

Green Hill Solar Farm Preliminary Environmental Information Report

Chapter 18: Human Health

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18 Human Health

18.1 Introduction

18.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings of the Environmental Impact Assessment (EIA) work undertaken to date concerning the potential impacts of the Scheme on human health during the construction, operation and maintenance, and decommissioning phases. The following aspects will be considered within the human health assessment process:

- Impacts on the social environment, including access and use of leisure and recreation facilities;
- Impacts on the economic environment, primarily in regard to education and employment;
- Impacts on the bio-physical environment; and
- Impacts on the institutional and built environment.

18.1.2 The preliminary assessment as set out in this PEIR chapter takes into consideration the preliminary assessments from other environmental topics. Those assessments which assess likely significant impacts on human receptors, and health and wellbeing infrastructure include:

- Chapter 7: Climate Change;
- Chapter 8: Landscape and Visual Impact;
- Chapter 10: Hydrology, Flood Risk and Drainage;
- Chapter 13: Transport and Access;
- Chapter 14: Noise and Vibration;
- Chapter 16: Air Quality;
- Chapter 17: Socio-Economics, Tourism and Recreation;
- Chapter 21: Electromagnetic Fields;
- Chapter 22: Ground Conditions and Contamination; and
- Chapter 23: Major Accidents and Disasters.

18.1.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) (Ref.1) require the direct and indirect significant effects of the proposed development on population and human health factors to be identified, described, and assessed. The assessment of human health impacts will further be assessed in the local and national planning policy context relevant to NSIPs and the DCO process.

18.1.4 The assessment will be undertaken in accordance with EIA guidance as published by the Institute of Environmental Management and Assessment (IEMA) in November 2022 (Ref.2, Ref.3).

18.1.5 For more details about the Scheme, refer to **Chapter 4: Scheme Description**.

Appendices and Figures

18.1.6 This chapter is supported by the following appendices in **PEIR Volume 3**:

- **Appendix 18.1:** Human Health Legislation, Policy, and Guidance.

18.1.7 This chapter is supported by the following figures in **PEIR Volume 2**:

- **Figure 18.1:** Study Areas for Human Health.

18.1.8 This chapter is supported by the following tables:

- **Table 18.1:** Summary of Consultation and Responses;
- **Table 18.2:** Baseline Study Area Data Areas;



- **Table 18.3:** Source to Receptor Pathway Links for Health Determinants;
- **Table 18.4:** Sensitivity and Importance of the Identified Environmental Receptor;
- **Table 18.5:** Magnitude of Change for the Identified Environmental Receptor;
- **Table 18.6:** Criteria for Assessing the Significance of Effects;
- **Table 18.7:** Proportion of LSOAs in Deprivation;
- **Table 18.8:** General Health Profile of Local Authority Areas and England;
- **Table 18.9:** Detailed Health Profile of Wards in the ZOI;
- **Table 18.10:** Residual Effects on Human Health Receptors; and
- **Table 18.11:** Cumulative Developments Relevant to Human Health.

18.2 Consultation

18.2.1 An EIA Scoping Report was submitted to the Planning Inspectorate (PINS) in July 2024, with a formal request for Scoping Opinion. PINS subsequently issued the Scoping Opinion on the proposed scope on 30th August 2024. Consultation undertaken throughout the pre-application and scoping phase for the Scheme has informed the approach to the assessment of human health impacts and the information provided within this chapter.

18.2.2 A summary of consultation with statutory and non-statutory health bodies, and of responses to the Scoping Report are outlined below in **Table 18.1**.

Table 18.1: Summary of Consultation and Responses

Consultee and Date	Response	Outcome and any further steps anticipated
The Planning Inspectorate Scoping Opinion: 3.14.1 30 Aug 2024	<p>Health related behaviour (all phases) – physical activity, risk raking behaviour and diet and nutrition:</p> <p>The Applicant proposes to scope out an assessment of physical activity from the ES on the basis that this will be considered under other matters within the Human Health ES chapter. On this basis the Inspectorate is content to scope this matter out of further assessment.</p> <p>The Applicant proposes to scope out an assessment of risk-taking behaviours on the basis that all on-site personnel would be professional workers and all contractors and operators on-site would have strict health and safety protocols enforced. The Inspectorate is content to scope out of further assessment.</p> <p>The Applicant proposes to scope out an assessment of impacts from diet and nutrition, including access to healthy affordable food... On the basis that any impacts on Best Most Versatile (BMV) agricultural land are assessed in the Agriculture Circumstances ES chapter, the Inspectorate is content to scope this mater out of further assessment.</p>	The Applicant notes this comment and has no further action.
The Planning Inspectorate	Social environment – housing (operation), relocation (all phases), community safety (all phases) and social participation, interaction and support (all phases):	The Applicant notes this comment and has no further action.



Consultee and Date	Response	Outcome and any further steps anticipated
<p>Scoping Opinion: 3.14.2 30 Aug 2024</p>	<p>The Applicant proposes to scope out an assessment of impacts on the social environment. The Scoping Report states that the Proposed Development will not result in the loss of any dwellings, and the majority of the operational workforce are expected to already be residents within the Zol. It is stated that the Proposed Development does not involve any population displacement or relocation and would not require compulsory purchase of homes or community facilities. Health and safety measures are proposed to be in place which would limit the potential for impacts on community safety, including from crime. These are proposed to be secured through a CEMP. There are no predicted impacts to social or community facilities, with any indirect impacts considered under scoped in elements of the Human Health ES Chapter. The Inspectorate agrees that [social environment] can be scoped out of further assessment.</p>	
<p>The Planning Inspectorate Scoping Opinion: 3.14.3 30 Aug 2024</p>	<p>Bio-physical environment – climate change mitigation and adaptation (construction and decommissioning), radiation (EMFs) all phases):</p> <p>The Scoping Report proposes to scope out climate change mitigation and adaptation during construction and decommissioning, on the basis that the impacts of construction activities are not expected to be of the scale to have significant health effects during these temporary phases. The Inspectorate is content to scope this matter out of the Human Health ES Chapter as these matters are considered within the Climate Change and Air Quality ES Chapters. The Human Health ES Chapter should provide clear cross-referencing to where the relevant impacts on human health are considered within the Climate Change and Air Quality ES Chapters.</p> <p>The Applicant proposes to scope out an assessment of effects from EMF. The Scoping Report states that long-standing exposure limit and health protection guidelines for EMF have been developed by ICNIRP and these have a high safety margin. It is stated that the Proposed Development will comply with these guidelines. It is noted (in Table 19.6) that impacts of EMF radiation can cause community anxieties; this is proposed to be addressed through community engagement.</p> <p>The Inspectorate agrees to scope out the effect of EMFs from all sources and phases, with the exception of the Cable Corridor during construction and operation, in accordance with the proposed approach set out in the EMF ES Chapter and agreed by the Inspectorate. As noted in ID 3.11.4 above, the voltage of the on-site and export cables has not yet been</p>	<p>The Applicant notes this comment in relation to climate change mitigation and adaptation (construction and decommissioning) and confirms that the Human Health ES chapter will include clear cross-referencing to where the relevant impacts on human health are considered within the Climate Change and Air Quality ES Chapters.</p> <p>The Applicant notes the Inspectorate’s comments in relation to scoping out the effect of electromagnetic fields (EMFs) from all sources and phases, with the exception of the Cable Corridor during construction and operation, in accordance with the proposed approach set out in the EMF ES Chapter and agreed by the Inspectorate.</p> <p>The Applicant confirms that potential human health impacts as a result of EMF in the Cable Corridor for the construction and operational phases have been assessed in the PEIR (under the subheadings “Radiation (Electromagnetic fields)”) and will be assessed in the ES on the basis of the information provided in Chapter 21: Electromagnetic Fields. The assessment considers risks to human health arising from EMFs in the context of existing infrastructure. The ES will demonstrate the design measures</p>



Consultee and Date	Response	Outcome and any further steps anticipated
	<p>determined, and cables above 132kV have the potential to cause EMF effects.</p> <p>Given the uncertainty surrounding cabling design and proximity to receptors, the Inspectorate is unable to agree to scope EMFs out for the Cable Corridor for the construction and operational phases. The ES should address the risks to human health arising from EMFs, including cumulatively with existing infrastructure, taking into account relevant technical guidance. The Inspectorate considers that the ES should demonstrate the design measures taken to avoid the potential for EMF effects on receptors.</p>	<p>taken to avoid the potential for EMF effects on receptors.</p>
<p>The Planning Inspectorate Scoping Opinion: 3.14.4 30 Aug 2024</p>	<p>Institutional and built environment - health and social care services (operation), built environment (all phases), wider societal infrastructure and resources (construction and decommissioning)</p> <p>The Applicant proposes to scope out an operational assessment of health and social care services on the basis that the Proposed Development is anticipated to utilise local workers within the ZOI during operation. The Inspectorate agrees that this matter can be scoped out of further assessment on this basis.</p> <p>It is stated that impacts on the built environment during construction and decommissioning will be mitigated through construction techniques and the use of a CEMP. The Inspectorate considers that this matter can be scoped out.</p> <p>For the operational stage the Applicant states that impacts to the natural environment will be considered in the Landscape and Visual ES Chapter, and that community response to landscape change will be dealt with elsewhere in the Human Health ES Chapter. This approach is deemed acceptable, and this matter can be scoped out of the ES.</p> <p>The Scoping Report proposes to scope out health effects related to wider societal infrastructure and resources for the construction and decommissioning phase of the Proposed Development, as it is not projected to generate public health benefits, nor adversities. The economic development elements will be discussed under other health effect matters. The Inspectorate is content to scope this matter out of further assessment.</p>	<p>The Applicant notes this comment and has no further action.</p>
<p>Bedford Borough Council Scoping Opinion 21 Aug 2024</p>	<p>In general, BBC is in agreement regarding this aspect's approach as set out by the Applicant and makes limited comment in this regard.</p> <p>(§19.1.1) For clarity, it would be useful if the Applicant states the extent of the ZOI to be used in this Chapter.</p>	<p>A description and justification of the selection of the ZOI and Study Area for this chapter is set out Section 18.4 below. This is supported by Figure 18.1.</p>



