

# Heckington Fen Solar Park

EN010123

## Chapter 18 – Miscellaneous Issues

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## CHAPTER 18: MISCELLANEOUS ISSUES

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Table of Contents:

**CHAPTER 18: MISCELLANEOUS ISSUES** ..... 1

Table of Contents: ..... 2

18 Miscellaneous Issues ..... 3

    18.1 Introduction ..... 3

    18.2 Development Parameters Assessed ..... 3

    18.3 Major Accidents and Disasters ..... 5

    18.4 Waste ..... 26

    18.5 Electric, Magnetic and Electromagnetic Fields ..... 37

    18.6 Telecommunications, Television Reception and Utilities ..... 44

    18.7 Summary ..... 48

List of Tables:

Table 18.1: Summary of Scoping Opinion Responses (Major Accidents and Disasters) ... 5

Table 18.2: Summary of Section 42 Consultation Responses since PEIR (Major Accidents and Disasters) ..... 9

Table 18.3: Long-List of potential Major Accidents and Disasters associated with the Proposed Development ..... 12

Table 18.4: Summary of Scoping Opinion Responses (Waste)..... 29

Table 18.5: Summary of Scoping Opinion Responses (electric, magnetic and electro-magnetic fields) ..... 39

Table 18.6: Summary of Section 42 Consultation Responses since PEIR (electric, magnetic and electro-magnetic fields) ..... 39

Table 18.7: Magnetic Fields for direct buried underground cables at 1m above ground level ..... 42

Table 18.8: Summary of Scoping Opinion Responses (telecommunication infrastructure, television reception and existing utilities) ..... 44

Table 18.9: Summary of Section 42 Consultation Responses since PEIR (telecommunication infrastructure, television reception and existing utilities) ..... 44

## 18 MISCELLANEOUS ISSUES

### 18.1 INTRODUCTION

18.1.1 An Environment Impact Assessment (EIA) has been developed in relation to a DCO application for the construction, operation (including maintenance), and decommissioning of a ground mounted solar photovoltaic (PV) electricity generation and energy storage facility (hereafter referred to as "the Energy Park"), cable route to, and above and below ground works at, the National Grid Bicker Fen Substation (hereafter referred to as "the Proposed Development" (inclusive of Energy Park)) on land at Six Hundreds Farm, Six Hundreds Drove, East Heckington, Sleaford, Lincolnshire.

18.1.2 The purpose of this chapter is to collate the assessment of other miscellaneous environmental topic areas that do not warrant individual chapters, either due to the brevity of the assessment or the limited impact associated with the Proposed Development.

18.1.3 This chapter of the ES describes and assesses the potential effects of the Development in terms of:

- Major Accidents and Disasters (Section 18.3);
- Waste (Section 18.4);
- Electric, magnetic and electromagnetic fields (Section 18.5); and
- Telecommunications, Television Reception and Utilities (Section 18.6)

18.1.4 Baseline conditions have been established through desk-based assessment and consultation in relation to the topics covered by this chapter, where appropriate. The assessment methods used within this chapter are described in greater detail in the relevant subsections below.

18.1.5 Legislation and guidance which is relevant has been considered within the assessments.

18.1.6 This chapter is supported by the following technical management plans secured by Requirements in the DCO:

- **Outline Construction Environmental Management Plan (oCEMP)** (document reference 7.7);
- **Outline Energy Storage Safety Management Plan (oESSMP)** (document reference 7.11); and
- **Outline Decommissioning and Restoration Plan (oDRP)** (document reference 7.9)

18.1.7 This chapter is supported by the following technical appendices provided in **Volume 3: Technical Appendices** of this Environmental Statement (document reference 6.3):

- **Appendix 18.1: UXO Risk Assessment** (document reference 6.3.18.1).

### 18.2 DEVELOPMENT PARAMETERS ASSESSED

18.2.1 A number of elements of detailed design for the Proposed Development cannot be confirmed until the tendering process for the design and construction of the Proposed Development has been completed. For example, due to the rapid pace of technological development in the solar photovoltaic (PV) and energy storage industry, the Proposed

Development could utilise technology which does not currently exist and therefore sufficient flexibility needs to be incorporated into the Application.

18.2.2 To address this, the Proposed Development has been assessed based on the likely worst-case parameters/scenarios as per the 'Rochdale Envelope' approach. This involves assessing the maximum (and where relevant, the minimum) parameters for the Proposed Development where flexibility needs to be retained. **Chapter 4: Proposed Development** (document reference 6.1.4) sets out the description of the Proposed Development against which this chapter has been assessed.

**18.3 MAJOR ACCIDENTS AND DISASTERS**

**Introduction**

18.3.1 This section summarises the potential effects of the Proposed Development on the risks of major accidents or disasters occurring.

18.3.2 ‘Accidents’ are an occurrence resulting from uncontrolled developments in the course of construction, operation, and decommissioning (e.g., major emission, fire or explosion).

18.3.3 ‘Disasters’ are naturally occurring extreme weather events or ground related hazard events (e.g., subsidence, landslide, earthquake).

18.3.4 Paragraph 1(8) of Schedule 4 to the EIA Regulations requires consideration to be given to the risks of major accidents and disasters, but does not include a definition of these terms. The consideration relates only to those accidents and disaster which are relevant to the Proposed Development.

**Policy Context**

18.3.5 The EIA Regulations cite two specific directives as examples of types of risk assessments to be considered as part of an EIA. These are the Directive 2012/18/EU of the European Parliament and of the European Council<sup>1</sup> (which deals with major accident hazard registered sites) and the Council Directive 2009/71/Euratom<sup>2</sup> (which deals with nuclear sites). Neither of these Directives is relevant to the Proposed Development.

18.3.6 IEMA Guidance ‘Major Accidents and Disasters in EIA: A Primer’<sup>3</sup> has been referred to in preparation of this Chapter.

**Consultation**

18.3.7 A summary of consultation prior to issue of the Preliminary Environmental Assessment Report (PEIR) in June 2022, outlines matters raised within the Scoping Opinion and how these have been addressed through the ES in relation to Miscellaneous Issues.

**Table 18.1: Summary of Scoping Opinion Responses (Major Accidents and Disasters)**

<b>Consultee</b>	<b>Details of Consultee response</b>	<b>How is matter addressed</b>	<b>Location of response</b>
<b>Major Accidents and Disasters</b>			
<b>PINS (Scoping Opinion)</b>	A standalone Chapter for major accidents and disasters is not proposed on the basis that the nature, scale, and location of the	No standalone Chapter has been provided in this ES for Major Accidents and Disasters. Further	Major Accidents and Disaster section in this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)

<sup>1</sup> OJEU (2012) Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.

<sup>2</sup> OJEU (2009) Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations.

<sup>3</sup> IEMA Guidance (2020) Major Accidents and Disasters in EIA: A Primer

Consultee	Details of Consultee response	How is matter addressed	Location of response
	<p>Proposed Development is not considered to be vulnerable to or give rise to significant impacts in relation to the risk of accidents and major disasters. Potential effects relating to soil conditions, surface water flooding and climate change will be assessed in other Chapters where relevant. The Inspectorate has considered the characteristics of the Proposed Development and agrees with this approach.</p>	<p>consideration of soil conditions, surface water flooding and climate change have been assessed in standalone Chapters in this ES.</p>	<p>Soil Conditions considered in <b>Chapter 16: Land Use and Agriculture</b> (document reference 6.1.16)</p> <p>Surface Water Flooding considered in <b>Chapter 9: Hydrology, Hydrogeology and Flood Risk and Drainage</b> (document reference 6.1.9)</p> <p>Climate Change considered in <b>Chapter 13: Climate Change</b> (document reference 6.1.13)</p>
	<p>Table 19.2 acknowledges that there is a potential fire risk associated with certain types of batteries such as lithium ion, which is reduced by cooling systems designed to regulate temperatures to within safe parameters.</p> <p>The Inspectorate considers that the risk of battery fire/explosion should be addressed in the ES, including where any measures designed to minimise impacts on the environment in the event of such an occurrence are secured.</p>	<p>This risk has been considered and mitigation measures have been outlined within this Chapter and in the supporting technical management plans.</p>	<p>Risk of energy storage fire/explosion addressed in <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18), <b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11), <b>Outline Construction Environmental Management Plan</b> (document reference 7.7) and <b>Outline Decommissioning and Restoration Plan</b> (document 7.9).</p>
<p><b>Health and Safety Executive</b></p>	<p>According to HSE's records the proposed DCO application</p>	<p>The high pressure gas pipeline (Feeder 7 East Heckington</p>	<p>The high pressure gas pipeline has been assessed in</p>

Consultee	Details of Consultee response	How is matter addressed	Location of response
<p><b>(Scoping Opinion)</b></p>	<p>boundary for this Nationally Significant Infrastructure Project is not within any consultation zones of major accident hazard sites but is within 1 zone of a major accident hazard pipelines.</p>	<p>to Gosberton) has been assessed, and the design team have taken utility constraints into account when preparing the <b>Indicative Layout</b> (Figure 2.1) for the Proposed Development.</p>	<p>Section 18.3 of Major Accidents and Disasters, <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)</p>
	<p><u>Hazardous Substance Consent</u></p> <p>The presence of hazardous substances on, over or under land at or above set threshold quantities (Controlled Quantities) will probably require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Act 1990 as amended.</p> <p>Further information on HSC should be sought from the relevant Hazardous Substances Authority.</p>	<p>This is a generic comment and standard clause relating to the gas pipeline present within the land on which the Proposed Development is to be constructed. There are no hazardous materials expected to be used as part of the construction, operation and/or decommissioning of the Proposed Development which would interfere with the pipeline and this, therefore, is not considered to be relevant to the Proposed Development.</p>	<p>This response has been addressed and no further response to it is considered required as part of the ES.</p>
	<p><u>Consideration of risk assessments</u></p> <p>Regulation 5(4) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires the assessment of significant effects to include, where relevant, the expected significant effects arising from the proposed</p>	<p>No significant effects are expected to arise from the Proposed Development, and therefore there is no standalone ES Chapter. Vulnerability to major accidents is discussed in this Chapter.</p>	<p>Vulnerability to major accidents assessed in Section 18.3 Major Accidents and Disasters, <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)</p>



Consultee	Details of Consultee response	How is matter addressed	Location of response
	development's vulnerability to major accidents.		
	<p><u>Explosives sites</u></p> <p>HSE has no comment to make as there are no licensed explosives sites in the vicinity.</p>	No further action is required for the consideration of explosive sites as there are none within the vicinity of the Proposed Development.	This response has been addressed and no further response to it is considered required as part of the ES.
<p><b>North Kesteven District Council (Scoping Opinion)</b></p>	<p>Whilst it is recognised that the battery energy storage system would have mitigation through cooling systems, this does not eliminate the risk. Therefore, whilst we agree that 'Major Accidents or Disasters' does not warrant formally 'scoping in', nevertheless further information should be presented with the DCO application which sets out how these risks will be mitigated and managed through scheme design and maintenance.</p>	<p>This risk has been considered and mitigation measures have been set out within this Chapter and in the subsequent supporting technical management plans.</p>	<p>Risk of energy storage fire/explosion addressed in <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18), <b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11), <b>Outline Construction Environmental Management Plan</b> (document reference 7.7) and <b>Outline Decommissioning and Restoration Plan</b> (document 7.9).</p>
<p><b>UK Health Security Agency (Scoping Opinion)</b></p>	<p>Given that the applicant has not finalised the route for the underground cable to be connected to the National Grid, but has identified that the route may pass close to residential dwellings and that <i>"The route will require crossing .... major roads, rail, high</i></p>	<p>The cable route will cross major roads, rail and third-party grid connections and has been assessed accordingly in relevant chapters. The cable route and vulnerability to accident has been</p>	<p>The cable route's vulnerability to major accidents is assessed in Section 18.3 Major Accidents and Disasters, <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)</p>

Consultee	Details of Consultee response	How is matter addressed	Location of response
	<i>pressure gas main and potentially third-party grid connections", we consider that it is too early to scope out a more detailed consideration of the risk of Major Accidents.</i>	assessed in this Chapter.	The cable route is assessed in the relevant technical chapter, <b>Chapters 6 to 18</b> of this Environmental Statement (document reference 6.1.6-6.1.18)  <b>Table 18.3</b> presents further details of the locations of the assessments for each of the shortlisted accidents and disasters.

