant.

Groundwater

9.8.216. No risks to the groundwater receptors identified under the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects will no longer be present.

9.8.217. Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by a Decommissioning Management Plan in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, which would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.218. The decommissioning of the Grid Connection Route B would take place with a Decommissioning Environmental Management Plan in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be a no change to the future baseline situation, with a neutral effect on the receiving waterbodies, that is not significant.

Burwell National Grid Substation Extension

Surface Water

9.8.219. Potential impacts from the decommissioning of any of the three sites considered for the Burwell National Grid Substation Extension are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These effects would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect due to some waterbodies being classed as high important, which is not significant.

Groundwater

9.8.220. No risks to the groundwater receptors identified under the construction phase are anticipated from the decommissioning of the Scheme as the structures

that have been assessed with regard to groundwater flow effects will no longer be present.

9.8.221. Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by a Decommissioning Environmental Management Plan in the event of decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, would result in a neutral effect, that is not considered significant.

Flood Risk

9.8.222. The decommissioning of the Burwell National Grid Substation Extension would take place with a Decommissioning Environmental Management Plan in place to ensure no silts/sediments are deposited within the watercourses. As a result, it is considered there would be a no change to the future baseline conditions, with a neutral effect on the receiving waterbodies, that is not significant.

9.9. Additional Mitigation and Enhancement Measures

9.9.1. No additional mitigation and enhancement measures are proposed.

Monitoring

9.9.2. It is considered there are no monitoring requirements for mitigation and enhancements. A pre-construction morphological survey is proposed as part of embedded mitigation to provide a record of channel form should there be any unforeseen impacts during installation of cables using non-open cut techniques that need to be remediated.

9.10. Residual Effects

9.10.1. No significant residual effects on surface water or groundwater resources or flood risk are anticipated by the Scheme.

9.10.2. Table 9-21 outlines the likely residual construction effects with the embedded mitigation including best practice measures secured via the CEMP included.

9.10.3. There are considered to be no significant residual effects for surface water, groundwater or flood risk during the operation and decommissioning phases of the DCO Scheme.

Table 9-21 Summary of Residual Effects (Construction)

Receptor	*Description of impact*	*Significance of effect with mitigation*	*Mitigation/Enhancement measure*	*Residual effect after mitigation*
Sunnica East Site A				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse	**Minor and negligible effect: Not Significant**	No extra measures proposed	**Slight, and Neutral effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Sunnica East Site B				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse	**Minor effect: Not Significant**	No extra measures proposed	**Slight effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral: Not Significant**	No extra measures proposed	**Neutral: Not Significant**
Sunnica West Site A				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse	**Minor and negligible effect: Not Significant**	No extra measures proposed	**Slight and neutral effect: Not Significant**

Receptor	*Description of impact*	*Significance of effect with mitigation*	*Mitigation/Enhancement measure*	*Residual effect after mitigation*
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Sunnica West Site B				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse	**Minor adverse effect: Not Significant**	No extra measures proposed	**Slight adverse effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Grid Connection Route A				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse during cable route construction, or crossing of the watercourse.	**Negligible effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**

Receptor	*Description of impact*	*Significance of effect with mitigation*	*Mitigation/Enhancement measure*	*Residual effect after mitigation*
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Not Significant**
Grid Connection Route B				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse during cable route construction, or crossing of the watercourses.	**Negligible effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Burwell National Grid Substation Extension				
Surface Water	Potential for direct impacts to surface water quality, or morphology of the watercourse	**Negligible effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Groundwater	Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**
Flood Risk	Potential for increase of flooding from the site, or to the site as a result of construction	**Neutral effect: Not Significant**	No extra measures proposed	**Neutral effect: Not Significant**

9.11. Cumulative Effects

9.11.1. The proposed development within the local area have been assessed (as described in ***Chapter 17: Effect Interactions*** and presented in ***PEI Report Volume 2: Appendix 5A***). They include the following:

- Outline planning application for up to 215 dwellings (8.57 ha) – Isleham.
- Outline application for the redevelopment of land to provide up to 350 dwellings (27.30 ha) – Burwell.
- Outline planning application for the development of a Garden Village (40 ha) – Kennett.
- Change of use from agricultural to a caravan site – Red Lodge.
- Outline application - demolition of Hundred Acre Farm and the construction of up to 268 dwellings (24.85 ha) – Herringswell.
- Outline planning application for up to 400 dwellings plus open space, foul and surface water infrastructure, two accesses on to the A142 (19.8 ha) – Newmarket
- Hybrid planning application consisting of a full planning application for 41 dwellings and an outline planning application for 97 dwellings (14.5 ha) – West Row.

9.11.2. For all these proposed developments, it is assumed they would follow best practice in terms of the management of construction works and surface water runoff (and risk of minor chemical leaks from static and mobile equipment) in the long term, compliant with all relevant environmental legislation.

9.11.3. Additionally, the DCO Scheme has no significant effects to water resources, and any temporary effects would be localised, therefore the receptors would not have the potential to be affected by the other developments.

9.11.4. Therefore, it is not predicted that there would be any significant changes to the baseline conditions of the water resources in the area, nor any significant cumulative effects.

9.12. References

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