Consultee and Date	Response	Outcome and any further steps anticipated
	<p>(Table 19.5) Water quality: this health effect should address / make reference to the potential discharge of contaminated fire water into the ground water and River Nene water course.</p>	<p>The Applicant confirms diffuse pollution from water discharge from battery fires is assessed under the subheadings “Water quality or availability” at various sections in this chapter.</p>
<p>Milton Keynes City Council: Public Health Scoping Opinion 30 Aug 2024</p>	<p>The scoping report identifies and includes air quality, noise, transport (including public rights of way), and socioeconomics, all of which can influence human health. A dedicated human health chapter is also proposed, which we support. The scope for this chapter has identified each of the authorities Joint Strategic Needs Assessments (JSNA) at 19.3.2, however it is also important that each of the authorities’ Joint Health and Wellbeing Strategies are also considered. These are statutory documents to be read alongside the JSNAs and are therefore relevant to the ES.</p> <p>We welcome the applicant’s commitment at 19.4.8 to engage with public health on their baseline assessment ahead of producing the ES. Table 19.2 presents a range of indicators that would be used to assess receptor sensitivity. It would be helpful to be upfront with exactly which indicators are going to be used to form this assessment and where these will be drawn from. Perhaps when the applicant is engaging with Public Health teams these can be agreed at this stage.</p> <p>It will be important to sensitively consider the mental health and mental wellbeing implications of the proposed development on existing resident population. We support that this is scoped into the assessment.</p>	<p>The Applicant confirms that the authorities’ Joint Health and Wellbeing Strategies have been considered and are listed in Appendix 18.1: Human Health Legislation, Policy and Guidance. The data therein has been used to determine the sensitivity of population groups as assessed in Section 18.6 below.</p> <p>Direct consultation between the Applicant team and MKCC Public Health was initiated prior to PEIR and will continue in relation to the topics of assessment scope and methodology up to DCO submission.</p> <p>The Applicant confirms that consideration of the potential impacts of the Scheme on the mental health and wellbeing of the existing resident population has been included in the assessment of human health effects.</p>
<p>Earls Barton Parish Council Scoping Opinion 15 Aug 2024</p>	<p>Earls Barton Parish Council would request that anything affecting the A4500, The Wickets estate or the parish of Earls Barton as a whole is scoped into the report. This includes, but is not limited to: ... human health and wellbeing.</p>	<p>The Applicant confirms that human health and wellbeing effects are scoped into this assessment as agreed by PINS, and that the parish of Earls Barton falls within the 2km ZOI for human health.</p>
<p>Grendon Parish Council Scoping Opinion 30 Aug 2024</p>	<p>Summary of scoping: we request the following items be moved to in scope: ...</p> <ul style="list-style-type: none"> - Human health: Bio-Physical Environment - Radiation. 	<p>The Applicant confirms that potential human health impacts as a result of EMF in the Cable Corridor during construction and operational phases have been assessed in the PEIR under the subheading “Radiation (Electromagnetic Fields)” and will be assessed in the ES on the basis of the information provided in Chapter 21: Electromagnetic Fields.</p> <p>This scope is agreed by PINS in their Scoping Opinion (3.14.3).</p>



Consultee and Date	Response	Outcome and any further steps anticipated
<p>Holcot Parish Council</p> <p>Scoping Opinion</p> <p>20 Aug 2024</p>	<p>pages 351-352 human health – community safety impacts from risk of fire and contamination (and radiation) should be assessed (see further below).</p>	<p>The Applicant confirms human health impacts as a result of fire – be it from smoke, or contamination of watercourses, are assessed under the subheadings “Air quality” and “Water quality or availability” at various sections in this chapter.</p>
<p>Mears Ashby Parish Council</p> <p>Scoping Opinion</p> <p>21 Aug 2024</p>	<p>The recent amendment is that ‘Battery Energy Storage Systems’ are to be considered in areas ‘C’ Wood Lodge Farm, and ‘E’ the central Mears Ashby area of 550 acres. Battery Storage Systems are notoriously unsafe, liable to catch fire and require hundreds of gallons of water to extinguish. Run-off from such a fire contains significant amounts of pollutants and can contaminate watercourses. Both areas are close to water courses that eventually run into Sywell reservoir at the Country Park.</p> <p>Water pressure throughout the parish is ‘Low’ and often unreliable due to antiquated, inefficient water tower and associated pipework. There has been occasions throughout recent times when the village has suffered a number of water supply outages due to the inadequate infrastructure. Full consideration must be given to the local services ability to effectively deal with these potential accidents or disasters.</p>	<p>The Applicant confirms human health impacts as a result of fire – be it from smoke, or contamination of watercourses, are assessed under the subheadings “Air quality” and “Water quality or availability” at various sections in this chapter.</p> <p>The Northamptonshire Fire and Rescue Service are to be consulted as statutory consultees to the Scheme, and as targeted consultees for the agreement of the Outline Battery Fire Safety Management Plan. NFRS can advise on firewater provision in the Mears Ashby area so that suitable alternative firewater provision can be sought if required.</p>
<p>North Northamptonshire Council</p> <p>Scoping Opinion</p> <p>22 Aug 2024</p>	<p>Human Health is a material consideration and North Northamptonshire Council consider that given the detail of the cable corridor routing and the siting of the BESS, substations, transformers, and Photo Voltaic inverters have not been finalised, this should be scoped in.</p> <p>It is agreed that elements of this section will be covered in both a section of its own and touched on within other sections within the Environmental Statement such as landscape and visual impact, climate change or transport and access. Table 19.5 of the scoping report (Health Effects to be scoped in) is considered reasonable and accepted. Table 19.6 of the scoping report (Health Effects to be scoped out) is considered reasonable and accepted.</p> <p>Major Accidents and Disasters The scope for this topic is agreed however the risk of battery fire/explosion should be clearly addressed within the Environmental Statement. It is noted that this is picked up in the Air Quality and Socio-Economic chapters.</p>	<p>The Applicant confirms that potential human health impacts as a result of EMF in the Cable Corridor during construction and operational phases have been assessed in the PEIR under the subheading “Radiation (Electromagnetic Fields)” and will be assessed in the ES on the basis of the information provided in Chapter 21: Electromagnetic Fields.</p> <p>This scope is agreed by PINS in their Scoping Opinion (3.14.3).</p> <p>With regard to battery fire impacts, the Applicant seeks to confirm that this is assessed in Chapter 16: Air Quality, and Chapter 18: Human Health under the subheading “air quality” at various sections in this chapter.</p>
<p>Scaldwell Parish Council</p> <p>Scoping Opinion</p> <p>22 Aug 2024</p>	<p>The Parish Council is concerned regarding the radiation produced by the proposed solar farm. Studies have shown that this can have an impact on people and it is important that this be sufficiently considered, especially given the proximity of the solar farm to settlements</p>	<p>The Applicant confirms that potential human health impacts as a result of EMF in the Cable Corridor during construction and operational phases have been assessed in the PEIR under the</p>



Consultee and Date	Response	Outcome and any further steps anticipated
		<p>subheading “Radiation (Electromagnetic Fields)” and will be assessed in the ES on the basis of the information provided in Chapter 21: Electromagnetic Fields. This scope is agreed by PINS in their Scoping Opinion (3.14.3).</p>
<p>United Kingdom Health Security Agency / Office for Health Improvement and Disparities Scoping Opinion 19 Aug 2024</p>	<p>Our position is that pollutants associated with road traffic or combustion, particularly particulate matter and oxides of nitrogen are non-threshold; i.e., an exposed population is likely to be subject to potential harm at any level and that reducing public exposure to non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards will have potential public health benefits. We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure) and maximise co-benefits (such as physical exercise). We encourage their consideration during development design, environmental and health impact assessment, and development consent.</p> <p>UKHSA notes the intention to include an assessment of the potential impact of electromagnetic fields pertaining to the Cable Corridor in the Environmental Statement for the construction and operation of the scheme (section 16.5 of the Scoping Report). Further details on performing the assessment are available in the UKHSA reference document - Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime.</p> <p>Advice should also be sought from the local public health team on additional local data. The baseline data should include mental health and wellbeing data. When estimating community anxiety and stress in particular, a qualitative assessment may be most appropriate. This may involve conducting resident surveys but also information received through public consultations, including community engagement exercises. Robust and meaningful consultation with the local community will be an important mitigation measure, in addition to informing the assessment and subsequent mitigation measures. Health baseline data should be reported at appropriate geographic scale to represent local communities, e.g. at least ward level or LSOA data where available.</p>	<p>The Applicant confirms that potential human health impacts due to pollutants from vehicular traffic/combustion have been assessed under the subheading “Air quality” in relevant sections of this chapter and are assessed on the basis of the information provided in Chapter 16: Air Quality. Measures to address inequalities and maximise co-benefits are to be explored where practicable through the ES.</p> <p>The Applicant confirms that potential human health impacts as a result of EMF in the Cable Corridor during construction and operational phases have been assessed in the PEIR under the subheading “Radiation (Electromagnetic Fields)” and are assessed in the ES on the basis of the information provided in Chapter 21: Electromagnetic Fields.</p> <p>The Applicant confirms that the baseline data in Section 18.5 below has been undertaken to ward level to determine baseline conditions in the 2km ZOI. The Applicant furthermore confirms that consultation with local authority public health teams has been initiated prior to PEIR and will continue to ensure the in relation to the assessment scope and methodology up to DCO submission. The Applicant seeks to use the statutory consultation period to engage directly with members of the public so that human health and wellbeing concerns can be discussed, understood, and suitable mitigation measures put in place where required. The scope of consultation is to be agreed with the host local authorities through the Statement of Community Consultation, with any additional required consultation being undertaken following statutory</p>



Consultee and Date	Response	Outcome and any further steps anticipated
		consultation and prior to DCO submission.
West Northamptonshire Council Scoping Opinion 22 Aug 2024	As with Socio-Economic, Tourism and Recreation, the impact on the potential degradation of PROWS should be considered	The Applicant confirms health impacts resulting from impacts on public rights of way (PROWs) are assessed in Section 18.7 under the sub-heading “open space, leisure and play” for their recreational use, and “transport modes, access and connections” for their functional use.
West Northamptonshire Council: Environmental Health Office 13 August 2024	<p>Thank you for your email and apologies for the delay in responding.</p> <p>There was some uncertainty as requests such as these should go through the planning department.</p> <p>This is because the planners are the decision makers and Environmental Health is not a statutory consultee. They of course may choose to consult us and If so we offer advice in relation to environmental protection matters (noise, land quality, air quality, construction phase, light).</p> <p>You may find the information on the following page helpful:</p> <p>Planning and noise guidance West Northamptonshire Council (westnorthants.gov.uk)</p>	<p>The Applicant notes this comment.</p> <p>The Applicant is in contact with West Northamptonshire Council’s Planning Team, and will continue to engage with them through statutory consultation and during the DCO submission process. Any requests for inputs from the Environmental Health team will be made through the Council’s planning team from this point forward.</p>
United Kingdom Health Security Agency / Office for Health Improvement and Disparities 13 September 2024	<p>OHID would be happy to meet prior to the PEIR if this would be useful, but any meeting should be attended by OHID and the local public health team.</p> <p>We expect the PEIR to provide a statement of competency to conform compliance with guidance issued by IEMA – Ref - Pyper, R., Birley, M., Buroni, A., Gibson, G., Day, L., Waples, H., Beard, C., Dellaflora, S., Salder, J., Netherton, A., Green, L., Purdy, J., Douglas, M. (2024) <i>IEMA Guide: Competent Expert for Health Impact Assessment including Health in Environmental Assessments</i>.</p>	<p>The Applicant awaits confirmation from local authority public health teams that a meeting is requested.</p> <p>The Applicant will reach out to OHID and the local authority public health teams following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.</p>
North Northamptonshire Council Public Health 1 October 2024	<p>Thanks for the contact, I have followed up with a member of the team to compile a list of data sources.</p> <p>Do you have any current links to the NHS Northamptonshire ICB, for information on local health services? This may be a useful connection we can make.</p>	<p>The Applicant awaits further information from the local authority public health team.</p> <p>The Applicant has informed North Northamptonshire Council Public Health that contact with NHS Northamptonshire ICB has not been returned, but that the ICB website has been used as a desk-based source to corroborate data from other sources.</p> <p>The Applicant will make contact again following receipt of</p>



Consultee and Date	Response	Outcome and any further steps anticipated
		comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
North Northamptonshire Council: Environmental Health Office	Outgoing correspondence made 5 August 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
Bedford, Luton, Milton Keynes Integrated Care Board	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
East Midlands Ambulance Service NHS Trust	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
East of England Ambulance Service NHS Trust	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
NHS England	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
Northamptonshire Integrated Care Board	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.
South Central Ambulance Service NHS Foundation Trust	Outgoing correspondence made 10 September 2024 – no response received.	The Applicant will make contact again following receipt of comments from the statutory consultation, inviting consultees to engage directly with the Applicant team on any matters not addressed at PEIR.