18.3.8 In addition, **Table 18.2**, outlines a summary of Section 42 consultation responses since the PEIR.

**Table 18.2: Summary of Section 42 Consultation Responses since PEIR (Major Accidents and Disasters)**

Consultee	Details of Consultee response	How is matter addressed	Location of response
<b>Major Accidents and Disasters</b>			
<b>Network Rail</b>	Key concerns will be how the scheme impacts on the railway operations in terms of the management of construction works around the operational railway.	Some of the shortlisted accidents and disasters (detailed in Table 18.3) are assessed in this Section, including rail accidents.	Major Accidents and Disaster section in this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)  <b>Outline Construction Environmental Management Plan</b> (document reference 7.7) provides measurements for safe construction work practice.
<b>Lincolnshire Police</b>	Concerns about security threats from terrorism and criminal damage to the Proposed Development.	Some of the shortlisted accidents and disasters (detailed in Table 18.3) are assessed in	Major Accidents and Disaster section in this <b>Chapter 18: Miscellaneous</b>

Consultee	Details of Consultee response	How is matter addressed	Location of response
		this Section, including Criminal Damage.	<b>Issues</b> (document reference 6.1.18)
<b>North Kesteven District Council</b>	Concerns about the fire/explosion risk associated with the use of Lithium-Ion batteries as part of the Proposed Development.	This risk has been considered and mitigation measures have been outlined within this Chapter and in the supporting technical management plans.	Risk of energy storage fire/explosion addressed in <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18) and <b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)
<b>Lincolnshire Fire and Rescue</b>	The developer should produce a risk reduction strategy. The strategy should cover the construction, operational and decommissioning phases of the project.	A Risk Reduction Strategy for construction, operation and decommissioning phases of the Proposed Development has been addressed, and included within <b>Appendix 18.2: Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)	<b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)
	Procuring components related to the BESS facility which comply with all relevant legislation relating to fire safety, and ensure the design minimises risk of fire.	Details of the tasks to deliver safety assurance of the Energy Storage element of the Proposed Development are outlined in the <b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)	<b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)
	Developing an emergency response plan with Lincolnshire	A Site Emergency Response Plan is detailed within the	<b>Outline Energy Storage Safety Management</b>

Consultee	Details of Consultee response	How is matter addressed	Location of response
	Fire and Rescue to minimise the impact of an incident during construction, operation and decommissioning of the facility.	<b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)	<b>Plan (oESSMP)</b> (document reference 7.11)
<b>Environment Agency</b>	Water abstraction for emergency fire on site. Fire Service can take water from the adjacent drains to fight the fire without an abstraction license. There will, however, be no guarantee that there will be water there. If the project requires abstraction more than 20m <sup>3</sup> /day, in order to fill this storage from the adjacent water courses, an abstraction license is needed.	The water storage system for manual firefighting which is proposed as part of the Proposed Development has been designed to respond to the worst-case scenario. Details of how the water storage system will be extracted and infilled as per the requirement of the Environment Agency in Section 18.3 (paragraph 18.3.47-18.3.52) of this Chapter	Section 18.3 in this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)
<b>Ministry of Defence Safeguarding (RAF Conningsby)</b>	The MOD has no safeguarding objections to this proposal at this stage.	No further action required.	No further action required.
<b>GTC UK</b>	Confirmation of no assets within and in the vicinity of the Proposed Development	No further action required.	No further action required.
<b>Verizon</b>	Confirmation of no assets within and in the vicinity of the Proposed Development	No further action required.	No further action required.
<b>Instalcom</b>	Confirmation of no assets within and in the vicinity of the Proposed Development	No further action required.	No further action required.

### **Assessment Methodology**

18.3.9 In general, major accidents or disasters, as they relate to the Proposed Development, fall into three categories:

- Events that could not realistically occur, due to the nature of the Proposed Development or its location;

- Events that could realistically occur, but for which the Proposed Development, and associated receptors, are no more vulnerable than any other development; and
- Events that could occur, and to which the Proposed Development is particularly vulnerable, or which the Proposed Development has a particular capacity to exacerbate.

18.3.10 An exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Proposed Development. The National Risk Register<sup>4</sup> identifies risks that could affect the UK. A long list of potential major accidents or disasters was established utilising the above guidance. Major accidents or disasters with little relevance in the UK were not included, such as volcanic eruptions for example. **Table 18.3** details the long-listed major accidents and disasters relevant to the Proposed Development and shortlists those considered for further assessment in this Chapter.

**Table 18.3: Long-List of potential Major Accidents and Disasters associated with the Proposed Development**

Major Accident or Disaster	Potential Risk and Receptor	Relevant Chapter or Appendix of the ES
Health and Safety at Work	Risk of accidents for workers during the construction and decommissioning of the Proposed Development.	Shortlisted and considered further in this section of the Chapter.
Floods	Risk of the Proposed Development flooding and its potential to exacerbate flooding to nearby property and people in areas of increased flood risk.	<b>Chapter 9: Hydrology, Hydrogeology, Flood Risk and Drainage</b> (document reference 6.1.9)  <b>Appendix 9.1: Flood Risk Assessment</b> (document reference 6.3.9.1)
Fire	Risk of fire to local residents, habitats and species.	Shortlisted and considered further in this section of the Chapter.  This section of this Chapter.  <b>Outline Energy Storage Safety Management Plan (oESSMP)</b> (document reference 7.11)
Road accidents	Risk to road users in the area from increased traffic and slow-moving vehicles.  Risk posed by spillage of hazardous loads from road traffic accidents during	<b>Outline Construction Traffic Management Plan</b> (document reference 7.10)  <b>Outline Construction Environmental</b>

<sup>4</sup> Cabinet Office (2020) National Risk Register 2020

Major Accident or Disaster	Potential Risk and Receptor	Relevant Chapter or Appendix of the ES
	<p>construction/decommissioning on the environment.</p> <p>Risk from glint and glare to affect road users.</p>	<p><b>Management Plan</b> (document reference 7.7)</p> <p><b>Outline Decommissioning and Restoration Plan</b> (document reference 7.9)</p> <p><b>Chapter 17: Glint and Glare</b> (document reference 6.1.17)</p>
Rail accidents	Risk of rail accident as a result of the cable route affecting the integrity of rails comprising the railway network.	<p>Shortlisted and considered further in this section of the Chapter.</p> <p><b>Outline Construction Environmental Management Plan</b> (document reference 7.7)</p>
Aviation disasters	Risk from glint and glare to affect pilots and aircraft	<b>Chapter 17: Glint and Glare</b> (document reference 6.1.17)
Utilities failure (gas, electricity, water, sewage, oil, communications)	Risk of utilities failure to affect employees and local residents	Shortlisted and considered further in this section of the Chapter.
Plant disease	Biosecurity risks from new planting to habitats and species	<p><b>Chapter 8: Ecology and Ornithology</b> (document 6.1.8)</p> <p><b>Outline Construction Environmental Management Plan</b> (document reference 7.7)</p>
Criminal Damage	Risk of sabotage/criminal activity and the effects of pre-planned damage to the Proposed Development.	Shortlisted and considered further in this section of the Chapter.

18.3.11 The following shortlisted major accidents and disasters to be considered further in this Section of this Chapter are:

- Health and Safety at Work;
- Fire;
- Rail accidents;
- Utilities failure (gas, electricity, water, sewage, oil, communications); and

- Criminal Damage.

### **Baseline Conditions**

18.3.12 A number of receptors are present in the vicinity of the Proposed Development which could be vulnerable to major accidents or disasters, either because of their proximity to the Proposed Development or their importance to the surrounding area. These include:

- Towns, villages, farms and residential homes;
- Commercial sites and buildings;
- Roads;
- Railways;
- Designated ecological sites, woodland, farmland, and waterbodies; and
- Underground infrastructure services including electricity, water, communications, and gas.

18.3.13 Details of the specific receptors that fall into the above categories are provided in **Chapter 4: Proposed Development** (document reference 6.1.4). These receptors have been considered in this assessment.

### Unexploded Ordnance (UXO) Assessment

18.3.14 A detailed Unexploded Ordnance (UXO) Assessment was undertaken by 1st Line Defence in August 2022 (**Appendix 18.1** (document reference 6.3.18.1)). The results identified within the Order Limits there is an overall 'low risk' from German and anti-aircraft unexploded ordnance. A central section of the Cable Corridor Route is elevated to 'medium risk' due to the presence of a WWII-era Home Guard Auxiliary base in this approximate location.

18.3.15 An expended shotgun cartridge was noted during the trial trenching programme in 2022 within field number SH1 of **Figure 1.4- Field Plan** (document reference 6.2.1).

### **Assessment of Potential for the Proposed Development to cause Major Accidents and Disasters**

#### Construction and Decommissioning Phase

#### Health and Safety at Work

18.3.16 In regard to the Overarching National Policy Statement for Energy EN-1<sup>5</sup> and with specific reference to section 4.13 which acknowledges access to energy is clearly beneficial to society as a whole, the production, distribution, and use of energy may have negative impacts on some people's health. The policy requires the decision maker to consider potential effects of development proposals on human health, stating:

**"where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate."**

18.3.17 Negative effects could include direct impacts on health including increased traffic, air or water pollution, dust, odour, hazardous waste and substance, noise, exposure to

<sup>5</sup> Department of Energy & Climate Change, (2011); Overarching National Policy Statement for Energy (EN-1).

radiation, and increases in pests; and the indirect health impacts of access to key public services, transport or the use of open space for recreation and physical activity.

18.3.18 There are various health and safety considerations particularly for workers during construction and decommissioning of the Proposed Development. Workers are in the closest proximity to the Proposed Development and as a result are considered to be the most at-risk group. However, the risk to both construction workers and the general public is low and not significant during the construction and decommissioning phases, as detailed in the mitigation measures to reduce risk of unexploded ordnance to workers on-site (paragraph 18.3.23- 18.3.28) and the design of equipment to reduce fire risk (paragraph 18.3.29-18.3.32).

18.3.19 Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. A Construction, Design and Management (CDM) co-ordinator will be appointed responsible for the provision of a pre-construction information pack, as required under the Construction (Design and Management) Regulations 2015<sup>6</sup>. The appointed contractor will be required to provide a construction phase plan as detailed in the **Outline CEMP** (document reference 7.7).

18.3.20 The construction of the Proposed Development would be managed in accordance with the Health and Safety at Work Act 1974<sup>7</sup> and would comply with all other relevant Health and Safety Regulations, including:

- The Construction (Health, Safety and Welfare) Regulations, 1996<sup>8</sup> (this regulation protects the health, safety and welfare of everyone who carries out construction work);
- Construction (Design and Management) Regulations 2015 (this regulation applies to every construction project in the UK and aims to make construction work safer); and
- Electricity Safety, Quality and Continuity Regulations, 2002<sup>9</sup> (this regulation specifies safety standards aimed at protecting the public and consumers from danger).

18.3.21 Construction work that is managed and complies with the above set of regulations will reduce the risk to workers due to the legal protection required by these.

18.3.22 Equipment associated with the Heckington Fen Solar Park generation bay at Bicker Fen Substation is assumed to be decommissioned at the end of the operational life of the Proposed Development. Some infrastructure installed as part of the National Grid Bicker Fen Substation Extension Works may over the lifetime of Heckington Fen Solar Park operation become integral to other National Grid connection bay users. In this situation, the integral infrastructure will remain in the ownership of National Grid. This could include elements of Air Insulated Switchgear (AIS) or, depending on the option chosen, Gas Insulated Switchgear (GIS) and the building used to house the GIS, if this option is pursued. The extent of removal will be agreed with National Grid who may continue to operate components of the of the Bicker Fen Substation Extension Works after the connection agreement is terminated.

<sup>6</sup> HMSO (2015) Construction (Design and Management) Regulations 2015.

<sup>7</sup> HMSO (1974) Health and Safety at Work Act 1974.

<sup>8</sup> HMSO (1996) The Construction (Health, Safety and Welfare) Regulations, 1996

<sup>9</sup> HMSO (2002) Electricity Safety, Quality and Continuity Regulations, 2002



18.3.23 Gas Insulated Switchgear (GIS) contain major conducting structures within a sealed environment, protected from environmental aggressors. All switchgear components are encased in metal modules filled with traditionally sulfur hexafluoride (SF<sub>6</sub>) gas with enhanced dielectric characteristics compared to other gases. SF<sub>6</sub> is a non-flammable gas preventing electrical accidents and fires, with a high level of safety, reliability and low health impact as a medium in electrical switchgear. However, SF<sub>6</sub> is a greenhouse gas with the largest global warming potential (23,500 times more than CO<sub>2</sub>).

18.3.24 If a GIS option is pursued as part of the National Grid Bicker Fen Substation Extension Works, the technology would use a SF<sub>6</sub> alternative gas as the dielectric medium. Emerging national UK policy, Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)<sup>10</sup>, encourages applicants to avoid the use SF<sub>6</sub> reliant assets in electricity network developments. National Grid Electricity Transmission (NGET) have committed to not use a GIS solution with SF<sub>6</sub> at the Bicker Fen Substation Extension Works in the Joint Position Statement with National Grid Electricity Transmission (document reference PS-002).

18.3.25 Many SF<sub>6</sub> alternative mediums are in the developmental phase and must be compliant with strict criteria such as low boiling point, low toxicity, non-flammability, chemically inert, high stability and easy to handle during maintenance work. SF<sub>6</sub> alternative gas options must undergo testing to verify performance and the required criteria. This testing must not only assess the switchgear unit and the medium, but also how they will interact at all stages in the switchgear unit's lifetime. This will include installation, handling, monitoring, operation, and decommissioning. Any alternative solution can only be considered as acceptable by industry by meeting the requirements of International Electrotechnical Commission (IEC) and International Organisation for Standardisation (ISO) regulations. These include the IEC 62271 family of standards (high-voltage switchgear and control gear) and ISO 9001 (quality management)<sup>11</sup>. It is expected if a GIS option is pursued by the time of construction (2026), a commercially viable SF<sub>6</sub> alternative gas/ medium will be available and used for the Bicker Fen Substation Extension Works.

~~18.3.21~~18.3.26 Workers would comply with relevant Health and Safety Regulations for AIS and GIS solutions including National Grid National Safety Instructions including National Safety Instructing 10 and Guidance- Equipment Containing Pressurised Interrupting/Insulating Gases<sup>12</sup>.

~~18.3.22~~18.3.27 All works will be subject to risk assessments as required by the **Outline CEMP** (document reference 7.7) of this Environmental Statement and the **Outline DRP** (document reference 7.7) of this Environmental Statement. Mitigation measures to be implemented during construction and decommissioning are listed within the Outline CEMP and the DRP respectively, which will be secured by Requirements in the DCO.

#### *Unexploded Ordnance (UXO)*

~~18.3.23~~18.3.28 The results from the UXO Assessment (**Appendix 18.1** (document reference 6.3.18.1) –identified the Energy Park Site as 'low risk', and the Cable Route Corridor as 'low risk', bar a central section of the Cable Route Corridor as 'medium risk'

<sup>10</sup> Department for Energy Security & Net Zero (2023) Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)

<sup>11</sup> Western Power Distribution Innovation. Next Generation Networks. SF6 Alternatives- A Literature Review on SF6 gas alternatives for use on the Distribution Network (2018)

<sup>12</sup> National Grid Electricity Transmission. National Safety Instruction 10 and Guidance- Equipment Containing Pressurised Interrupting/Insulating Gases (January 2023)

due to the presence of a WWII-era Home Guard Auxiliary base in this approximate location. An expended shotgun cartridge was noted during the trial trenching program in 2022 within the Energy Park Site.

~~18.3.24~~18.3.29 Therefore, UXO will continue to be addressed as a potential health and safety risk to construction workers throughout the pre-construction planning and the construction phase of the Proposed Development to ensure the health and safety of site workers.

~~18.3.25~~18.3.30 An UXO Risk Management Plan has been produced for the Proposed Development detailing the steps to be taken in the event of such a discovery, considering elements such as communication, raising the alarm, nominated responsible persons etc. This plan will be kept on-site and be referred to in the event that a suspect item of UXO is encountered at any stage of the project.

~~18.3.26~~18.3.31 Personnel working on-site pre-construction were provided with a Site Specific UXO Awareness Briefing in September 2022. During the construction phase all personnel involved in intrusive groundworks will attend a UXO Awareness Briefing before starting work.

~~18.3.27~~18.3.32 In the 'medium risk areas', an UXO specialist will be present on-site to monitor intrusive works

~~18.3.28~~18.3.33 Following adoption of these measures, the risk to human health of construction workers is considered to be low and **not significant** during the construction phase.

#### *Design of the Equipment- Fire Risk*

~~18.3.29~~18.3.34 Health and Safety on-site would be managed by the contractor during construction and decommissioning to mitigate the risk of equipment failure that could lead to a fire risk in line with legislative safety requirements.

~~18.3.30~~18.3.35 The risk of fire from ESS is low, and to a lesser extent for workers during the construction and decommissioning phase that onsite employees during the operational phase, as the ESS will be containerised, thus reducing the risk of damage to the energy storage which may cause fires.

~~18.3.31~~18.3.36 It is intended that after the 40-year operational life of the solar panels, the energy storage system, and associated equipment will be removed from the Energy Park site removing the risk of fire. An **Outline Energy Storage Safety Management Plan** (document reference 7.11) has been prepared and is provided with the application. The implementation of the Outline ESSMP will be secured by a requirement to the DCO. The **Outline Construction Environment Management Plan** (document reference 7.7) and **Outline Decommissioning and Restoration Plan** (document reference 7.9) also include measures to reduce risk of fire during construction and decommissioning, and is secured by a requirement to the DCO.

18.3.37 Equipment associated with the Bicker Fen Substation Extension Works is assumed to be decommissioned at the end of the operational life of the Proposed Development, reducing the risk of fire in this phase. Some infrastructure may remain, such as, some components of the Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) options. Risk of fire is minimised for AIS or GIS solutions through design protocol and manufacturer testing of infrastructure components to regulated safety standards. If a GIS option is pursued, the use of a SF<sub>6</sub> alternative gas must be non-flammable and therefore minimising fire risk. ~~extent of removal will be agreed with National Grid who may continue~~

~~to operate the sub-station and the generator bay after the connection agreement is terminated.~~

~~18.3.32~~18.3.38 The risk of fire is small and therefore not likely to lead to any major accidents or disasters as this has been mitigated by the design of the equipment and the design of the Proposed Development site. With the above embedded mitigation, **no significant** effects are anticipated and the risk of fire would be unlikely.

#### Rail Accidents

~~18.3.33~~18.3.39 The cable route corridor crosses the railway line connecting Grantham to Skegness, also known as the 'Poacher line'. Trenchless techniques, such as drilling, will be used to construct the crossing of the cable route; therefore, the works will be undertaken deep below the crossing and a distance either side, not interfering with the operations of the railway. The construction and decommissioning of the underground cable crossing will be managed to the specific requirements of Network Rail and therefore the risk of a rail accident as a result of the crossing will be minimised. Therefore, **no significant** effects on rail accidents are anticipated. Liaison with Network Rail is underway, and the Applicant expects to put in place Protective Provisions for the benefit of Network Rail.

~~18.3.34~~18.3.40 All works will be subject to risk assessments as required by the **Outline CEMP** (document reference 7.7) of this Environmental Statement and the **Outline DRP** (document reference 7.9) of this Environmental Statement. Mitigation measures to be implemented during construction and decommissioning are listed within the Outline CEMP and the DRP respectively, which will be secured by Requirements in the DCO.

#### Utilities Failure

~~18.3.35~~18.3.41 The potential exists for utilities to be affected during the construction of the Proposed Development through damage caused as a result of excavation and engineering operations. Without any precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect.

~~18.3.36~~18.3.42 Precautionary measures have been included as part of the embedded mitigation for the Proposed Development. These include:

- i. locating the Proposed Development outside of utilities' protected zones. A high-pressure gas pipeline (Feeder 7 East Heckington to Gosberton) bisects the Energy Park site running in a north-south direction through the centre of the Energy Park. The design of the Proposed Development has ensured the buffers that the operators have asked to be applied to the design are in place (24.4m easement) including no solar panels in this area. Liaison with National Grid has taken place to ensure the access requirements and security fencing requirements are adequate (for the Energy Park); and
- ii. the use of ground penetrating radar before excavation to identify any unknown utilities; and consultation and agreement of construction/demobilisation methods prior to works commencing.

~~18.3.37~~18.3.43 These measures would reduce the likelihood of effects on utilities during construction.

~~18.3.38~~18.3.44 The decommissioning phase would require below ground works to remove the on-site infrastructure; however, the grid connection cables will typically remain *in situ*. Works would be undertaken within the footprint excavated during

construction. The embedded mitigation measures used during construction would also apply during decommissioning and therefore no adverse effects are predicted during decommissioning.

~~18.3.39~~18.3.45 Engagement is also ongoing with all statutory undertakers with apparatus with the potential to be affected by the Proposed Development to agreement protective provisions that are included in the DCO. Therefore, **no significant** effects are expected during construction.

~~18.3.40~~18.3.46 All works will be subject to risk assessments as required by the **Outline CEMP** (document reference 7.7) of this Environmental Statement and the **Outline DRP** (document reference 7.9) of this Environmental Statement. Mitigation measures to be implemented during construction and decommissioning are listed within the Outline CEMP and the DRP respectively, which will be secured by Requirements in the DCO.

#### Criminal Damage

~~18.3.41~~18.3.47 The Order limits would be managed by the contractor during construction and decommissioning to mitigate the risk of criminal activity. The design will include safety measures to protect the Site from criminal damage, including fencing, CCTV cameras and lighting in critical areas. The security fencing will be the last infrastructure to be removed from the Energy Park during the decommissioning phase to ensure the Energy Park is secure- see **Outline DRP** (document reference 7.9) for further details. Therefore, the Proposed Development is expected to have **no significant** effect on the environment as a result of criminal damage during construction and decommissioning.

#### Operational Phase

##### Health and Safety of Workers

18.3.48 The Development would operate in accordance with the Health and Safety Executive 'Health and safety in the new energy economy: Meeting the challenge of major change'<sup>13</sup> published in August 2010.

~~18.3.42~~18.3.49 Personnel who work on or near to the National Grid Bicker Fen Substation must comply with National Grid Electricity Safety Rules<sup>14</sup> and National Safety Instructions (22 documents)<sup>15</sup> are provided to make sure work can be carried out safely on or near electrical and mechanical equipment.

~~18.3.43~~18.3.50 Traffic during the operational phase will consist of movements by staff that will supervise the operation and maintenance of the Proposed Development, and those that attend the sheep as the pasture around the solar array will form part of a sheep farming enterprise. This is unlikely to involve HGVs and considered to be of negligible magnitude, and hence any related effects will be **not significant**.

##### Design of the Equipment- Fire Risk

~~18.3.44~~18.3.51 When operational the majority of the Proposed Development will comprise solar PV modules which are inert. Electrical infrastructure will be located across

<sup>13</sup> Health and Safety Executive (2010) Health and safety in the new energy economy: Meeting the challenge of major change. Available online: <http://www.hse.gov.uk/eet/assets/pdf/new-energy-economy.pdf>

<sup>14</sup> [National Grid UK Electricity Transmission plc Safety Rules and Guidance \(Fifth Edition\) \(June 2022\)](#)

<sup>15</sup><https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/national-safety-instructions>

the Proposed Development, in the form of inverters, transformers and cabling, all of which will be designed and installed to relevant standards and good practice and be subject to routine maintenance such that it is not considered to pose a significant risk to creating an accident or disaster.

~~18.3.45~~18.3.52 The main onsite substation, which will include transformers; switchgear and bus-bars, will be designed and installed to relevant standards and good practice and be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident or disaster.

~~18.3.46~~18.3.53 The Proposed Development has also been designed to include an Energy Storage System (ESS). The ESS is located within (up to) two Energy Storage Compounds alongside the main On-site Substation and includes containers for energy storage (up to 200), inverters (up to 100), transformers (up to 100), an ESS system control room, tanks for containment of water (or other fire suppressant if confirmed as required during detailed design) and a lagoon (if required) to capture water run-off during a fire incident.

~~18.3.47~~18.3.54 There is a potential fire risk associated with certain types of energy storage such as lithium ion batteries. An **oESSMP** (document reference 7.11) has been prepared and is provided with the application. The implementation of the Outline ESSMP will be secured by a requirement to the DCO. This fully considers the risks associated with fires from ESS equipment and minimises the impact of an incident during construction, operation, and decommissioning.