18.3 Legislation, Planning Policy and Guidance

18.3.1 This section provides an overview of the legislation, planning policy and guidance against which the Scheme will be considered for human health. A more detailed list of policy and guidance considerations from these documents is set out in **Volume 3, Appendix 18.1: Human Health Legislation, Policy, and Guidance**.

Legislation

18.3.2 The following legislation is relevant to the assessment of human health:

- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref.1);
- Planning Act 2008 (Ref.4); and
- Health and Care Act 2022 (Ref.5).

Planning Policy

National Planning Policy

National Planning Statements for Energy

18.3.3 National Policy Statements (NPS) set out the policy basis for NSIPs including for ground mounted solar developments. The NPSs that are relevant to the Scheme are Overarching National Policy Statement for Energy (EN-1), National Policy Statement for Renewable Energy Infrastructure (EN-3) and National Policy Statement for Electricity Networks Infrastructure (EN-5), dated November 2023 and designated on 17 January 2024, and are important material considerations, in addition to other relevant and important national and local planning policies.

18.3.4 Those policies therein that pertain directly to human health matters are summarised as follows.

- Overarching National Policy Statement for Energy (EN-1) (Ref.6);
 - Specifically, Section 4.4 which sets out the assessment principles for health and certain sections of Part 5 which consider the generic impacts that arise from the development of all types of energy infrastructure covered by the energy NPSs;
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref.7);
 - Specifically, Section 2.10 which provides the primary policy basis for decisions on renewable energy DCO applications in relation to solar photovoltaic energy generation; and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref.8);
 - Specifically, Sections 2.9, 2.10 and 2.11 in respect of human health impacts from electromagnetic fields (EMF).

National Planning Policy Framework

18.3.5 The National Planning Policy Framework, adopted December 2023 (Ref.9), provides policy context at chapter 8 for the support and promotion of healthy and safe communities, at chapter 12 for achieving well-designed and beautiful places, and chapter 15 for conserving and enhancing the natural environment.

National Planning Policy Framework (NPPF) consultation July 2024

18.3.6 Proposed reform to the NPPF opened for consultation in July 2024 (Ref.10). The consultation material includes a version of the NPPF showing proposed amendments in tracked changes (Amended NPPF). Most policy in relation to promoting health and safe communities has remained unaltered, with only minor changes to policy wording. These changes as set out in the Amended NPPF relate to explicit reference to early years and post-16 education places and facilities (chapter 8), and the removal of the explicit need to consider the availability agricultural land for food production (footnote 63, chapter 15).



Local Planning Policy

18.3.7 The Local Planning Policy is set out in the host local authorities adopted policy documents, including made neighbourhood planning policies:

North Northamptonshire Council

- North Northamptonshire Council Joint Strategic Needs Assessment (Ref.11);
- North Northamptonshire Joint Core Strategy 2011 to 2031 (adopted July 2016) (Ref.12);
- Wellingborough Local Plan (Part 2), adopted February 2019 (Ref.13);
- Earls Barton Neighbourhood Plan 2011-2031 (Final), adopted January 2016 (Ref.14);
- Ecton Neighbourhood Development Plan 2016-2031, adopted May 2021 (Ref.15);

West Northamptonshire Council

- West Northamptonshire Council Joint Strategic Needs Assessment (Ref.12);
- West Northamptonshire Joint Health and Wellbeing Strategy 2023-2028 (Ref.17);
- West Northamptonshire Joint Core Strategy Local Plan (Part 1), adopted December 2014 (Ref.18);
- Settlements and Countryside Local Plan (Part 2) for Daventry District 2011-2029, adopted February 2020 (Ref.19);
- South Northamptonshire Local Plan (Part 2) 2011-2029, adopted July 2020 (Ref.20);
- Moulton Neighbourhood Development Plan 2014-2029, adopted December 2016 (Ref.21);
- Overstone Neighbourhood Development Plan 2019-2029, adopted December 2021 (Ref.22);

Milton Keynes City Council

- Milton Keynes Joint Strategic Needs Assessment (Ref.23);
- Milton Keynes Health and Wellbeing Strategy – Lifelong Wellbeing (Ref.24);
- Plan:MK 2016-2031, adopted March 2019 (Ref.25);
- Lavendon Neighbourhood Plan 2019 to 2031, adopted November 2019 (Ref.26);

Bedford Borough Council

18.3.8 Although not one of the host authorities, Bedford Borough is likely to experience some level of change to the human health environment as a result of the Scheme, even if limited to socio-economic derived effects, such as employment and income, and education and skills. As such, the following is also considered:

- Bedford Borough Joint Strategic Needs Assessment (Ref.27); and
- Bedford Borough Joint Local Health and Wellbeing Strategy 2024-2027 (Ref.28).

Emerging Policies

18.3.9 In addition to adopted policy documents, relevant emerging policy documents are considered as part of the local planning policy context, where such emerging policies are in a relatively progressed stage and are unlikely to change considerably prior to adoption. Their status will be kept under review through PEIR and through drafting of the ES ahead of DCO submission to ensure the most up-to-date position is considered.

18.3.10 The North Northamptonshire Local Plan (Ref.29), is at an early stage and no draft policies have been published but will once adopted supersede the North Northamptonshire Joint Core Strategy 2011 to 2031 and Wellingborough Local Plan (Part 2). The New Local Plan for West Northamptonshire (Ref.30) is also at a relatively early stage, with draft policies published for Regulation 18 Draft Plan consultation from April to June 2024. It is proposed that a final draft of



the plan will be consulted upon in early 2025, at which point the policies therein will be considered sufficiently progressed to be considered for assessment.

National and Industry Guidance

18.3.11 The following national and industry guidance has been reviewed and is relevant to the assessment of potential health impacts associated with the Scheme.

- National Planning Practice Guidance (NPPG), updated February 2024 (Ref.31);
- Institute of Environmental Management and Assessment (IEMA) Guide to: Effective Scoping of Human Health in EIA (2022) (Ref.2);
- Institute of Environmental Management and Assessment (IEMA) Guide to: Determining Significance for Human Health in Environmental Impact Assessment (2022) (Ref.3);
- NHS London Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment (HIA) Tool, Fourth Edition (2019) (Ref.32);
- PHE guidance, Spatial Planning for Health: An evidence resource for designing healthier places (2017) (Ref.33);
- Public Health England (PHE) guidance, Health Impact Assessment in spatial planning: A guide for local authority public health and planning teams (2020) (Ref.34Ref.33);
- PHE Strategy 2020 to 2025 (2019) (Ref.35);
- Wales Health Impact Assessment Support Unit (WHIASU), Health Impact Assessment. A practical guide to HIA (2012) (Ref.36);
- Marmot et al., Fair Society Healthy Lives: The Marmot Review: strategic review of health inequalities in England post-2010 (2010) (Ref.37);
- Institute of Health Equity, Health Equity in England: The Marmot Review 10 Years On (2020) (Ref.38);
- The Health Foundation and the Institute of Health Equity, Build Back Fairer – the Covid-19 Marmot Review: The Pandemic, Socioeconomic and Health Inequalities in England (2020) (Ref.39);
- NHS, The NHS Long-Term Plan (January 2019) (Ref.40);
- Milton Keynes Health Impact Assessment Supplementary Planning Document, March 2021 (Ref.41); and
- Suffolk County Council, Energy and Climate Adaptive Infrastructure Policy: Community Engagement and Wellbeing Supplementary Guidance Document (2024) (Ref.42).

18.4 Assessment Methodology

18.4.1 The methodologies described in the following section have been developed in line with the relevant planning policy and appropriate industry guidance for assessing potential effects of the Scheme on human health.

18.4.2 The assessment of health cross refers to the technical assessments undertaken for the other technical disciplines in the PEIR, highlighting any conclusions reached which are relevant to human health. A health 'lens' has been applied to these conclusions to determine the extent to which these conclusions have any effect (or not) upon the health of the local population or specific population groups therein. A clear pathway between the anticipated impact and the resultant health effects has been determined to understand the significance of any effects to human health, including for direct and less obvious indirect effects. The assessment has also been informed by available topic-specific literature, and where appropriate, engagement with health and wellbeing stakeholders and statutory bodies.

18.4.3 The assessment of human health is undertaken on the understanding that as defined by the Constitution of the World Health Organization (WHO) in 1948, "*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*"



(Ref.43). As such, the health and wellbeing of individuals and communities is based on a broad range of determinants of health, which have been modelled by Dahlgren and Whitehead (1991), and Barton and Green (2006) respectively, as shown in **Figures 18.1** and **18.2** below.

Figure 18.1: Determinants of Health in Individuals (Ref.44)

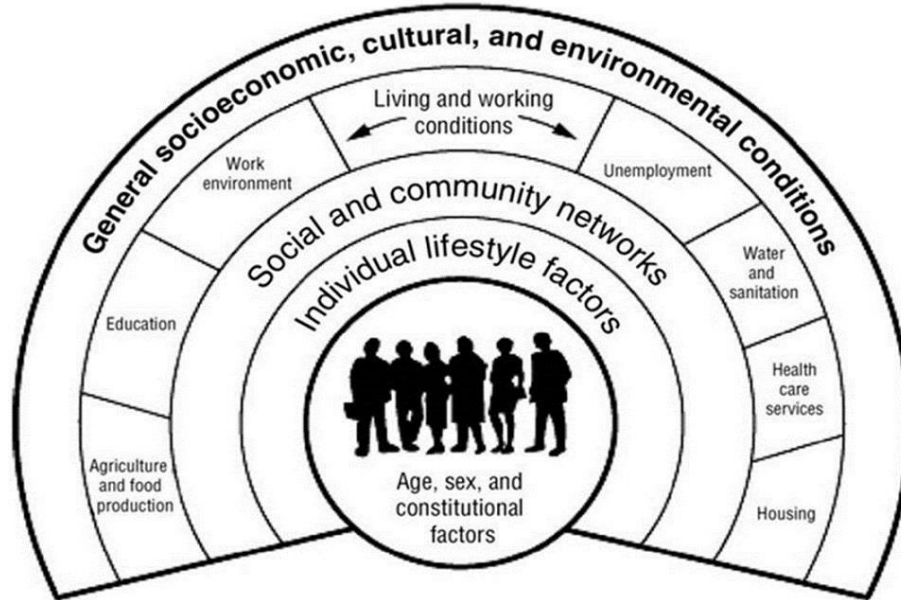


Figure 18.2: Determinants of Health in Neighbourhoods (Ref.45)





18.4.4 These models illustrate the range of factors that contribute to health and wellbeing, from largely fixed personal factors (such as age, sex, and hereditary factors), to broader determinants of health based on individual lifestyle, social community and network based determinants, to wider environmental and economic factors, all of which are characterised by their interdependency in how they contribute to health living.