~~18.3.48~~18.3.55 A Site Emergency Response Plan in respect of ESS will be produced for the Energy Storage Compound area, secured through the **oESSMP** (document reference 7.11) by a requirement to the DCO. The Emergency Response plan should include the following:

- a. Details of the hazards associated with lithium-ion (li-ion) batteries;
- b. Isolation of electrical sources to enable firefighting activities;
- c. Measures to extinguish or cool batteries involved in fire;
- d. Minimise environmental impact of an incident;
- e. Containment of fire water run-off;
- f. Handling and responsibility for disposal of damaged batteries; and
- g. Establishment of regular onsite training exercises.

~~18.3.49~~18.3.56 The Energy Storage Compound area has been designed to facilitate a worse-case scenario to ensure sufficient water is available for manual firefighting in the unlikely event of a fire in the compound. A water supply of a minimum of 1,900 l/min for at least 120 minutes (2 hours) is needed to be supplied in an initial response, reducing to 800l/min for 24 hours in the continued cooling (as informed by insurers). Provision for 1,500m<sup>3</sup> of water is made within the site layout at the Energy Storage Compound to accommodate the water supply requirements.

~~18.3.50~~18.3.57 Fire-fighting water could be stored in up to 8 cylindrical steel panel tanks, up to 10m diameter and up to 4m in height. A further 2 tanks will be available in Energy Storage Compound to store water used in the event of a fire and may be

contaminated. A bunded lagoon 120m by 30m in plan capable of storing 2000m<sup>3</sup> of water is also located in the Energy Storage Compound, with therefore a significant margin of water able to be contained onsite (1,500,000 with provision for up to 2,500,000 litres should it be required). Due to the nature of energy storage as a fast paced developing technology the parameters noted above are bound in the design, however should detailed design not require water to be held on-site they would not be built out. Alternatively, the tanks are available in the design if some other form of fire-suppressant is required, e.g. foam.

~~18.3.51~~18.3.58 Water will be infilled into the tanks at a slow rate (20m<sup>3</sup>/day) over many months so that no abstraction licence is needed during the construction period. Should additional water be required an abstraction licence could be applied for.

~~18.3.52~~18.3.59 There is water available on-site for the current farming practices, with approximately 341,000 litres of water usage in 2021. During the construction phase farming practices will no longer take place and abstraction of water will be used for infilling the tanks.

~~18.3.53~~18.3.60 Whilst tanks are provided in the event of a fire, it is understood from the Environment Agency that emergency abstractions from the nearby ditches could also be utilised. All of this is noted as a worse case to bound the design, and detailed design once a technology provider has been chosen is likely to utilise a special fire suppressant as well as early warning systems alerting the operator to thermal runaway. Some technologies also have water supplies built into them.

~~18.3.54~~18.3.61 Fire hydrants are available in the local area, with a possible connection could be extended into the Energy Park Site via the new site access onto the A17 where the current water main runs. Should the detailed design and safety report require a fire hydrant a planning application for one or more hydrants in consultation with Lincolnshire Fire and Rescue Service, will be made prior to commencement as required by the **oESSMP** (document reference 7.11) secured by DCO requirement.

~~18.3.55~~18.3.62 As well as fire suppression systems described above, fire detection systems and suppression systems, will be installed within battery containers. The Proposed Development will include adequate separation (5m) and, if required, firewalls (expected to be built into the energy storage containers) to ensure that an isolated fire would not become widespread and lead to a major incident.

~~18.3.56~~18.3.63 Any system installed will be strenuously tested during the factory and pre-commissioning testing regime before being given the final sign-off to energise. It is worth highlighting that the overwhelming majority of energy storage sites continue to operate without any problems which means that the risk is quite small.

~~18.3.57~~18.3.64 Each battery container will have dedicated temperature control system which is designed to regulate ambient temperatures to within safe operating conditions which in turn minimise thermal runaway and the risk of fire. In addition, off-gas detection systems which can detect the gases given off before a thermal runaway event can be utilised to shut down the malfunctioning cell/rack safely. The sensors used to do this are sensitive down to 1ppm (parts per million).

~~18.3.58~~18.3.65 The approach to fire protection is outlined in the following details:

- The manufacturer undertakes extensive type testing to international standards;
- Comprehensive monitoring and alarm system to oversee condition of battery cells.

- A control system and electrical protection design that disconnects unhealthy equipment or equipment operating abnormally.
- A defence in depth approach to avoiding thermal runaway.
- Adequate spacing between battery containers to minimise propagation of thermal runaway.
- Regular inspection and maintenance regimes
- Protect the installation area from flooding, which may cause electrical fires – the risk of flooding will be assessed as part of **Appendix 9.1: Flood Risk Assessment** (document reference 6.3.9.1) accompanying **Chapter 9: Hydrology, Hydrogeology and Flood Risk and Drainage** (document reference 6.1.9) in the ES, and mitigation measures to protect it from flooding have been recommended which will be developed as part of the detailed design; and
- Ensure that installation areas comply with the appropriate local fire, electrical and building code requirements – this would be the case with the Proposed Development.

~~18.3.59~~18.3.66 Further specific mitigation measures are identified in the **Outline Energy Storage Management Plan** (document reference 7.11). With the above mitigation and the additional measures included within the Outline ESSMP, the risk of fire is minimised. In addition, in the unlikely case that there is a fire, it would be contained and controlled.

~~18.3.60~~18.3.67 Once the system is commissioned, regardless of the technology used, the whole installation will be monitored continuously at a central hub where engineers and technology experts will ensure that it is operating optimally and safely 24 hours a day, 7 days a week.

~~18.3.61~~18.3.68 Additionally, though solar park fires are rare, they are not impossible. High risk areas, such as the inverters are provided with automatic fire suppression system, which can detect and suppress a fire before it spreads. Where fire suppression may not be in place, including at the solar panels this needs to be treated with caution to avoid fire spreading or electrocution to fire fighting personnel. Whereby the panels are still producing electricity this needs to be stopped, for example breaking the circuit or using products to block the sunlight – such as that trialled by London Fire Brigade called PVStop<sup>16</sup>.

~~18.3.62~~18.3.69 The risk of fire is small and therefore not likely to lead to any major accidents or disasters as this has been mitigated by the design of the equipment and the design of the Site. With the above embedded mitigation, **no significant** effects are anticipated, and the risk of fire would be unlikely.

#### *Plume Assessment*

~~18.3.63~~18.3.70 A Plume Assessment Technical Note has been produced and is appended to the **oESSMP** (document reference 7.11) providing preliminary information to inform an emergency response plan by identifying the direction and dispersion of the plume in the event of a fire from the ESS, and assessing the air quality impacts on the local community.

~~18.3.64~~18.3.71 The Proposed Development has been designed following the Rochdale Envelope approach to allow for flexibility as ESS technology is rapidly evolving. A dispersion modelling study has been undertaken in the Plume Assessment Technical

<sup>16</sup> Source: [Brigade trials light blocking solution for solar panel fires | London Fire Brigade \(london-fire.gov.uk\)](https://www.london-fire.gov.uk/news/brigade-trials-light-blocking-solution-for-solar-panel-fires)

Note based on a modular lithium ion (Li-ion) based energy storage system, housed in outdoor cabinets, with an integral battery management system, with cooling, fire suppression and AC to DC inverters.

~~18.3.65~~18.3.72 In the event of a fire, a number of air pollutants can be released. This assessment has modelled hydrogen fluoride emissions due to its high toxicity compared to other releases from battery fires, and because emission rates, albeit limited, are available. However, to note it is not possible to accurately model the impact of air emissions during a potential battery fire as every fire is different. The direction of the plume will depend on the wind direction, and the dispersion would also depend on wind speed and atmospheric turbulence.

~~18.3.66~~18.3.73 The findings of the modelled scenario show there is a low risk of there being an adverse effect on human health due to hydrogen fluoride emissions from the fire for the general public. The highest maximum modelled concentrations anywhere within the modelling domain predicted hydrogen fluoride concentration will not exceed safe limits for construction workers or any nearby residential properties. Therefore, the likely impact on the general public, particular nearby residents is deemed to be low and **not significant**.

~~18.3.67~~18.3.74 The Applicant will update the **oESSMP** (document reference 7.11) and Plume Assessment Technical Note appendix at detailed design stage to reflect the chosen technology, which would be shared with the council(s) and the local fire service for approval prior to construction of the ESS. Technology will only be selected if it shows to produce a plume which is the same or less harmful than the modular lithium ion (Li-ion) based energy storage system technology which has been selected as the concept design and modelled at time of DCO submission.

#### Rail Accidents

~~18.3.68~~18.3.75 The cable route corridor crosses the railway line connecting Grantham to Skegness, known as the 'Poacher line'. Trenchless techniques, such as drilling, will be used to construct the crossing of the cable route; therefore, the works will be undertaken deep below the crossing and a distance either side, not interfering with the operations of the railway. The underground cable crossing will be designed to meet the specific requirements of Network Rail and therefore the risk of a rail accident as a result of the crossing will be minimised. Therefore, **no significant effects** on rail accidents are anticipated.

#### Utilities Failure

~~18.3.69~~18.3.76 A high-pressure gas pipeline (Feeder 7 East Heckington to Gosberton) bisects the Energy Park site running in a north-south direction through the centre of the Energy Park. The design of the Proposed Development has ensured the buffers that the operators have asked to be applied to the design are in place (24.4m easement) including no solar panels in this area. The operators will run their own maintenance programme which will include their own Health and Safety programme and procedures to implement.

~~18.3.70~~18.3.77 Through careful design consideration of the Proposed Development, and operators following implemented site management and Health and Safety procedures, the risk of impact is considered unlikely and **not significant**. Additionally, effects on utilities are predicted unlikely during the operational phase of the Proposed Development because no below-ground works will be required during operation.

#### Criminal Damage



~~18.3.71~~18.3.78 If the Proposed Development were to be damaged through pre-planned criminal activity, the risk of a major accident occurring on site may increase. The design will ensure that the compounds and solar equipment are secure to minimise the potential for damage to occur through criminal activity. Embedded mitigation will include fencing, CCTV cameras and lighting in critical areas. These are described in further detail in **Chapter 4: Proposed Development** (document reference 6.1.4) of this Environmental Statement

~~18.3.72~~18.3.79 There will also be a commissioning phase of testing undertaken prior to the operation phase to ensure that all equipment is operating correctly. There will be 5 permanent operations staff present on site during the day; this will allow faster responses to an intruder security alert or damage than other solar parks in the UK, which are traditionally unmanned. Furthermore, the Proposed Development does not process or include large scale chemicals and criminal damage to the infrastructure is unlikely to lead to a large-scale leak, explosion, or other major event. Therefore, the Proposed Development is expected to have **no significant effect** on the environment due to the risk of a major accident occurring as a result of criminal activity during operation.

### **Mitigation Measures**

~~18.3.73~~18.3.80 Minimising the risk of major accidents during construction and decommissioning will be addressed through appropriate risk assessments as required in the **Outline CEMP** (document reference 7.7) and **Outline DRP** (document reference 7.9). The implementation of those plans will be secured via a requirement in the DCO.

~~18.3.74~~18.3.81 **Outline Energy Storage Safety Management Plan (oESSMP)** (document reference 7.11) has been produced for the Proposed Development and will be updated and maintained as a 'live document' throughout the operational phase of the Proposed Development. This has been produced in consultation with Lincolnshire Fire and Rescue Service. The implementation of the strategy will be secured via a requirement in the DCO.

### **Residual Effects**

~~18.3.75~~18.3.82 Given the nature of accidents and disasters, there is the potential for significant effects if an event does occur, however, the assessment has concluded that the risk of such events occurring is low for the Proposed Development, and no **significant effects** on the environment are therefore anticipated. On the rare occasion that a major accident and disaster does occur, the significance of the effect would correlate to the scale of the major accident and disaster event.

~~18.3.76~~18.3.83 The focus is on prevention of major accidents and disasters, and mitigation if an event does occur. Taking into account the good industry practice and additional mitigation measures discussed above, the risk of accidents and disaster events at the Proposed Development is considered low. However, the assessment has concluded that the risk of such events occurring is low.

### **Cumulative Effects**

~~18.3.77~~18.3.84 The shortlist of cumulative sites for this DCO application are all large-scale infrastructure developments, primarily of solar parks and battery storage applications.

~~18.3.78~~18.3.85 The increase in traffic during construction and decommissioning phases of the Proposed Development is forecast to be within the typical AADT variation travelling on the A17. This in combination with other developments on the

shortlist in close proximity such as the consented Vicarage Drove application (B/21/0443) and Land west of Cowbridge Road application (B/22/0356 and H04-0849-22) is unlikely to affect the risk of road accidents. However, if necessary, this could be managed through a Health and Safety process between the two construction crews for both schemes.

~~18.3.79~~18.3.86 All of the other cumulatively listed developments are not positioned in close proximity to the developable area of the Proposed Development's site to have any notable inter-relationship of effects. Additionally, with embedded mitigation and additional mitigation listed above to reduce the risk of fire, no significant effects are expected from the Proposed Development alone. For these reasons, it is concluded that **no significant cumulative effects** associated with major accidents and disasters would arise from the Proposed Development.

## 18.4 WASTE

18.4.1 This section sets out the approach to waste management that will be applied to the design and the expected waste streams during each phase of the Proposed Development.

18.4.2 'Waste' is defined as materials that are unwanted, having been left over after the completion of a process which would otherwise be discarded. The legal definition of waste also covers substances or objects, which fall outside of the commercial cycle or out of the chain of utility. In particular, most items that are sold or taken off site for recycling are wastes, as they require treatment before they can be resold or reused.

18.4.3 In practical terms, wastes include surplus spoil, scrap, recovered spills, unwanted surplus materials, packaging, office waste, wastewater, broken, worn-out, contaminated or otherwise spoiled plant, equipment and materials.

18.4.4 Waste minimisation is the process of reducing the quantity of such materials arising, requiring processing and/or disposal.

18.4.5 The priority at the Proposed Development will not be producing waste in the first place. To do this, the waste implications of the proposals need to be considered at the earliest possible stage.

### **Policy Context**

#### National Policy Statements

18.4.6 The Overarching National Policy Statement for Energy (EN1) considers Waste Management at 5.14 and the draft Overarching National Policy Statement for Energy (Draft EN1)<sup>17</sup> considers Resource and Waste Management at 5.15.

18.4.7 EN1 notes at 5.14.2, sustainable waste management is to be implemented through the waste hierarchy setting out the priorities that must be applied when managing waste. This is also reflected at 5.15.2 of Draft EN1 and shown below in **Figure 18.1-Waste Hierarchy** (integrated into text).

18.4.8 EN1 notes that the disposal of waste should only be considered where other waste management options are not available or where it is the best overall environmental outcome.

18.4.9 Draft EN1 notes where possible applicants are encouraged to source materials from recycled or reused sources and use low carbon materials, sustainable sources and local suppliers. Furthermore, applicants are encouraged to use construction best practices in relation to storing materials to prevent waste. The use of Building Information Management tools to record the materials used on construction can help to reduce waste during the decommissioning phase.

18.4.10 EN1 notes, the applicant should set out the arrangements that are proposed for managing any waste produced and prepare a Site Waste Management Plan. The arrangements described and Management Plan should include information on the proposed waste recovery and disposal system for all waste generated by the development, and an assessment of the impact of the waste arising from development on the capacity of waste management facilities to deal with other waste arising in the area for at least five

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<sup>17</sup> Department of Energy & Climate Change, (2023~~1~~); Draft Overarching National Policy Statement for Energy (EN-1).

years of operation. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that this is the best overall environmental outcome.

#### Legislation

18.4.11 The Waste Framework Directive (WFD) 2008/98/EC<sup>18</sup> is the legislative framework for the collection, transport, recovery and disposal of waste across the European community. The revised Directive (2018)<sup>19</sup> introduces new provisions in order to boost waste prevention and recycling through the adoption of the 'Waste Hierarchy', as the guiding principle to sustainable waste management.

18.4.12 In addition, Schedule 1 of the Waste (England and Wales) Regulations 2011 (as amended 2014)<sup>20</sup> translates the provisions of the Waste Framework Directive into legislation and require waste prevention programmes and waste management plans that apply the 'Waste Hierarchy'.

18.4.13 The Waste Management Plan for England (2021)<sup>21</sup> is a high-level strategy that supports the implementation of the objectives and provisions set out within the revised Waste Framework Directive, specifically Article 28 which requires that Member States must establish one or more waste management plans covering their territory.

18.4.14 The Waste (England and Wales) 2011 Regulations (as amended 2014) require that everyone involved in waste shall take all reasonable measures to apply the waste hierarchy except where, for specific waste streams, departing from the hierarchy is justified.

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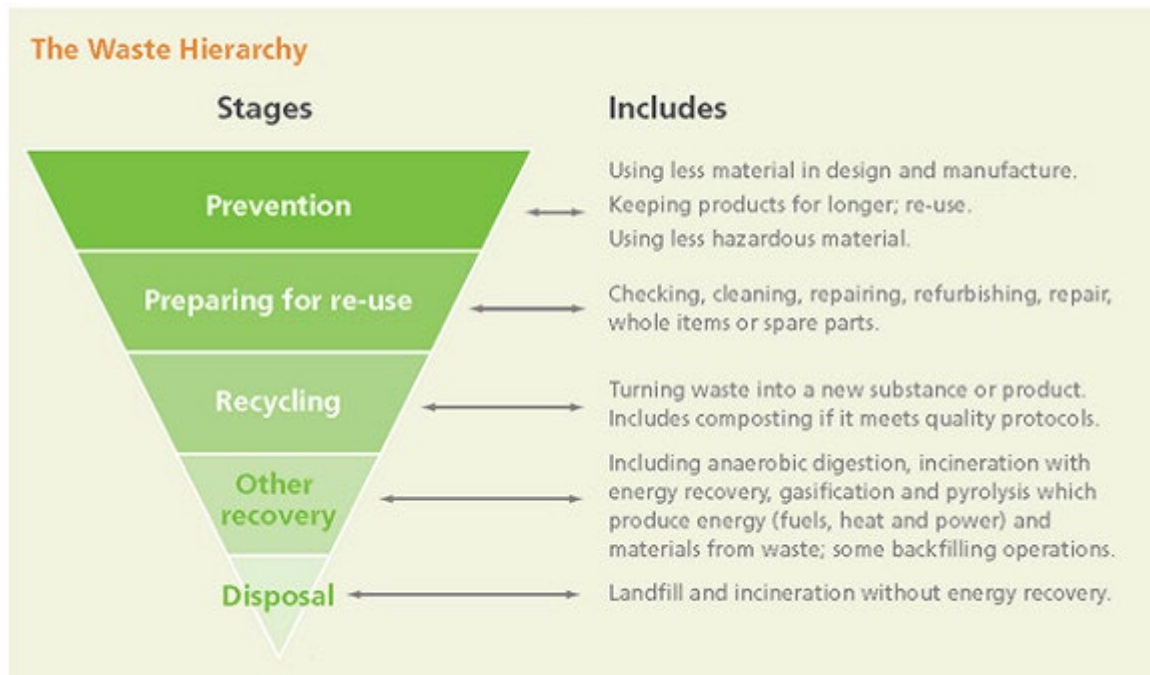
<sup>18</sup> Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and repealing certain Directives (Waste Framework Directive).

<sup>19</sup> Directive 2018/851/EC of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Waste Framework Directive).

<sup>20</sup> HMSO (2011) The Waste (England and Wales) Regulations 2011. (as amended by The Waste (England and Wales) (Amendment) Regulations 2014).

<sup>21</sup> Department for Environment, Food & Rural Affairs, (2021); Waste Management Plan for England, 2021.

Figure 18.1- Waste Hierarchy



18.4.15 The Waste Hierarchy will be adopted throughout the construction, operation and decommissioning phases of the Proposed Development, and the producers and holder of waste will be required pursuant to the Waste (England and Wales) Regulations 2011 (as amended 2014), and formally under Section 34 of the Environmental Protection Act (1990)<sup>22</sup> to:

- a. Prevent illegal disposal, treatment or storage of waste;
- b. Handle their waste safely;
- c. Know whether the waste is hazardous or non-hazardous;
- d. Store waste securely in a manner that prevents release of the waste;
- e. Provide an accurate written description of the waste in order to facilitate the compliance of others with the Duty and avoidance of the offences under Section 33 of the Environmental Protection Act 1990: via a compulsory system of Controlled Waste Transfer Notes (WTNs) which controls the transfer of waste between parties; and
- f. Ensure anyone dealing with their waste has the necessary authorisation.

18.4.16 The Hazardous Waste Regulations (England and Wales) 2005 (amended in 2016)<sup>23</sup> places a requirement on producer of the waste to:

- a. Classify the waste;
- b. Separate hazardous waste from other general waste streams;

<sup>22</sup> HMSO (1990) Environmental Protection Act 1990.

<sup>23</sup> HMSO (2016) The Hazardous Waste (England and Wales) (Amendment) Regulations 2016.

- c. Use authorised businesses to collect, recycle or dispose of your waste; and
- d. Complete relevant hazardous waste consignment note.

18.4.17 Under the Control of Pollution (Amendment) Act 1989<sup>24</sup> it is a criminal offence for anyone not registered as a carrier, to transport Controlled Waste

**Assessment Methodology**

18.4.18 Waste streams and quantities have been estimated using industry standards, based on activities, material requirements and staff requirements during the construction, operation, and decommissioning phases. This is considered in relation to the waste hierarchy minimising, reducing and re-use of waste as appropriate.

18.4.19 A Site Waste Management Plan (SWMP) will be agreed with the relevant local authorities as part of the final CEMP prior to the commencement of construction. This is detailed in the **oCEMP** (document reference 7.7), secured via a Requirement in the DCO.

**Consultation**

18.4.20 A summary of consultation prior to issue of the Preliminary Environmental Assessment Report (PEIR) in June 2022, outlines matters raised within the Scoping Opinion and how these have been addressed through the ES in relation to Miscellaneous Issues.

**Table 18.4: Summary of Scoping Opinion Responses (Waste)**

<b>Consultee</b>	<b>Details of Consultee response</b>	<b>How is matter addressed</b>	<b>Location of response</b>
<b>Waste</b>			
<b>PINS (Scoping Opinion)</b>	The ES should consider whether regional scale likely significant effects could occur with other large scale solar projects e.g. arising from changes in land use and disposal of waste.	Cumulative and in-combination effects are addressed for Waste in this Chapter in respect of the Proposed Development and other shortlisted schemes.	Section 18.4 of this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)
	The ES should address the likely significant effects from waste at decommissioning to the extent possible at this time, including consideration of any measures to ensure that component waste will avoid entering the waste chain. This should also include waste likely to be	Decommissioning phase of this Chapter addresses how the individual infrastructure components will enter various likely waste streams, with where possible following the Waste Hierarchy values. The replacement rates of key	Section 18.4 of this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)  <b>Chapter 13: Climate Change</b> (document 6.1.13) also details and assessed the replacement of product components.

<sup>24</sup> HMSO (1989) Control of Pollution (Amendment) Act 1989.

Consultee	Details of Consultee response	How is matter addressed	Location of response
	generated from replacing components.	components are assessed.	
	The ES should include an assessment of the likely impact of component replacement (e.g. batteries and panels) and outline what measures, if any, are in place to ensure that these components are able to be diverted from the waste chain.	Decommissioning phase of this Chapter addresses how the individual infrastructure components will enter various likely waste streams, with where possible following the Waste Hierarchy values.  The replacement rates of key components are assessed.	Section 18.4 of this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)  <b>Chapter 13: Climate Change</b> (document 6.1.13) also details and assessed the replacement of product components.
	The ES should assess the likely significant effects from waste at decommissioning to the extent possible at this time. The Scoping Report states that a Decommissioning Plan will be agreed with the Local Planning Authority. The Inspectorate would expect to see this secured through the inclusion of an Outline Decommissioning Plan or similar with the Application.	An Outline Decommissioning and Restoration Plan accompanied this DCO application, and a final DRP is secured by Requirement 18 of the DCO.	<b>Outline Decommissioning and Restoration Plan</b> (document reference 7.9)
	The ES should clearly set out how decommissioning is to be assessed and any components which may remain following decommissioning.	Section included in this Chapter on Decommissioning of Waste and details any infrastructure that will remain following decommissioning.	Section 18.4 of this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)

18.4.21 No further relevant comments were raised relating to waste following statutory consultation of the PEIR.

**Baseline Conditions**

18.4.22 Waste at the Proposed Development's site area is currently associated with agricultural practice. Potential waste streams currently could include left over crop and straw bales, fertiliser sacks and chemical containers.