Study Area

18.4.5 The boundaries of the Sites (Green Hill A to G and BESS Site) and the Cable Route Search Area together define the extents of the Scheme for the purpose of the PEIR. These are shown in **Volume 2, Figure 3.1.**

18.4.6 The Study Area for determining baseline conditions for human health is based on an anticipated 2km key Zone of Influence (ZOI) surrounding the Scheme. Baseline data will be collected across census Lower Super Output Area (LSOA) level that best fit the ZOI. Where data is unavailable at the LSOA level, authority-level data has been used from the host authorities of North Northamptonshire, West Northamptonshire, and Milton Keynes, hereafter referred to as the “Wider Baseline Study Area”. Local-level data will also be compared against data for the Wider Baseline Study Area and national data to determine likely sensitivity of populations in the ZOI. These are shown on **Volume 2, Figure 18.1: Study Area for Human Health** which supports this chapter.

18.4.7 **Table 18.2** below sets out the names of each data area considered as part of the ZOI.

Table 18.2 Study Area (ZOI) Data Areas

Lower Super Output Area (pre-2021)	Lower Super Output Area (post-2021)	Ward	Local Authority
Bedford 002D	Bedford 002D	Harrold	Bedford
Milton Keynes 001C	Milton Keynes 001C	Olney	Milton Keynes
Milton Keynes 001E	Milton Keynes 001E		
Kettering 011F	N. Northants. 020C	Burton and Broughton	North Northamptonshire
Kettering 011H	N. Northants. 020A	Rothwell and Mawsley	
Wellingborough 001D	N. Northants. 026D	Earls Barton	
Wellingborough 009A	N. Northants. 038A		
Wellingborough 009B	N. Northants. 038B		
Wellingborough 009C	N. Northants. 038C		
Wellingborough 009D	N. Northants. 038D		
Wellingborough 009E	N. Northants. 038E		
Wellingborough 009F	N. Northants. 038F	Hatton Park	
Wellingborough 003D	N. Northants. 029D		
Wellingborough 005A	N. Northants. 031A		Brickhill and Queensway
Wellingborough 005B	N. Northants. 031B		
Wellingborough 005C	N. Northants. 031C		
Wellingborough 010D	N. Northants. 040D	Irchester	
Wellingborough 010E	N. Northants. 040E		
Daventry 002C	W. Northants. 002C	Brixworth	West Northamptonshire
Daventry 005B	W. Northants. 003A	Moulton	
Daventry 005C	W. Northants. 003B		



Lower Super Output Area (pre-2021)	Lower Super Output Area (post-2021)	Ward	Local Authority
Daventry 005D	W. Northants. 003C		
Daventry 005E	W. Northants. 003D		
S. Northants. 002C	W. Northants. 043C	Hackleton and Grange Park	
S. Northants. 002D	W. Northants. 043D		

18.4.8 The Study Areas for human health impacts have been largely influenced by the relevant technical assessment in the rest of the PEIR. For example, where noise and vibration impacts are defined within a given Study Area of the Scheme, this same Study Area is considered when assessing the health impacts associated with the changes in noise and vibration identified.

Impact Assessment Methodology

18.4.9 The assessment scenarios are set out in **Chapter 4: Scheme Description**.

18.4.10 For assessment of baseline conditions with respect to human health, data has been gathered from a number of data sources to provide a holistic understanding of the baseline conditions in the Study Area. Where this relies on baseline data collected in other topic chapters in the PEIR, these have been identified and summarised. Information sources to be used specifically for human health, and not derived from other topic chapters, have been sourced from the below locations:

- Office for National Statistics (ONS) – 2021;
- Department for Communities and Local Government (DCLG): Indices of Multiple Deprivation Map App – 2019;
- Office for Health Improvement and Disparities (OHID): Fingertips Public Health Data web tool – 2016-2024;
- Department for Work and Pensions (DWP) Stat-Xplore web tool – 2023-2024; and
- Joint Strategic Needs Assessments and Joint Health and Wellbeing Strategies;
 - North Northamptonshire (JSNA only);
 - West Northamptonshire;
 - Milton Keynes City;
 - Bedford Borough.

18.4.11 The preliminary assessment of health and wellbeing impacts was applied to the general population, and to identified vulnerable groups as identified through baseline conditions analysis. Consideration of vulnerable groups was utilised to effectively determine sensitivity of the population as a whole and identify what impacts the Scheme may have on health inequalities. Vulnerable sub-population groups as identified in Table 9.2 of IEMA Guide to: Effective Scoping of Human Health in Environmental Impact Assessment (2022) (Ref.2) include the following groups:

- Age related groups: children, young people, older people;
- Income related groups: people on low income or with poor job security, economically inactive and unemployed people, people in poverty or experiencing homelessness, those unable to work due to poor health;
- Health inequality or disadvantage: people with long-term physical disabilities, long-term mental disabilities, and learning or neurological disabilities, and those providing care to people with disabilities;



- Social disadvantage: people experiencing social isolation, persons experiencing discrimination (including specifically based on race or religion), as necessary any other protected characteristic as defined by the Equality Act 2010 (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation), gypsy and traveller groups, refugee and/or asylum seekers, non-English speakers, and those with low literacy or numeracy; and
- Geographic factors: people experiencing barriers in access to services or service provision, amenities, or facilities, people living in areas of high deprivation, and differences in urban versus rural challenges to access to services.

18.4.12 The preliminary health assessment also considered sensitive receptors such as schools, care homes, and healthcare facilities, which may be particularly vulnerable to change as a result of their occupants or users. The identification of these vulnerable groups and locations was furthermore supported by the technical assessments of other PEIR chapters as appropriate.

18.4.13 Drawing on the EIA Scoping report, the following determinants of health, scoped into this assessment, and the relevant source to receptor pathway are set out in **Table 18.3** below:

Table 18.3 Source to Receptor Pathway Links for Health Determinants

Source	Pathway	Receptor	Project Stage
Potential temporary changes in access to temporary and rental accommodation arising from the need to accommodate incoming temporary construction and decommissioning workforce	Potential adverse effects on suitable access to housing or temporary accommodation	People reliant on rental or temporary accommodation, or at risk of homelessness	Construction, Decommissioning
Potential temporary or permanent closures, diversions or amenity impacts on PRowWs or impacts on the local road network which impact cycling, equestrian or pedestrian users	Potential adverse effects on active travel journeys, and on recreation, including from fear and intimidation both of which could impact physical and mental health and wellbeing	People using PRowWs and the local road network for commuting, travel, and recreation	Construction, Operation, Decommissioning
Potential temporary or permanent reduction in accessibility to, or amenity impacts on the use and enjoyment of, open spaces and established leisure and recreation facilities	Potential adverse effects on physical activity and enjoyment of recreational facilities which could impact physical and mental health and wellbeing	People accessing open spaces and using leisure and recreation facilities	Construction, Operation, Decommissioning
Potential temporary or permanent increases in traffic on the local road network	Potential adverse impacts on road safety, which could impact human health	Vehicular users of the local road network	Construction, Operation, Decommissioning
Potential temporary or permanent changes to community identity as a result of landscape and visual impacts on surroundings	Potential adverse impacts on visual amenity and enjoyment of the surroundings and environment, which could impact wellbeing	People living in communities nearby to the Scheme	Construction, Operation, Decommissioning
Potential temporary or permanent increase in employment and training opportunities, directly	Potential beneficial personal and economic impacts arising from employment, training and	People who could potentially benefit from direct employment and skills training	Construction, Operation, Decommissioning



Source	Pathway	Receptor	Project Stage
related to the Scheme, or within the wider supply chain	income opportunities for those working on the Scheme, or within the wider supply chain, which could impact human health	opportunities generated by the Scheme, or through the wider supply chain	
Potential permanent changes to Greenhouse Gas (GHG) emissions	Potential beneficial human health impacts as a result of reduced GHG emissions over lifetime of Scheme	All people	Operation
Potential temporary changes in local air quality including increased dust and particulate matter emissions arising from construction, potential fires during operation, and from decommissioning activities relating to the Scheme	Potential adverse human health impacts arising from increased exposure to dust and particulate matter emissions arising from the Scheme	People at risk of direct and indirect air quality impacts, including those with respiratory illnesses	Construction, Operation, Decommissioning
Potential temporary changes to water quality due to runoff or contamination from onsite activities	Potential adverse human health impacts arising from reduced water quality, cleanliness, or as a result of contaminants entering the drinking water supply	People likely to be at risk of possible contamination to drinking water	Construction, Operation, Decommissioning
Potential acute or long-term exposure to contaminants whether from previous site uses, or from the Scheme	Potential adverse human health impacts arising from contact with contaminants associated with the Sites or Scheme	People likely to be at risk of contact with onsite contaminants, including site workers and vulnerable future users	Construction, Operation, Decommissioning
Potential temporary or permanent changes in noise and vibration levels arising from the Scheme	Potential adverse physical and mental human health impacts arising from increased exposure to noise and vibration arising from the Scheme	People at risk of direct and indirect noise and vibration impacts, including those with sensory disabilities	Construction, Operation, Decommissioning
Potential temporary or permanent changes in EMF levels arising from the Scheme	Potential adverse physical human health impacts arising from acute high magnitude or prolonged low-level exposure to EMF from the Scheme, from high voltage cables and substations	People at risk of direct exposure to EMFs from the Scheme	Operation
Potential temporary changes in access to health and social care services arising from incoming temporary construction and decommissioning workforce	Potential adverse effects on accessibility of primary and social healthcare services as a result of increased demand, which could impact on physical and mental health and wellbeing	People using healthcare services likely to be affected by incoming temporary workers	Construction, Decommissioning
Potential temporary changes to wider societal infrastructure and resources	Potential beneficial effects on human health as a result of the Scheme's contributions towards economic development,	All people	Operation



Source	Pathway	Receptor	Project Stage
	climate change mitigation, and protection or enhancement of the natural environment, which could impact on physical and mental health and wellbeing		

18.4.14 The impacts of the Scheme on these determinants of human health are assessed using professional judgement, good practice, and drawing on other assessments within the PEIR. The assessment of human health effects is made with respect of residual effects to receptors as identified in other assessments in the PEIR.

Sensitivity of Receptors

18.4.15 The sensitivity of all identified environmental receptors has been described as high, medium, low, or very low, whilst the magnitude of impact on those receptors has been described as high, medium, low, or negligible. Where an effect is identified, the likely duration, location and significance has been presented. The health effects have been assessed in the context of the baseline position, as well as the nature and context of the effect, taking account of the sensitivity of the identified receptor (i.e. the existing population and identified vulnerable/ priority groups).

18.4.16 The sensitivity of the receptors identified in this chapter have been assessed by understanding measurable indicators of the receptor’s present characteristics and considering this alongside the weighted importance of the receptor in local, regional, and national policy or strategic requirements together with professional judgement. To ensure a consistent approach across the socio-demographic and economic receptors identified in this assessment, each receptor has been assessed against the criteria as set out in **Table 18.4** to determine its sensitivity. This determination has been based on statistical analysis where appropriate or based on professional judgement of the qualitative aspects of the criteria being assessed.