18.4.23 The plastic waste associated with the Proposed Development's site area is currently sent to Lindum Waste Recycling Centre (c.39km north-west) for baling. Approximately 2.5 tonnes of plastic waste are removed from the Proposed Development's site area annually.

18.4.24 The additional straw bales are sold to a third-party trader and are likely to be used as 'energy from waste' burned at biomass power stations.

18.4.25 The commercial nature of the waste to be produced during both construction, operation and decommissioning of the Proposed Development will mean it will be managed by appropriately permitted carriers and facilities in line with the appropriate environmental permits and requirements. The waste carriers and landfill sites used for the Proposed Development will be determined by the contractor pre-construction.

18.4.26 An **Outline CEMP** (document reference 7.7) and **Outline DRP** (document reference 7.9) of this Environmental Statement include measures to control and manage waste on-site. These will be secured through respective DCO requirements.

**Assessment of Potential Effects**

18.4.27 The nature of the Proposed Development and the known construction processes indicate no significant quantities of waste are anticipated.

**Construction Phase**

18.4.28 Waste materials can be generated during the site preparation stage of construction and during the installation of infrastructure and erection of buildings.

18.4.29 The majority of construction equipment will be delivered to the Proposed Development for assembly and installation (mounting structures) and connection (solar panels).

18.4.30 Exact quantities and types of waste likely to be generated during the construction phase are unknown, however it is expected that waste streams could include:

- Welfare facility waste;
- Waste chemicals, fuels and oils;
- Waste metals (iron and steel);
- Waste water from dewatering of excavations;
- Waste water from cleaning activities (e.g., wheel wash);
- Packaging; and
- General construction waste (paper, cardboard, wood, etc.).

18.4.31 Destinations of the above waste streams would be, where applicable, through recycling plants, landfill sites for construction and demolition waste and landfill for hazardous waste.

18.4.32 The generation of construction-related waste can be significantly reduced through the choice of materials and other opportunities pre-construction phase will be explored as



far as possible. Possibilities to reuse or recycle materials will be explored before resorting to landfill options.

18.4.33 Construction operations will also generate waste materials as a result of general handling losses and surpluses and these wastes can be mitigated through good site practices, including proper storage and handling of materials to avoid damage, and accurate quantity estimates and efficient purchasing arrangements to avoid over ordering.

18.4.34 Design considerations will seek to minimise wastage from the construction phase and are likely to follow these approaches:

- Maximise the use of reclaimed materials in the construction;
- Maximise recycling opportunities in the decommissioning phase (further details below);
- Use prefabricated and standardised components in the standard product sizes (e.g., panels, mounting structures). As these are made in factory-controlled environment, they tend to generate less waste and if standard product sizes are made use of, this minimises wastage on site.
- Segregation of construction waste on site to maximise potential for reuse/recycling;
- Use of suppliers who collect and reuse/recycle packaging materials;
- The off-site separation and recycling of materials where on-site separation is not possible; and
- Training of contractors in waste minimisation and materials reuse.

18.4.35 Toxic and / or hazardous waste must be treated by an authorised operator. Transportation of hazardous waste will also require an authorised carrier. Materials are to be dealt with in accordance with **Outline CEMP** (document reference 7.7) which will be secured through a DCO requirement. With these in place and the appropriate control measures followed, no effects are anticipated.

18.4.36 Re-usable waste includes soil excavated for trenches, roads, compound areas and foundations. Soils are an important resource, and to minimise effects to this resource, engineers must carry out precise take off calculations. To avoid wastage, with reference to DEFRA's Soil Strategy (2009), stripped soils will be stored in separate resource bunds no more than 3m high, and kept grassed free from construction traffic, to ensure that the soil can be re-used elsewhere on site.

18.4.37 The primary measures to mitigate against the loss of soil resources will be to reuse as much of the surplus resources on-site and to dispose of any surplus soils thereafter in a sustainable manner (i.e., as close to the Proposed Development as possible and to an after-use appropriate to the soil's quality). However, surplus resources requiring removal off site are not expected.

18.4.38 There may be a need to remove some soils from the Order limits for treatment or disposal, if found to be contaminated and if it is not practical to treat this onsite. This would be overseen by a soil advisor specialist as outlined in the Outline Soil Management Plan appended to the **oCEMP** (document reference 7.7). Toxic and / or hazardous waste must be treated by an authorised operator. Transportation of hazardous waste will also require an authorised carrier. Materials are to be dealt with in accordance with **Outline CEMP** (document reference 7.7). With these in place and the appropriate control measures followed, **no significant effects** are anticipated.

18.4.39 The Applicant and its contractors are aware of their duty of care in respect of offsite waste transfers and ensuring that all waste is transferred to authorised hauliers

and disposal/treatment sites. All waste transported off site will be delivered to the appropriately licensed receivers of such materials. Operators receiving any waste materials resulting from the Proposed Development will be subject to their own consenting procedures.

18.4.40 The number of vehicles associated with the removal of waste material associated with construction considered within **Chapter 14: Transport and Access** (document reference 6.1.14) of this Environmental Statement.

#### Operational Phase

18.4.41 During the operational phase of the Proposed Development waste arising is expected to be substantially less than during the construction phase.

18.4.42 It is estimated there will be up to 5 permanent staff, and due to the scale of the Proposed Development maintenance personnel would be expected to be present on-site most days. Waste streams arising are expected to be minimal, and would include:

- Welfare facility waste;
- Equipment needing replacing;
- Waste metals; and
- General waste (paper, cardboard, wood, etc.).

18.4.43 Should equipment fail and need replacement, it is anticipated that the part would be returned to the manufacturer if still under warranty for refurbishment if possible or recycled if facilities allow. Like all electrical equipment producers have legal obligations under the Waste Electrical and Electronic Equipment Directive legislation.

18.4.44 During the operational phase the industry benchmark for key solar farm components include:

- Solar panels- 0.2% per year replacement rate;
- Solar inverters- 4.4% per year replacement rate;
- Energy storage inverters- 3.1% per year replacement rate; and
- Cable- 0.1% per year replacement rate.

18.4.45 If solar panels are needed to be replaced, they contain aluminium which can be recycled, and the remaining glass and silicon mix can be ground up into other building materials and industrial applications. Information obtained from GreenMatch noted 96% of materials can be reused for produced new solar panels<sup>25</sup>. The electrical infrastructure, should it need replacing is also likely to be taken apart and recycled.

18.4.46 The operational phase effects associated with waste are anticipated to be **not significant** with waste generated during operation assessed that it will be adequately managed.

#### Decommissioning Phase

18.4.47 During the decommissioning phase it is expected that a number of waste streams will be created. They are likely to include the following:

- Solar panels and mounting structures;
- Waste materials from foundations;

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<sup>25</sup> GreenMatch, The Opportunities of Solar Panel Recycling. Source:

<https://www.greenmatch.co.uk/blog/2017/10/the-opportunities-of-solar-panel-recycling> Accessed June 2022

- Electrical equipment;
- Energy Storage System i.e., batteries;
- Cables;
- Welfare facility waste;
- Waste chemicals, fuels and oils;
- Waste metals;
- Waste water from dewatering of excavations; and
- Wastewater from cleaning activities (e.g., wheel wash).

18.4.48 As the primary purpose of the Proposed Development is to convert solar radiation into electricity and export the electricity to the national grid, no hazardous waste will have been created on the site when the lifetime of the Proposed Development ends (resulting in no requirement for an environmental remediation strategy).

18.4.49 The photovoltaic modules will be recycled or reused, where possible. With regards to the supporting structures, the structures will be unscrewed/unbolted, and then removed from the ground using a piling machine. Once the supporting structures have been removed, they will either be re-used or recycled, where possible. Only a small amount of backfilling will be required to fill the holes of the supporting structures.

18.4.50 Other associated infrastructure, such as the inverters will be removed from their concrete foundations and will be transported via HGVs off site. The equipment will either be re-used or recycled, where possible.

18.4.51 When removing the substation infrastructure, such as transformers, they will be loaded onto an abnormal indivisible load vehicle (AILs) and removed from site in much the same way as it was delivered to site. The area will be returned to its former condition and the transformers are likely to be refurbished and re-used on another site or taken to a recycling facility.

18.4.52 The inverter platforms and concrete foundations will be broken up and removed off site. The crushed foundations will be provided to a licensed waste transfer station for appropriate disposal or solar as recycled aggregate. Any uneven ground will be reinstated to its former condition.

18.4.53 The customer switchgear containers do not have foundations and, therefore, will simply be transported off site. The containers will be re-used or recycled, where possible.

18.4.54 All tracks will be restored to the previous condition. The aggregate used for the internal tracks will be recovered, loaded onto HGVs and transported off site for re-use at another site or to a recycling facility.

18.4.55 Underground cables will be disconnected from the local electricity network to be capped off and left *in situ*. The 400Kv underground cable leaving the Onsite Substation and running to National Grid Bicker Fen Substation will be left buried as it will be below 1m underground.

18.4.56 The Applicant is dedicated to ensuring that, where possible, as much of the equipment proposed is either re-used or recycled. As such, the quantum of non-recyclable waste will be limited.

18.4.57 Recycling of all materials after end use will include panels (which are covered by the Waste Electrical and Electronic Equipment Directive), screws, mounting frames and

wiring. Any non-recyclable waste will be stored in a skip for regular removal to an appropriate landfill.

18.4.58 Restoring the site will involve some minor ground works. Any residual soil which cannot be accommodated on site, will be removed and disposed of at an appropriate landfill or sold to a landowner needing additional soil. However, this is not expected to be required due to the size of the Site.

18.4.59 All waste transported off site will be delivered to the appropriately licenced receivers of such materials. Operators receiving any waste materials resulting from the Proposed Development will be subject to their own consenting procedures. It is worth noting that it is not possible to forecast the capacity of the landfill sites for decommissioning at this stage due to potential change in waste generation and operators at that time.

18.4.60 Waste during the decommissioning phase will be dealt with as part of **Outline DRP** (document reference 7.9) and in line with relevant legislation and guidance at that time. Therefore, the effect is anticipated to be **not significant**.

### **Mitigation Measures**

18.4.61 As part of the embedded mitigation, a CEMP and DRP will be secured through respective DCO requirements and will be applicable for the commencement of construction; similar measures will then be included in a decommissioning scheme.

18.4.62 Waste streams will be prevented from arising and designed out where possible. Opportunities to re-use material resources will be sought where practicable. Where re-use and prevention are not possible, waste arising will be managed in line with the Waste Hierarchy.

### **Residual Effects**

18.4.63 During construction, operation, and decommissioning, the re-use or recycling of materials will be explored before resorting to landfill options. Waste during the construction, operation and decommissioning phase will be dealt with as part of a CEMP and DRP, which will be prepared in line with relevant legislation and guidance. Therefore, it is anticipated that there would be **no significant effects** on waste from the Proposed Development.

### **Cumulative Effects**

18.4.64 There are a number of potential schemes within the region that, depending on construction dates and if all are granted for approval, may have cumulative effects with the Proposed Development.

18.4.65 The shortlist of cumulative sites for this Proposed Development to be assessed against, when considering waste, are primarily solar parks and battery storage schemes, and therefore there may be cumulative volumes of waste associated with solar generation and decommissioning. This could create pressure on the capacity of local recycling plants or landfill sites.

18.4.66 Since 2010, there has been an increasing number of solar farms planning applications across the UK, with the majority granted approval. Therefore, there is a new industry emerging for recycling solar panels, and the resale of any operational phases, with this sector likely to continue grow. These waste streams would be explored during the decommissioning phase. It is unlikely, that on the assumption that all shortlisted

cumulative solar and battery storage schemes are granted approval, that waste would not be adequately managed, and therefore it is anticipated there will be **no significant cumulative effects**.

18.4.67 Management of the potential cumulative volumes of waste would be secured through the CEMP and DRP. Consultation with waste providers would be undertaken to ensure waste can be accommodated.

18.4.68 Additionally, cumulative effects may occur from increased HGVs transporting waste to recycling plants and landfill. This is assessed in **Chapter 14: Transport and Access** (document reference 6.1.14) of the Environmental Statement.

## 18.5 ELECTRIC, MAGNETIC AND ELECTROMAGNETIC FIELDS

18.5.1 This section sets out the approach to the potential of electric, magnetic and electro-magnetic fields (EMFs) produced by the Proposed Development.