Table 18.4 Sensitivity and Importance of the Identified Environmental Receptor

Sensitivity	Definition
High	Population or population groups with high levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Population or population groups with moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Population or population groups with low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very Low	Population or population groups with very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.



Magnitude of Impacts

18.4.17 The methodology for determining the impact magnitude is described below and is based on the residual impacts of the Scheme post-mitigation. The magnitude of change has been used for either beneficial or adverse impacts. As there is no standard methodology for determining how magnitude of impacts is calculated, professional judgement has been used to determine the criteria set out in **Table 18.5**.

Table 18.5 Magnitude of Change for the Identified Environmental Receptor

Magnitude	Definition
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Assessment of Significance

18.4.18 The degree of significance of impacts, in respect of human health, is determined using the matrix below in **Table 18.6**, taking into consideration both receptor sensitivity to change and magnitude of change to baseline conditions.

18.4.19 Effects that are major, major/moderate, moderate or moderate/minor are significant in terms of EIA as in accordance with IEMA guidance (Ref.3).

Table 18.6: Criteria for Assessing the Significance of Effects

Sensitivity	High	Medium	Low	Negligible
Magnitude				
High	Major	Major/moderate	Moderate/minor	Minor/negligible
Medium	Major/moderate	Moderate	Minor	Minor/negligible
Low	Moderate/minor	Minor	Minor	Negligible
Negligible	Minor/negligible	Minor/negligible	Negligible	Negligible

18.4.20 The degree of significance of an effect can be described either as beneficial or adverse in nature, or neutral if there is no anticipated impact. Temporally, effects are described as being of short-, medium-, or long-term. These together with the level of significance should be used to determine which effects from the Scheme and will be considered further in the ES, and therefore which effects require mitigation measures to be implemented in the design, construction, operation, and decommissioning phases of the Scheme.

Cumulative Effects

18.4.21 The assessment also considers potential in-combination (or intra-development) effects from different aspects of the Scheme, and cumulative effects related to relevant projects, where they are considered likely to have significant environmental effects. This includes assessing the



cumulative impact of the construction of this Scheme, its operational lifetime, and its decommissioning, against other nearby NSIPs and relevant TCPA planning applications and approvals which will also have effects within the ZOI as appropriate. A full list of these cumulative sites considered for assessment has been included at **Volume 3, Appendix 2.2**. Those considered in this chapter are identified in **Table 18.11** and explored to greater length in **Chapter 25: Cumulative Effects**.

18.5 Assessment Assumptions and Limitations

18.5.1 This preliminary assessment is based on baseline and Scheme design information available at the time of writing this chapter. A full assessment is being undertaken as part of the EIA, the assessment will be developed and refined following statutory consultation and as additional information becomes available, the final assessment presented within the ES.

18.5.2 Where the Scheme designs and details are either not yet known or incomplete at this stage, either assumptions have been made based on professional judgement, or, in the event that it is not possible to make any assumptions, only a high-level preliminary assessment has been made. This assessment is an iterative process and will be both expanded and made more specific as survey data is collected, analysed and reported on, and designs are further developed. This process will be carried out in conjunction with consultation with relevant consultees and third parties as necessary to achieve the most robust outcome.

18.5.3 The methodology for human health has considered the following assumptions:

- Reporting of baseline conditions is based on the most up-to-date publicly available datasets for each category. Where data relies on the 2021 Census, the potential impact upon the socio-demographic environments as result of the COVID-19 pandemic and associated national lockdowns have been identified. The report also recognises that datasets that are subject to repeated updates are based on the most recent publication at the point of writing. Some datasets (for example: JSNAs, OHID publications, and NHS data) may be subject to a lag between data collection and publication, and as such where new datasets are published following statutory consultation, these will be required to be updated for the ES at DCO submission.
- The assessment of effects on human health from the Scheme is based on professional judgement as directed by the industry policy and guidance as set out in Section 18.3 above and **Volume 3, Appendix 18.1**. This preliminary assessment considers preliminary beneficial and adverse effects to human health in the Scheme's ZOI.
- Preliminary effects on human health during the construction, operation and decommissioning phases are assessed in this PEIR, drawing upon the preliminary assessment throughout the PEIR of relevance to human health and its wider determinants. Each of these topics are subject to further investigation and reporting in the complete ES. The preliminary information available at the point of writing is considered suitable for assessing the preliminary effects on the human health environment. The relevant chapters of the PEIR comprise:
 - Chapter 7: Climate Change;
 - Chapter 8: Landscape and Visual Impact;
 - Chapter 10: Hydrology, Flood Risk and Drainage;
 - Chapter 13: Transport and Access;
 - Chapter 14: Noise and Vibration;
 - Chapter 16: Air Quality;
 - Chapter 17: Socio-Economics, Tourism and Recreation;
 - Chapter 21: Electromagnetic Fields;
 - Chapter 22: Ground Conditions and Contamination; and



- Chapter 23: Major Accidents and Disasters.
- Where this preliminary assessment of human health effects relies upon preliminary information from other chapters within the PEIR, the topic-specific assumptions and limitations set out in the respective chapters also apply to this chapter.
- In-combination effects during the construction, operation and decommissioning phases are based on preliminary assessments taking into consideration the preliminary reporting on all matters relevant to human health. Where any of these topics each record a significant effect on a receptor or group of receptors that have a likely pathway to have in-combination effects with regard to human health, it will be assumed as a worst-case that the effect could occur at the same time. These will be further investigated in the ES that will be submitted with the DCO application.

18.6 Baseline Conditions

18.6.1 This section describes the baseline environmental characteristics for the Scheme's Baseline and Wider Baseline Study Areas with specific reference to human health.

Existing Baseline

18.6.2 The existing baseline conditions for population health reporting and service provision are derived from desk-based studies. Additional topic-specific information based on field-studies has been referred to where presented in other chapters in the PEIR as listed at paragraph 18.5.3 above.

Human Environment

18.6.3 The 2021 Census (Ref.46) identifies a total population in the ZOI of approximately 46,000. The proportion of residents in the ZOI aged up to 15 years old is 18.6%. This is lower than each of the four authorities in the Wider Baseline Study Area, which range from 19.3-21.7%, but is comparable to the England and Wales average of 18.5%.

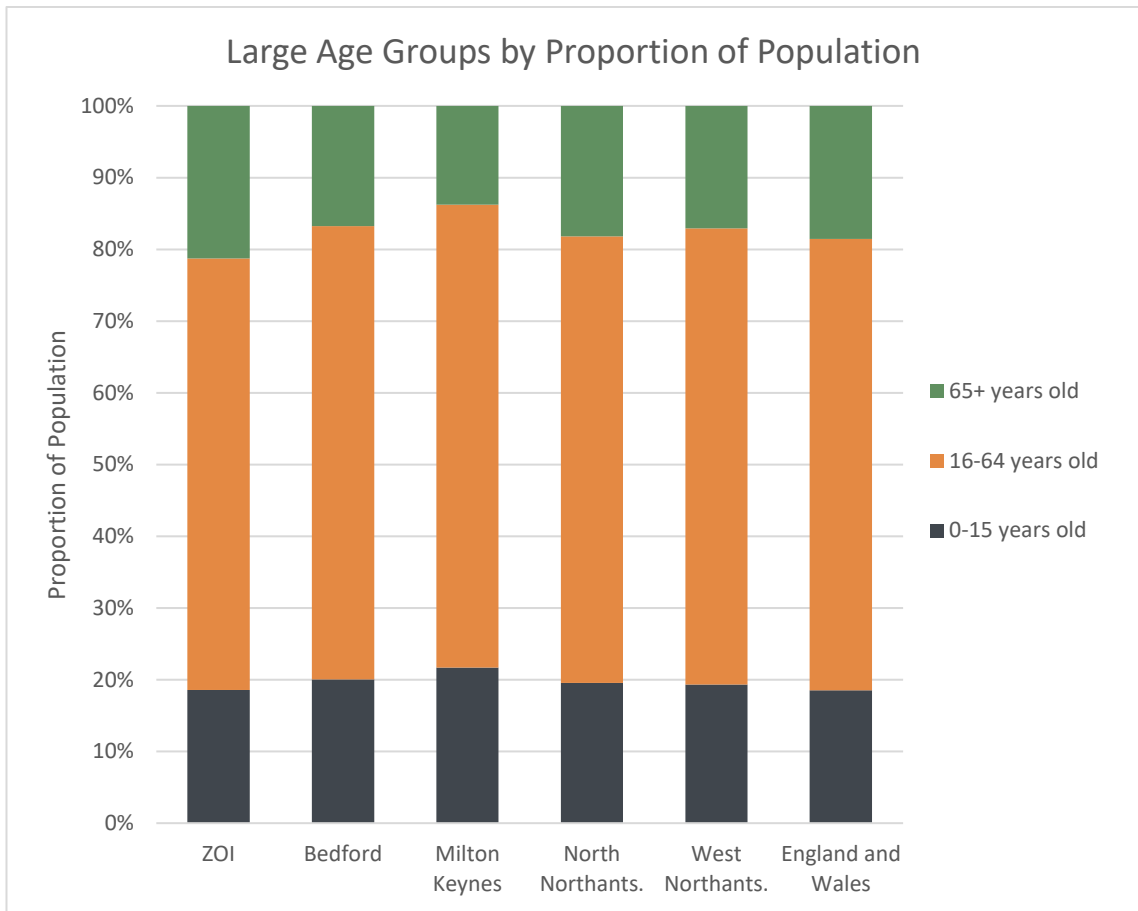
18.6.4 The proportion of the population of working age (16-64 years old) in the ZOI is 60.2%. This is comparatively lower than the Wider Baseline Study Area (ranging from 62.3-64.5%), and is similarly lower than the national average for England and Wales of 62.9%.

18.6.5 Consequently, the remaining population, those aged 65 or above, form a larger contingent in the ZOI (21.3%) than any of the four authority areas in the Wider Baseline Study Area (13.8-18.2%). The population of the ZOI is also comparatively older than the national rate of 18.6% of the population aged 65 and over.