18.5.2 EMF is produced both naturally and as a result of certain human activities. The earth has a magnetic field produced by currents deep inside the core of the planet; the earth is also subject to electric fields produced by electrical activity in the atmosphere such as thunderstorms.

18.5.3 EMFs are inevitable wherever electricity is produced, distributed, and used, including electrical substations, power lines and electric cables and around domestic, office or industrial equipment that uses electricity.

18.5.4 Electric fields are produced by voltage. Voltage is the pressure behind the flow of electricity. Electricity inside UK homes is at 230 volts (V) whereas electrical distribution systems in the UK utilise much higher voltages generally from 11,000 to 400,000 volts (11kV to 400kV). The higher the voltage the greater the electric field, which is measured in volts per metre (V/m). Fences, shrubs and buildings can block electric fields.

18.5.5 Magnetic fields are produced by the flow of electric current; however most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source. Magnetic fields depend on the electrical currents flowing and are not significantly limited by most common materials. Typically, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line but can be higher at small distances from the cable.

### **Policy Context**

18.5.6 There is no direct statutory provision in the planning system relating to protection from EMFs.

18.5.7 However, the National Policy Statement for Electricity Networks Infrastructure (EN-5)<sup>26</sup> requires the applicant to consider the following aspects, with regard to Electric and Magnetic Fields:

- Compliance with Electricity Safety Quality & Continuity Regulations 2002<sup>27</sup> (ESQCR);
- Health Protection Agency (HPA) guidance<sup>28</sup>; and
- Optimal phasing of high voltage overhead power lines is introduced wherever possible and practicable in accordance with the Voluntary Code of Practice<sup>29</sup> to minimise effects of EMFs. The Voluntary Code of Practice is used to show compliance with guideline public exposure limits for NSIPs in England and Wales.

18.5.8 Section 2.10 of NPS EN-5 acknowledges that all overhead lines produce both electric fields and magnetic fields. The fields will be highest directly under the conductors and will reduce dramatically as the distance from the line increases. The electric fields

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<sup>26</sup> Department of Energy and Climate Change (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5)

<sup>27</sup> HMSO (2002) Electricity Safety, Quality and Continuity Regulations 2002

<sup>28</sup> HPA (2009) Application of ICNIRP Exposure Guidelines for 50 Hz Power Frequency Fields

<sup>29</sup> Department of Energy and Climate Change (2012). DECC Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice 2012.

produced by overhead lines are also attenuated significantly by structures such as fences, walls, trees and hedges. As recognised by EN-5, putting cables underground eliminates the electric field but underground cables can still produce magnetic fields. Again, the magnetic fields produced by underground cables drop rapidly as the distance from the cable increases.

18.5.9 The Electricity at Work Regulations 1989<sup>30</sup> place duties on employers and employees with respect to health and safety when working on or with electrical equipment and particularly those involved in the design, construction, operation or maintenance of electrical systems and equipment.

18.5.10 The Electricity Safety, Quality and Continuity Regulations (SI 2665/2002) and subsequent amendments (SI 1521/2006 and SI 639/2009)<sup>31</sup> specify certain requirements for electrical infrastructure and equipment, including overhead lines and underground cables, intended for the safety and protection of workers and safeguarding of the general public from danger.

18.5.11 There are no statutory regulations in the UK that limit the exposure of the general public to power-frequency electric or magnetic fields, responsibility for implementing appropriate measures for the protection of the public from EMF lies with the UK Government.

18.5.12 In 2004, the Government adopted guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)<sup>32</sup> in line with the terms of the 1999 EU Council recommendation on limiting public exposure to EMF. These guidelines were transposed into the HPA guidance<sup>33</sup>. The criteria establish acceptable limits for exposure of the public to EMF that adopt a precautionary approach taking into account various scenarios and potentially more vulnerable groups (such as infants).

18.5.13 Guidance documents on EMF exposure and appropriate design of electrical infrastructure, including:

- Power Lines: Demonstrating compliance with EMF public exposure guidelines – a Voluntary Code of Practice (2012).
- Power Lines: Control of microshocks and other indirect effects of public exposure to electric fields - a Voluntary Code of Practice (2013)<sup>34</sup>.

18.5.14 The Voluntary Code of Practice (2012) guidance states that **'overhead power lines at voltages up to and including 132 kV, underground cables at voltages up to and including 132 kV and substations at and beyond the publicly accessible perimeter'** are not capable of exceeding the ICNIRP exposure guidelines and therefore no assessment is required for these and other types of infrastructure listed on the Energy Networks Association website.

18.5.15 National Grid guidance<sup>35</sup> states that, **"Underground cables, whether directly buried or in a tunnel, produce no external electric field."**

<sup>30</sup> HMSO (1989) Electricity at Work Regulations 1989

<sup>31</sup> HMSO (2002) Electricity Safety, Quality and Continuity Regulations (SI 2665/2002) and subsequent amendments (SI 1521/2006 and SI 639/2009)

<sup>32</sup> ICNIRP (1998) ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz).

<sup>33</sup> HPA (2009) Application of ICNIRP Exposure Guidelines for 50 Hz Power Frequency Fields

<sup>34</sup> Department of Energy and Climate Change (2013) Power Lines: Control of microshocks and other indirect effects of public exposure to electric fields - a Voluntary Code of Practice, 2013.

<sup>35</sup> National Grid Website (EMFs.info) (2018), Underground Power Cables.

18.5.16 Therefore electric fields are not considered further in this assessment. Magnetic fields for the underground 400kV cabling system will be considered further in this assessment.

**Consultation**

18.5.17 A summary of consultation prior to issue of the Preliminary Environmental Assessment Report (PEIR) in June 2022, outlines matters raised within the Scoping Opinion and how these have been addressed through the ES in relation to Miscellaneous Issues.

**Table 18.5: Summary of Scoping Opinion Responses (electric, magnetic and electro-magnetic fields)**

Consultee	Details of Consultee response	How is matter addressed	Location of response
<b>Electric, Magnetic and Electromagnetic Fields</b>			
<b>PINS (Scoping Opinion)</b>	The voltage of underground export cables between the onsite substation and the existing National Grid Bicker Fen substation is likely be 400kV. In line with relevant guidance (DECC Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice 2012), cables above 132kV have potential to cause electro-magnetic field (EMF) effects. The Inspectorate considers that the ES should demonstrate the design measures taken to avoid the potential for EMF effects on receptors.	No significant EMF effects are expected to arise from the Proposed Development, and therefore there is no standalone ES Chapter. Vulnerability to EMF is discussed in this Chapter.	EMF section in this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)

18.5.18 In addition, **Table 18.6**, outlines a summary of Section 42 consultation responses since the PEIR.

**Table 18.6: Summary of Section 42 Consultation Responses since PEIR (electric, magnetic and electro-magnetic fields)**

Consultee	Details of Consultee response	How is matter addressed	Location of response
<b>Electric, Magnetic and Electromagnetic Fields</b>			
<b>North Kesteven</b>	EMF impacts are not anticipated within the energy park site itself,	Students at Build-A-Future East Heckington based	EMF section in this <b>Chapter 18: Miscellaneous</b>



<p><b>District Council</b></p>	<p>for the absolute avoidance of doubt it is advised to check, confirm and rule out that none of the pupils at Elm Grange School have any hypersensitivity to EMF which requires further consideration.</p>	<p>at Elm Grange are likely to include those diagnosed with Autism Spectrum Disorder and hypersensitivity. The ICNIRP exposure guidelines to EMF's take into account vulnerable groups. The infrastructure components for the Proposed Development will not exceed public/occupational exposure guidelines and therefore students at Build-A-Future East Heckington are not anticipated to be significantly affected. Consultation with Build-A-Future East Heckington has been ongoing and they have raised no concerns with the Proposed Development.</p>	<p><b>Issues</b> (document reference 6.1.18)</p>
<p><b>UK Health Security Agency</b></p>	<p>We have considered the submitted documentation in section 18.5 of the PEIR. We are satisfied that the applicant is aware of the EMF guidance and that this should be taken into account in the approach taken and the conclusions drawn. We wish to make no further comment at this time.</p>	<p>The 'Assessment Methodology' in this Section details the guidance EMF used and applied to inform the 'Assessment of Potential Effects' section.</p>	<p>EMF section in this <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)</p>

**Assessment Methodology**

18.5.19 The scope of the assessment of EMFs is limited to consideration of any cables associated with the Proposed Development which exceed 132kV. The only part of the Development to exceed this voltage is the underground export cable between the

Proposed Development 400kV Substation and the existing National Grid Bicker Fen Substation which will be an underground 400kV cable system.

18.5.20 The ICNIRP 'reference levels' for the public are:

- 100 microteslas ( $\mu\text{T}$ ) for magnetic fields; and
- 5 kilovolts (kV) per metre for electric fields.

18.5.21 The occupational limits are double for electric fields and five times higher for magnetic fields:

- 500 microteslas ( $\mu\text{T}$ ) for magnetic fields; and
- 10 kilovolts (kV) per metre for electric fields.

18.5.22 If people are not exposed to field strengths above these levels, direct effects on the central nervous system would be avoided and indirect effects such as the risk of painful spark discharge will be small. The reference levels are not in themselves limits but provide guidance for assessing compliance with the basic restrictions and reducing the risk of indirect effects.

18.5.23 This ICNIRP guidelines outlines an assessment methodology as a structured approach below:

- Stage 1 – comparison of external fields to ICNIRP reference levels;
- Stage 2 – if stage 1 identifies that an exceedance is above the reference levels, the results of the evaluation should be compared with the values of external fields required to produce the basic restrictions in the body; and
- Stage 3 - to demonstrate compliance with basic restrictions, a detailed assessment should be carried out taking into account factors that represent the actual exposure conditions.

18.5.24 Following each stage of evaluation, if the results of the assessments are at or below the reference values, then compliance with the basic restrictions can be assumed.

18.5.25 Magnetic fields are not simply added together where they may be generated by separate sources and are typically dominated by the biggest source<sup>36</sup>, therefore it is appropriate to consider the magnetic field generated by the 400 kV cable system in isolation in areas where a magnetic field may be present from multiple sources. This is the approach taken in this assessment.

### **Baseline Conditions**

18.5.26 A proposed connection point for the underground 400 kV cable system will be to the existing National Grid Bicker Fen Substation approximately 8.5km south of the Proposed Development, which connects to the existing 400 kV overhead transmission network. This infrastructure has the potential to generate EMFs as it includes equipment of greater than 132kV.

18.5.27 The underground 400 kV cable system will be located predominately on private land that is not publicly accessible (although will be located in part crossing roads and railway underground). The public and occupational exposure reference levels have been used in this assessment to ensure that there are no adverse effects on the closest publicly accessible areas and residential areas.

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<sup>36</sup> National Grid Website (EMFs.info) (2018), Adding fields together.

**Assessment of Potential Effects**

Construction and Decommissioning Phase

18.5.28 Effects during the construction phases of the Proposed Development are scoped out of the assessment as the cables will not produce any significant EMFs until the Proposed Development is generating electricity when it is operational.

18.5.29 During the decommissioning phase, the 400 kV underground cable will be disconnected from the local electricity network to be capped off and left *in situ*, buried underground. The underground cable once disconnected will not produce any significant EMFs and is scoped out of the assessment, and therefore **no significant effects** are anticipated.

Operational Phase

18.5.30 An underground high voltage 400 kV cable system, buried underground, will be installed to connect the Proposed Development substation with the existing National Grid Bicker Fen Substation. The 400 kV cable system is described in **Chapter 4: Proposed Development** (document reference 6.1.4).

18.5.31 The highest EMFs produced by underground cables are located directly above the buried cables, and field strength decreases with distance from the source.

18.5.32 National Grid gives examples of magnetic fields for underground cables calculated at 1m above ground level<sup>37</sup>, as seen in **Table 18.7**

**Table 18.7: Magnetic Fields for direct buried underground cables at 1m above ground level**

Voltage	Specifics	Location	Load	Magnetic Field in $\mu\text{T}$ at Distance from Centreline			
				0m	5m	10m	20m
400kV	Direct Buried	0.5m spacing, 0.9m depth	Maximum	96.17	13.05	3.58	0.92
			Typical	24.06	3.26	0.90	0.23

18.5.33 The ICNIRP guidelines for occupational exposure are 500  $\mu\text{T}$  and for public exposure 100  $\mu\text{T}$ . **Table 18.7** demonstrates that even directly above the cable under maximum load, neither the occupational nor public limits will be breached in regard to magnetic field exposure.