18.6.6 This is set out graphically in **Figure 18.3** below.



Figure 18.3: Age Groups by Proportion of Population

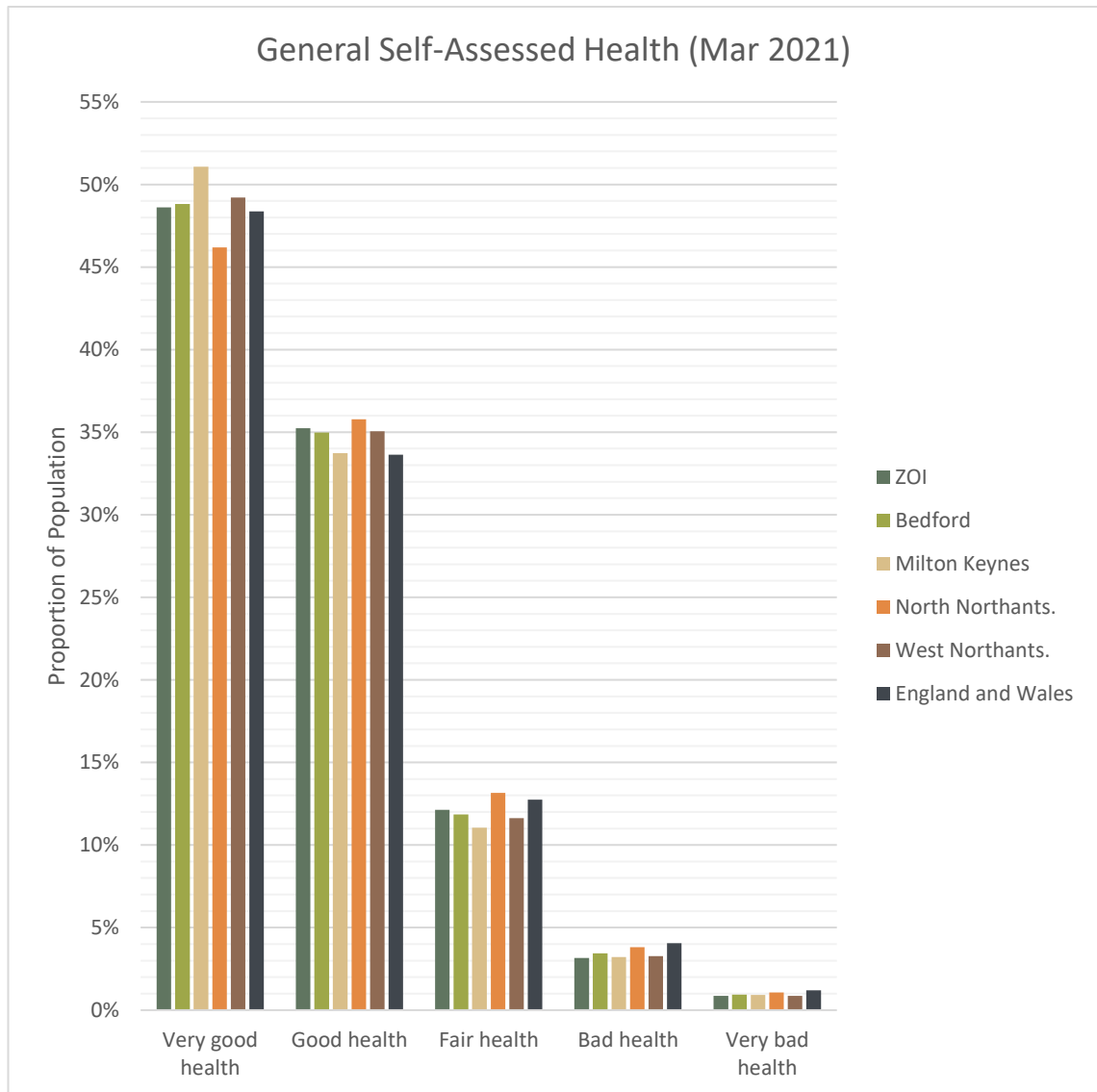


18.6.7

As part of the Census 2021, participants were asked to declare a self-assessment of their own health. At all geographic levels, participants were most likely to answer “very good”, followed by “good” health. The combined proportion of the population in the ZOI declaring they had “bad” or “very bad” health was 4.0%. This is slightly lower than any of the authorities in the Wider Baseline Study Area (ranging from 4.1-4.9%), and notably lower than the proportion for England and Wales overall, of 5.2% (Ref.47). This is shown in full in **Figure 18.4** below.



Figure 18.4: Self-assessment of General Health

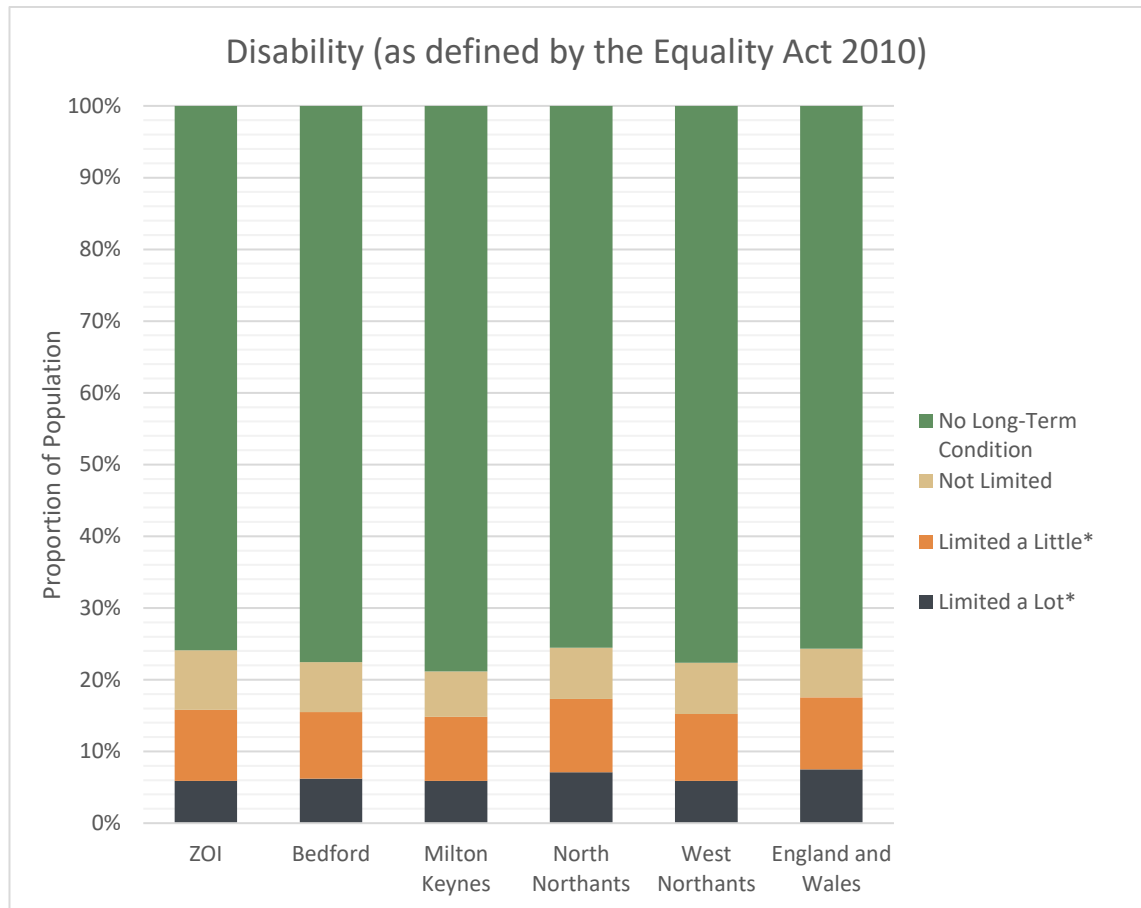


18.6.8 In addition to a self-assessment of general health, Census 2021 respondents were asked to self-assess or declare long-term health conditions or disabilities. The response categories considered as “not disabled” under the Equality Act 2010 (Ref.48) were: “No long term physical or mental health conditions”, and “Has long term physical or mental health condition but day-to-day activities are not limited”. For those who would qualify as disabled under the Equality Act 2010, the available responses were “Day-to-day activities limited a little” and “Day-to-day activities limited a lot”.

18.6.9 As presented in **Figure 18.5** below, the proportion of the population in the ZOI self-assessing that their day-to-day activities are limited a little or a lot by a long-term health condition or disability is 15.8% (Ref.49). This is comparable although higher than three of the four authority areas in the Wider Baseline Study Area, which range from 14.8%-15.5%, with only North Northamptonshire having a greater proportion at 17.3%. This however compared favourably to the national trend across England and Wales, where a total of 17.5% of the population have declared limitations to their day-to-day activities that would qualify as a disability as defined by the Equality Act 2010.



Figure 18.5: Self-assessment of Disability



18.6.10 The proportion of the working age population (age 16-64) who are entitled to Personal Independence Payment (PIP) is published on a monthly basis by the Department for Work and Pensions, demonstrating the number of people who are eligible for financial support to improve quality of life and ability to work where limited by short and long-term illnesses and disabilities. The most recent data, for April 2024 (Ref.50), demonstrates that 7.1% of the working age population in the ZOI around the Scheme are eligible for PIP. This is within the average range across the Wider Baseline Study Area (6.8-8.8%) but is substantially lower than the eligibility rate across England and Wales at 9.0%.

Deprivation

18.6.11 The most recent data available on deprivation experienced in England is the Index of Multiple Deprivation (IMD) study from 2019, which provides information at a local authority, and Lower Super Output Area level for a range of assessed deprivation measures, known as “domains”. Each area is ranked according to its score associated with each domain of deprivation, with the index providing a measure of relative deprivation across England at each measured level. (Ref.51, Ref.52)

18.6.12 The ZOI covers a total of 25 LSOAs across four local authorities (six at the time of indexing in 2019). As such, there is large degree variance across the ZOI. Overall deprivation in the ZOI is low, with only four of 25 LSOAs being in the 50% most deprived areas in England. However, three of these (North Northamptonshire 031A, 031B, 031C, formerly Wellingborough 005A-C), are in the 20% most deprived areas.

18.6.13 With regard to domains of deprivation, those interrogated further are:



- Health Deprivation and Disability, which measures the risk of premature death and the impairment of quality of life through poor physical or mental health;
- Barriers to Housing and Services, which measures the physical (geographic) and financial accessibility of housing and local services; and
- Living Environment Deprivation, which measures the quality of the local environment. The indicators fall into two sub-domains. The ‘indoors’ living environment measures the quality of housing; while the ‘outdoors’ living environment contains measures of air quality and road traffic accidents.

- 18.6.14 Similar to overall deprivation, the ZOI performs well in regard to health deprivation and disability, with only five of 25 LSOAs in the 50% most deprived areas in England. As with the overall metric, North Northamptonshire 031A, 031B, 031C perform poorest, although are only in the 30% most deprived neighbourhood areas in England.
- 18.6.15 The index of barriers to housing and services demonstrates that the ZOI performs in a very similar trend to national performance, with the spread of LSOAs in each decile being almost evenly distributed. This demonstrates significant variance in access to housing and services in the ZOI. That notwithstanding, only one LSOA, West Northamptonshire 003D (formerly Daventry 005E) covering Old, Walgrave, Hannington and Holcot, is within the most deprived 10% of neighbourhoods in England, largely due to its rural aspect and distance to local services. A total of five of the LSOAs fall within the most deprived 20% of areas.
- 18.6.16 The LSOAs across the ZOI generally perform well with regard to living environment, with no LSOA falling within the 30% most deprived areas in England, and only 6 of the 25 LSOAs falling within the 50% most deprived areas. As a generalisation, this indicates housing quality is average to good, as is the quality of the outdoor environment in these areas. Rural aspect, low traffic volumes, and relatively good air quality away from major transport corridors such as the A45 are likely to contribute to this.
- 18.6.17 A detailed breakdown by area of the proportion of LSOAs in the most deprived decile (10%), most deprived quintile (20%) and most deprived half (50%) of neighbourhood areas in England are set out in **Table 18.7** below. Text in green demonstrates areas will substantially lower levels of deprivation, black text shows levels in the expected range, while red text shows substantial greater levels of deprivation than the expected range.