18.5.34 Underground cables do not produce any external electric fields and there will therefore be **no significant effects**.

18.5.35 The cable route will be located within a swathe 25m wide to ensure flexibility within the design and allow micro siting to allow for ground conditions and other environmental constraints. The exact position of the cable route will be confirmed at the detailed design stage. The nearest residential receptor is located approximately 80m from the likely route of the underground cable. Due to the magnitude of effect upon the receptors, in accordance with ICNIRP exposure limit values, EMFs will have no effect on local residents or the local educational facility, Build-A-Future East Heckington based at Elm Grange, and therefore the effect is not significant in terms of the EIA Regulations.

<sup>37</sup> National Grid Website (EMFs.info) (2018), A guide to the debate on electric and magnetic fields and health.

### **Mitigation Measures**

18.5.36 The requirement to consider EMF exposure guidance is fully understood by the Applicant and has been factored into the consideration of the route alignment from an early stage.

18.5.37 The final route alignment within the 25m wide swathe and design of the electrical infrastructure at the detailed design stage will consider the measures required to ensure compliance with the Electricity Safety, Quality and Continuity Regulations 2002 (as amended), and any new advice that may emerge from the Department of Health relating to Government policy for EMF exposure guidelines.

18.5.38 It has been shown that the relevant electrical infrastructure will comply with the current public exposure guidelines, and so no further mitigation is necessary.

### **Residual Effects**

18.5.39 During the construction and decommissioning phase no significant EMF effects are anticipated until the Proposed Development is operational and generating electricity. EMF's, specific to the 400 kV underground cable route as the only relevant infrastructure to be assessed, is demonstrated through the assessment work not to produce EMF exposure above public and occupational guidelines. Therefore, it is anticipated that there would be **no significant residual effect** on EMF from the Proposed Development.

### **Cumulative Effects**

18.5.40 The shortlist of cumulative sites for this DCO application are all large-scale infrastructure developments, primarily of solar farms and battery storage applications. Some of the shortlisted solar cumulative sites may also be connecting into National Grid Bicker Fen Substation with underground cabling, however these solar schemes are less than 50MW, with any potential underground cabling to National Grid Bicker Fen Substation voltages below 132 kV.

18.5.41 As set out in the Assessment Methodology, magnetic fields are not added together where they may be present from multiple sources, therefore there will be **no significant cumulative effects** with other developments.

**18.6 TELECOMMUNICATIONS, TELEVISION RECEPTION AND UTILITIES**

18.6.1 This section evaluates the effects of the Proposed Development on telecommunication infrastructure, television reception and existing utilities.

18.6.2 The Proposed Development has the potential to affect the existing telecommunications and utility infrastructure below ground.

**Policy Context**

18.6.3 Effects relating to existing infrastructure are not environmental effects and there is no requirement to include an assessment of these effects under the EIA Regulations. However, given the nature of the Proposed Development, they have the potential to affect existing infrastructure above and below ground.

**Consultation**

18.6.4 A summary of consultation prior to issue of the Preliminary Environmental Assessment Report (PEIR) in June 2022, outlines matters raised within the Scoping Opinion and how these have been addressed through the ES in relation to Miscellaneous Issues.

**Table 18.8: Summary of Scoping Opinion Responses (telecommunication infrastructure, television reception and existing utilities)**

Consultee	Details of Consultee response	How is matter addressed	Location of response
<b>Telecommunications, Television Reception and Utilities</b>			
<b>PINS (Scoping Opinion)</b>	The ES should explain the findings of the desk-based study and any required mitigation measures but is otherwise content to scope this matter out.	Findings of the desk-based study and any required mitigation presented in this chapter.	No standalone PEIR chapter, but section included within <b>Chapter 18: Miscellaneous Issues</b> (document reference 6.1.18)

18.6.5 In addition, **Table 18.9**, outlines a summary of Section 42 consultation responses since the PEIR.

**Table 18.9: Summary of Section 42 Consultation Responses since PEIR (telecommunication infrastructure, television reception and existing utilities)**

Consultee	Details of Consultee response	How is matter addressed	Location of response
<b>Electric, Magnetic and Electromagnetic Fields</b>			
<b>National Grid Electricity Transmission (NGET)</b>	Guidelines on electricity infrastructure has been provided by National Grid.  Ground levels above our cables must not be altered in any way.	The design team have taken utility constraints into account when preparing design layouts. Separate consultation has been undertaken with National Grid, including engagement on	Details of the iterative design process and the Proposed Development components are in <b>Chapter 3: Site Description, Site Selection and Iterative Design Process</b>

		protective provisions.	(document reference 6.1.3) and <b>Chapter 4: Proposed Development</b> (document reference 6.1.4)
<b>C A Telecom</b>	Confirmation of no apparatus within and in the vicinity of the Proposed Development	No further action required	No further action required
<b>MBNL</b>	Confirmation of no apparatus within and in the vicinity of the Proposed Development	No further action required	No further action required
<b>Vodafone</b>	Confirmation of no apparatus within and in the vicinity of the Proposed Development	No further action required	No further action required

### **Assessment Methodology**

18.6.6 To identify any existing infrastructure constraints, both consultation and a desk-based study has been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development. Consultees include water, gas and electricity utilities providers and telecommunications providers.

18.6.7 Telecommunications and television providers are unlikely to be affected by Electromagnetic Interference (EMI) unless transmitters are near electrical infrastructure associated with the solar PV array, in particular inverters<sup>38</sup>.

18.6.8 A desk-based search has been undertaken for the presence of telecommunications, television reception and utilities infrastructure within the Order Limits. A qualitative approach undertaken by competent experts is used to assess the likelihood of significant effects on telecommunications, television reception and utilities.

### **Baseline Conditions**

#### Telecommunications

18.6.9 There are understood to be no buried telecommunication infrastructure beneath the Energy Park. There are no phone masts present with the Order limits. The nearest telecommunication mast is 350m west from the western boundary of the Order Limits, positioned adjacent to Sidebar Lane.

#### Television Reception

18.6.10 The area surrounding the Proposed Development receives television signals that were made exclusively digital after the digital switchover was completed in the Yorkshire region in 2011<sup>39</sup>.

<sup>38</sup> Pager Power (2014) News: Electrical Compatibility: solar farms and wireless transmissions

<sup>39</sup> UK Digital Switchover Explained: <https://www.frequencycast.co.uk/godigital.html>

18.6.11 The area within and surrounding the Proposed Development is predominantly served by the Belmont transmitter<sup>40</sup> (Lincolnshire), which is located approximately 37km north-east of the Proposed Development.

18.6.12 Additional searches were undertaken for the presence of analogue radio, digital radio and freeview transmitter masts in the vicinity of the Development. The following transmitters were identified within 25km:

- Boston Wyberton (Lincolnshire) DAB transmitter is located approximately 13km east;
- Callans Lane Wood (Lincolnshire) DAB transmitter is located approximately 21km south-west; and
- Grantham New Gate Lane (Lincolnshire) DAB transmitter is located approximately 25km south-west of the Proposed Development.

### Utilities

18.6.13 On-site utilities could include water, sewers, a high-pressure gas pipeline and electrical cables. Knowledge of the utilities during design and construction allows any effects to be negated by avoiding them or by use of suitable structures, such as pipe bridges.

18.6.14 Statutory undertakers including Cadent Gas Ltd, Anglian Water, National Grid Electricity Transmission, National Grid Gas, Network Rail, Western Power Distribution, and Environment Agency, have been informed of the Proposed Development. Further details on those consulted are within the **Consultation Report** (document 5.1).

18.6.15 Through consultation and a desk-based search of existing datasets, the following utilities and infrastructure that have the potential to be affected by the Proposed Development have been identified:

- High pressure gas pipeline (Feeder 7 East Heckington to Gosberton);
- Electricity transmission underground cables and associated equipment;
- 11kV distribution network overhead lines on-site;
- Above ground electricity sites and installations; and
- Water mains, resource mains or discharge pipes.

### **Assessment of Potential Effects**

#### Telecommunications – Construction, Operational and Decommissioning Phase

18.6.16 No telecommunication infrastructure has been identified beneath or close to the Proposed Development.

18.6.17 Therefore, the Proposed Development is unlikely to interfere with telecommunications infrastructure and therefore **no effects** are anticipated in the construction, operation and decommissioning phase.

18.6.18 In any event, the DCO will include the standard protective provisions for the protection of telecommunications operators, so measures will be in place for the protection of telecommunications infrastructure.

#### Television Reception – Construction, Operational and Decommissioning Phase

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<sup>40</sup> Full service- Freeview Transmitters: <https://ukfree.tv/maps/freeview>

18.6.19 The Proposed Development consists of fixed low-lying infrastructure and is therefore unlikely to interfere with digital television signals and therefore **no effects** are anticipated in the construction, operation and decommissioning phases.

#### Utilities – Construction and Decommissioning Phase

18.6.20 The potential exists for utilities to be affected during the construction and decommissioning of the Development through damage caused as a result of excavation and engineering operations. In the absence of precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect. However this risk has been mitigated through:

- mapping infrastructure that crosses the Proposed Development and avoiding it through the design of the Development;
- the use of ground penetrating radar before excavation to identify any unknown utilities; and
- consultation and agreement of construction / demobilisation methods prior to works commencing. Protective Provisions will also be in place for those affected statutory undertakers and included within the DCO application.

18.6.21 Consultation has been undertaken with National Grid Gas Plc in order to carefully identify the easement corridors required to avoid the high-pressure gas pipeline (Feeder 7 East Heckington to Gosberton) running through the Order limits.

18.6.22 These measures, along with those listed within the **Outline Construction Environmental Management Plan** (document reference 7.7) would reduce the likelihood of effects on utilities during construction. Engagement is also ongoing with all statutory undertakers with apparatus with the potential to be affected by the Proposed Development to agreement of protective provisions that are included in the DCO. Therefore, **no significant adverse effects** are expected during construction.

18.6.23 The decommissioning phase would require below ground works to remove the on-site infrastructure; however, the underground cabling to the National Grid Bicker Fen Substation will remain *in situ* with no decommissioning works needed. Works would be undertaken within the footprint excavated during construction.

18.6.24 Embedded mitigation measures used during construction would also apply during decommissioning. These measures, along with those listed within **Outline Decommissioning and Restoration Plan** (document reference 7.9) would reduce the likelihood of effects on utilities during decommissioning and therefore, no adverse effects are predicted during decommissioning.

#### Utilities- Operational Phase

18.6.25 **No effects** on utilities are predicted as a result of the operational phase of the Development because no below-ground works will be required during operation.

#### **Mitigation Measures**

18.6.26 The risk of damage to utilities during construction would be minimised through embedded mitigation, which would involve those measures listed above and mapping infrastructure that crosses the Proposed Development and avoiding it through the design. The draft DCO also includes protective provisions for the protection of electronic communication networks and utilities, and engagement with relevant statutory undertakers in this respect is ongoing. No further mitigation would be required.



### **Residual Effects**

18.6.27 During the construction, operational and decommissioning phase no significant effects on telecommunication or television reception as the infrastructure is either not present in the Proposed Development or in close proximity, and the nature and scale of the infrastructure in the Proposed Development will not cause any effects. Embedded mitigation measures will minimise risk of damage to utilities during construction and decommissioning. No effects on utilities are predicted as a result of the operational phase of the Development because no below-ground works will be required during operation. Therefore, it is anticipated that there would be **no significant residual effect** on telecommunications, television reception and utilities from the Proposed Development

### **Cumulative Effects**

18.6.28 Cumulative effects will not occur in combination with other projects on the cumulative shortlist, as the Proposed Development is predicted to have no effect on telecommunication, television or utilities.

18.6.29 It is expected that the other solar developments included within the cumulative sites shortlist would also have **no significant effect** on telecommunications and television reception and would adhere to the same mitigation as set out above to reduce the risk of damaging utilities.

## **18.7 SUMMARY**

18.7.1 As the above environmental topics have been scoped out of the ES as part of the Heckington Fen Solar Park Scoping Report (**Appendix 1.1** (document reference 6.3.1.1)) and confirmed in the Planning Inspectorate Scoping Opinion (**Appendix 1.2** (document reference 6.3.1.2)) these topics are not likely to cause significant effects and does not require a full chapter within the ES. Therefore, no summary table of significant effects, mitigation and residual effects is presented within this chapter.