Table 18.7: Proportion of LSOAs in Deprivation

Area	ZOI	Bedford	Milton Keynes	North Northants.	West Northants.
Overall Index of Multiple Deprivation (IMD)					
10% most deprived	0.0%	3.9%	5.3%	5.7%	5.7%
20% most deprived	12.0%	13.6%	11.8%	15.5%	14.0%
50% most deprived	16.0%	45.6%	36.8%	44.8%	36.4%
Health Deprivation and Disability					
10% most deprived	0.0%	6.8%	2.6%	7.2%	5.3%
20% most deprived	0.0%	11.7%	6.6%	19.6%	16.7%



Area	ZOI	Bedford	Milton Keynes	North Northants.	West Northants.
Proportion of LSOAs					
50% most deprived	20.0%	39.8%	36.8%	49.0%	45.6%
Barriers to Housing and Services					
10% most deprived	4.0%	13.6%	18.4%	6.2%	7.0%
20% most deprived	20.0%	28.2%	50.7%	14.9%	20.2%
50% most deprived	56.0%	67.0%	88.2%	49.5%	61.8%
Living Environment					
10% most deprived	0.0%	1.9%	0.7%	1.0%	3.5%
20% most deprived	0.0%	16.5%	2.0%	4.6%	11.8%
50% most deprived	28.0%	43.7%	9.2%	24.2%	34.6%

Health Profile and Strategic Priorities

- 18.6.18 Data on a number of health indicators is available at the local authority level, and ward level from the Office of Health Inequalities and Disparities (OHID) through their online public access data tools. A summary of key findings is presented in the section below.
- 18.6.19 General health indicators at the local authority level demonstrate that the four authorities in the Wider Baseline Study Area perform at or similarly to the national level with respect of life expectancy, and under-75 mortality. Notable exceptions, as shown in **Table 18.8** below are the consistently lower than average life expectancy inequality rates for both males and females, but the greater than average suicide rate per 100,000 people (except in West Northamptonshire) (Ref.53). Life expectancy inequality is based on the Slope Index of Inequality.

Table 18.8 General Health Profile of Local Authority Areas and England

Health Indicator	Data period	Bedford	Milton Keynes	North Northants	West Northants	England
Male life expectancy	2020-2022	78.6	79.2	78.8	79.6	78.9
Female life expectancy	2020-2022	82.7	82.5	82.2	83.0	82.8
Inequality in life expectancy at birth (Male) (years)	2018-2020	8.9	8.4	9.0	9.0	9.7



Health Indicator	Data period	Bedford	Milton Keynes	North Northants	West Northants	England
Inequality in life expectancy at birth (Female) (years)	2018-2020	7.8	7.2	7.4	7.7	7.9
Under-75 mortality rate from all causes (per 100,000)	2022	340.3	345.8	366.6	332.1	342.3
Suicide rate (per 100,000)	2020-2022	12.4	11.3	10.8	8.7	10.3
Emergency hospital admissions for intentional self-harm (per 100,000)	2022/2023	120.0	111.1	151.9	242.6	163.7

- 18.6.20 At the ward level, OHID provides more detailed information, of which key health indicators have been selected for wards that cover the ZOI (Ref.54). It should be noted that the date this data was collected is often older than that for the local authorities and so should be read in that context. Wards falling within the ZOI have also been summarised to show the minimum, median, and maximum values within the ZOI overall, to account for large variations in population baseline conditions therein.
- 18.6.21 Data for deaths and hospital admissions is based on standardised mortality rate (SMR), a ratio of the number of deaths observed in a population over a given period to the number that would be expected over the same period if the study population had the same age-specific rates as the standard (England national) population.
- 18.6.22 Generally, life expectancy at birth for both males and females in the ZOI is higher (median life expectancy of 81.2 for males, and 84.1 for females) than the national average for England (79.5 for male, 83.2 for female). The only exceptions to this are in Brickhill and Queensway ward (77.8 for male, 81.1 for female), and Moulton (82.2 for female).
- 18.6.23 Similarly, the ZOI overall performs well against the national average with lower deaths of all causes for under-75s, lower deaths from respiratory diseases at all ages, and lower deaths from causes considered preventable, when considered against the expect age-related rates for the population. Exceptions to this are Brickhill and Queensway ward for all three categories, and Burton and Broughton and Irchester wards for deaths from respiratory diseases at all ages, which are higher than the expected rates. For Burton and Broughton ward, and for Irchester ward, there is a high likelihood that proximity to the A14 and A43 respectively are a contributing factor due to increased exposure to vehicle emissions.
- 18.6.24 Rates of emergency hospital admissions for intentional self-harm across the ZOI vary considerably from 38.1 (SMR) in Olney to 164.6 (SMR) in Rothwell and Mawsley, indicating significant variance in mental health prevalence and access to support and care. Overall, however, the ZOI performs only slightly worse (103.2 (SMR)) than the national rates. A similar disparity base on geographic area can also be seen at the local authority level.
- 18.6.25 Modelled estimates for prevalence of regular smoking in 15 year olds, available through OHID based on 2014 estimates, indicate the ZOI performs worse than the national average of (5.4%) of the 15 year old population engaging in regular smoking. Values in the ZOI range from 4.5-9.7%, with a median average of 6.9%, with only Brickhill and Queensway ward (at 4.5%) having a lower than national average proportion. This trend is also seen at the local authority level with all four of the authorities in the Wider Baseline Study Area having higher than average modelled



rates of prevalence of smoking in 15 year olds (5.7-6.7%). An alternative dataset from NHS England (Ref.55) identifies a higher national prevalence of regular smoking in 15 year olds of 7.7% in 2014, which has dropped to 3.3% in 2021. Subnational data is not available in this dataset; however, it can be assumed that the smoking rate in the ZOI and Wider Baseline Study Area remains somewhat higher than the national average.

- 18.6.26 As with some other health determinants, the prevalence of child obesity in children in Year 6, as measured across a 3-year reference period, is overall lower (19.8%) across the ZOI than the four authority areas (20.0-23.9%) and the national average rates (22.5%). That notwithstanding, there is significant variance across the ZOI, with the lowest rate of obesity in Year 6 children of 11.8% in Brixworth ward being less than half of the rate in Brickhill and Queensway ward (28.6%).



Table 18.9 Detailed Health Profile of Wards in the ZOI

	Life expectancy at birth (Male)	Life expectancy at birth (Female)	Deaths from all causes, under-75 years (SMR)	Deaths from respiratory diseases, all ages (SMR)	Deaths from causes considered preventable, under-75 years (SMR)	Emergency hospital admissions for intentional self-harm (SMR)	Smoking prevalence at age 15 (regular smokers) (% population)	Year 6 prevalence of obesity (including severe obesity) (% population)
Area	2016-2020	2016-2020	2016-2020	2016-2020	2016-2020	2016/17-2020/21	2014	2020/21-2022/23
Brickhill and Queensway	77.8	81.1	114.4	145.1	120.3	147.8	4.5	28.6
Brixworth	81.2	84.9	73.3	84.6	61.7	84.7	6.9	11.8
Burton and Broughton	80.6	84.1	98.3	118.3	89.6	102.7	6.9	24.3
Earls Barton	81.4	83.7	89.1	80.0	75.3	136.9	8.7	20.0
Hackleton and Grange Park	81.5	85.1	73.3	90.4	67.3	92.1	6.1	15.5
Harrold	82.4	85.3	97.7	94.7	85.6	88.6	7.8	17.2
Hatton Park	80.3	84.5	88.0	90.8	87.0	129.0	6.9	25.7
Irchester	80.0	83.5	95.9	115.4	89.5	103.2	8.4	21.3
Moulton	82.3	82.1	73.7	95.1	70.9	107.3	7.2	15.2
Olney	81.9	86.5	62.7	91.8	55.2	38.7	9.7	14.7
Rothwell and Mawsley	80.6	83.9	82.4	90.8	86.8	164.6	6.3	19.8
ZOI Minimum	77.8	81.1	62.7	80.0	55.2	38.7	4.5	11.8



	Life expectancy at birth (Male)	Life expectancy at birth (Female)	Deaths from all causes, under-75 years (SMR)	Deaths from respiratory diseases, all ages (SMR)	Deaths from causes considered preventable, under-75 years (SMR)	Emergency hospital admissions for intentional self-harm (SMR)	Smoking prevalence at age 15 (regular smokers) (% population)	Year 6 prevalence of obesity (including severe obesity) (% population)
Area	2016-2020	2016-2020	2016-2020	2016-2020	2016-2020	2016/17-2020/21	2014	2020/21-2022/23
ZOI Median	81.2	84.1	88.0	91.8	85.6	103.2	6.9	19.8
ZOI Maximum	82.4	86.5	114.4	145.1	120.3	164.6	9.7	28.6
Bedford	79.6	83.3	98.4	90.1	95.6	100.8	5.7	22.3
Milton Keynes	79.2	83.2	100.2	103.0	100.7	70.4	6.7	22.9
North Northants.	79.2	82.4	100.5	121.5	101.3	137.3	6.2	23.9
West Northamptonshire	79.8	82.9	99.8	101.3	96.4	169.4	6.2	20.0
England	79.5	83.2	100.0	100.0	100.0	100.0	5.4	22.5



- 18.6.27 Local health priorities are assessed and defined in the Joint Strategic Needs Assessments and Joint Health and Wellbeing Strategies for each of the four authority areas in the Wider Baseline Study Area. These have been identified and introduced in Section 18.3 and the accompanying **Volume 3, Appendix 18.1**.
- 18.6.28 In Bedford, the Joint Local Health and Wellbeing Strategy 2024 – 2027 (Ref.28) sets out the relevant priorities for Bedford Borough, which they refer to as their “key building blocks of health”. These involve supporting, fostering and actioning:
- Inclusive employment, lifelong education, and workplace health;
 - Sustainable built and natural environment;
 - Healthy homes;
 - The best start in life; and
 - Strong communities.
- 18.6.29 In Milton Keynes, the priorities as set out in the Lifelong Wellbeing: Our Ten Year Health and Wellbeing Strategy document (Ref.24) include:
- Supporting starting well, by stopping abuse and neglect, providing mental health and special educational support to children, and improving diet and access to green spaces for children;
 - Supporting living well, by stopping domestic abuse and exploitation, improving healthcare for adults with mental health problems and learning disabilities such as autism, reducing homelessness, and improving housing quality; and
 - Supporting aging well, by maintaining healthcare and social care for an aging population, and promoting specialist support for dementia, end of life care, and social isolation.
- 18.6.30 The Joint Health and Wellbeing Strategy for North Northamptonshire is currently subject to further consultation and engagement and therefore is not published. That notwithstanding, the Joint Strategic Needs Assessment (Ref.11) identifies indicates that areas of key challenges and focus for North Northamptonshire are improving health and wellbeing outcomes in relation to physical activity, good food and healthy eating, healthy weight, and improving and supporting mental health in adults.
- 18.6.31 West Northamptonshire’s Joint Health and Wellbeing Strategy 2023-2028 (Ref.17) sets out five key approaches to shape strategic health and wellbeing ambitions in the local authority area. These key approaches are: prevention as a priority, tackling health and wellbeing inequalities, putting importance on ‘place’ and local assets, using an evidence-based and community insight led approach, and utilising co-production of the strategy.

Social Environment

Housing and Accommodation

- 18.6.32 The existing baseline conditions relating to housing and accommodation are set out in Section 17.6 of **Chapter 17: Socio-Economics, Tourism and Recreation**. A summary of the baseline conditions relevant to human health are set out below.
- As of 2023, the Wider Baseline Study Area has an affordability ratio (between median average house value and the average (median) workplace-based full-time earnings) in the range of 8.2 to 9.7 across the four authority areas therein. This is higher than the national average for England and Wales of 8.14, and substantively greater than the affordability threshold of 5.0;
 - Across the Wider Baseline Study Area, there is a suitable supply of land for new housing, although this includes a significant projected undersupply in West Northamptonshire;
 - An estimated 19.3% of households in the Wider Baseline Study Area are in private rental accommodation. Applying a conservative estimate of likely vacancy and availability for



occupation, 5.2% of private rental properties – some 135 in the ZOI and 5,100 in the Wider Baseline Study Area – may be available for temporary occupation by construction workers.

- In addition to permanent accommodation, the Wider Baseline Study Area hosts an estimated 13,500 serviced accommodation rooms, of which a minimum of 14% (1,890) are estimated to be available for use by construction workers.

18.6.33 Sectors of the population most sensitive to changes to the housing and accommodation environment are those living in locations where access to suitable housing is poorest, and sub-population groups including those in unsuitable, cramped and/or temporary accommodation, and people experiencing long-term homelessness.

Open Space, Leisure and Play

18.6.34 The existing baseline conditions relating to open space, leisure and play are set out in Section 17.6 of **Chapter 17: Socio-Economics, Tourism and Recreation**. A summary of the baseline conditions relevant to human health are set out below.

18.6.35 The ZOI is host to a well-connected network of PRowS and permissive recreational routes, which are important for both connectivity, and personal activity and wellbeing. A substantial number of these PRowS and one permissive footpath cross the Sites and the Cable Route Search Area. The ZOI also boasts a good number of leisure and recreation facilities including navigable waterways, formal sports recreation grounds, recreational aviation facilities, equestrian centres, and a small number of recreational play and informal sport areas in local villages and settlements for children.

18.6.36 Overall open space, leisure and play facilities in the ZOI provide a range of opportunities and recreation activities, catering for a large range of ages and levels of mobility and fitness.

18.6.37 Sectors of the population most sensitive to changes to conditions relating to open space, leisure and play are young people, and adults who experience limited activity either as a result of lifestyle, or as a result of a long-term disability.

Transport Modes, Access and Connections

18.6.38 The existing baseline conditions relating to transport modes, access and connections are set out in Section 13.6 of **Chapter 13: Transport and Access**. A summary of the baseline conditions relevant to human health are set out below. The Study Area for Transport and Access is defined by the Scheme extents, and the local and strategic highway networks likely to be used for construction, operational, and decommissioning vehicle movements, as shown in **Figure 13.1** in **Chapter 13: Transport and Access**.

18.6.39 A large number of PRowS and permissive recreational routes lie adjacent to or cross the Sites and Cable Route Search Area. A total of 54 PRowS and permissive recreational routes are tabulated in Table 17.11 in **Chapter 17: Socio-Economics, Tourism and Recreation**. The density of PRowS and permissive recreational routes in the Study Area (for Transport and Access) provides good levels of connectivity between communities, and provide a good level of access to the countryside and between settlements for non-vehicular travel. Roadside footpaths, cycle paths, and on-road cycle infrastructure is limited in the Study Area (for Transport and Access), particularly outside built-up areas. Inter-settlement infrastructure is limited to:

- Footpath along Old Rd/Walgrave Rd between the village of Old and Walgrave, predominantly on the northern side of the road, but crosses to the south side for a total of 600m to service the hamlet of Cherry Hill;
- Shared foot and cycle path roadside along the A43 from Kettering to the junction with Kettering Road, Hannington (total of 6km), includes un-signalled at-grade crossings of the A14/A43 Broughton Interchange, and “Mawsley” roundabout;
- Narrow footpath along Mears Ashby Road, Earls Barton from the A4500 junction to the junction with Washbrook Lane. Crossings at the A4500 junction are only partially signalled for pedestrian users: an un-signalled crossing is required for pedestrian connectivity to Earls Barton village;



- Footpath along B573 between the village of Earls Barton and Great Doddington, predominantly on the southern side of the road; and
- Footpath along Grendon Road from the A45/Station Road underpass to the southern side of the River Nene.

18.6.40 No part of the Scheme lies more than 10 miles (16km) from the nearest railway station, at Kettering, Wellingborough, or Northampton. All stations have direct services connecting to London, Birmingham, Nottingham, Corby, Bedford, Luton as well as other nearby settlements.

18.6.41 The communities nearest the Scheme also host a number of bus services operated by Stagecoach Midlands and by the Cogenhoe and Whiston Parish Council Village Hopper Bus. Services to smaller villages are less frequent, while Earls Barton benefits from up to five buses per hour between Northampton and Wellingborough during weekdays. Mears Ashby is the largest settlement in the Study Area (for Transport and Access) with no bus services.

18.6.42 Preliminary review of road and pedestrian safety within the Study Area (for Transport and Access) has been undertaken as set out in **Chapter 13: Transport and Access**, and will be expanded upon and assessed in full in the ES, but effects of the Scheme on road and pedestrian safety are not anticipated to be significant.

Community Identity, Culture, Resilience and Influence

18.6.43 The ZOI covers a number of settlements, and as such a number of localised communities. Many of these communities are centred around villages with a historic core with key community buildings or spaces such as churches or areas of greenery and parkland that provide a community focal point, even where gradual population growth, and built development has increased the sizes of these settlements. Community culture is also likely to be influenced by access and connection to the countryside as a result of the semi-agricultural landscape and provision of PRoWs to access it, particularly in the context of the ZOI's proximity to large urban areas. The existing baseline conditions relating to landscape and visual impacts are set out in **Chapter 8: Landscape and Visual Impact**.

18.6.44 The ZOI is host to only a small number of existing solar PV developments, notably at Sywell Park and in Warrington. A small number of other solar farms are located in the surrounding areas, including at Irchester. Other grid infrastructure is primarily defined by the National Grid substation at Grendon and overhead transmission lines radiating away from it. Large scale energy infrastructure is therefore relatively novel in this area and as such the local population is likely to be more sensitive to changes as a result of the Scheme. Furthermore, the ZOI has not hosted any other NSIP of any type since their establishment under the Planning Act 2008 (Ref.4). Given the likely reduced level of experience within the community of NSIPs and large scale infrastructure projects, it may be appropriate for greater levels of community engagement during construction, operation and decommissioning to be put in place to ensure community influence and understanding of the Scheme is at a suitable level.

18.6.45 The sensitivity of the population to changes to community resilience and influence will also be reliant on the scope of pre-application consultation being undertaken as part of the DCO process. Whilst this does not explicitly form part of the assessment, good standards of consultation (as set out in the Statement of Community Consultation) will help give the community sufficient opportunity to engage with the Scheme's design, mitigation requirements, and their eventual implementation.

Economic Environment

Education and Training

18.6.46 The existing baseline conditions relating to education and training are set out in **Chapter 17: Socio-Economics, Tourism and Recreation**. A summary of the baseline conditions relevant to human health are set out below.

18.6.47 The proportion of the population between the ages 16-64 years old achieving no qualifications in the Wider Baseline Study Area varies significantly by authority area from 3.6-7.7%, with a resultant rate in the Wider Baseline Study Area of 6.0%. This is consistent with, albeit slightly lower than, the national rates for England (6.2%) and the UK (6.6%).



- 18.6.48 Attainment of the equivalent of a national vocational qualification (NVQ) Level 4 and higher qualifications is also widely varied across the Wider Baseline Study Area, ranging from 27.9-53.0% by authority area. Across the Wider Baseline Study Area, the overall rate of Level 4 and higher qualifications stands at about 42.0%, compared to 46.7% in England, and 47.1% across the UK.
- 18.6.49 The population of the Wider Baseline Study Area is also identified as more likely than the national average to be deprived of access to suitable education and skills attainment, although this is of greatest concern in the former districts of Corby, Wellingborough, and Northampton.
- 18.6.50 Members of the population with poor qualification attainment will be most sensitive to changes the provision of education and training.

Employment and Income

- 18.6.51 The existing baseline conditions relating to employment and income are set out in Section 17.6 of **Chapter 17: Socio-Economics, Tourism and Recreation**. A summary of the baseline conditions relevant to human health are set out below.
- As of March 2024, the Wider Baseline Study Area has an economic activity rate within members of the working age (16-64-year-old) population of 81.0%. This is substantially higher than the national average for England (78.8%) and the UK (78.5%);
 - For the year up to March 2024, the unemployment rate in the Wider Baseline Study Area was 2.8%, substantially lower than the national average for England (4.0%) and the UK (3.9%). Data for the Wider Baseline Study Area shows the overall trend from 2014-2024 for the Wider Baseline Study Area largely follows the national trend but shows far more exaggerated year-on-year fluctuations, but is generally lower than national rates;
 - For residents within the Wider Baseline Study Area, the approximated median annual gross salary for full-time workers (in 2023) was £34,200. This is marginally lower than the median of England, at £35,100, and the UK median, at £35,000. For workers within the Wider Baseline Study Area, the approximated median annual gross salary for full-time employment (in 2023) was £33,900. This is marginally lower than the median for residents, and is resultantly lower than that of England and the UK median.
- 18.6.52 As of February 2024, the proportion of 16-64 year olds claiming either Jobseekers Allowance (Ref.56) or Universal Credit where in the “searching for work” conditionality group (Ref.57) in the ZOI was 2.4%. This is substantially lower than the claimant rate across the Wider Baseline Study Area (3.5%, ranging from 3.1-4.1% dependent on authority area), and significantly lower than the national rate for England and Wales (3.9%).
- 18.6.53 Changes to baseline conditions relating to employment and income are most likely to affect sub-populations who are deprived of access to suitable employment opportunities and to suitable wages, and those who are unemployed.

Bio-physical Environment

Climate Change Mitigation and Adaptation

- 18.6.54 The existing baseline conditions relating to climate change, mitigation, and adaptation are set out in **Chapter 7: Climate Change**. A summary of the baseline conditions relevant to human health are set out below.
- The current use of the Sites and the Cable Route Search Area predominantly consists of arable land, managed trees and hedgerows. The baseline agricultural greenhouse gas (GHG) emissions are dependent on the soil and vegetation types present, and the fuel used for the operation of any plant and machinery on the Sites. As a conservative approach, the baseline activities on site will be assumed to be generating zero emissions of CO₂e;
 - The most recent available and completed historic climate data acquired by the Met Office from the closest Met Office Station to the Scheme (Oxford) for the 30-year climate period of 1981 – 2010 will provide the current baseline for the Climate Change Risk Review;



- It is anticipated that the future baseline will be different from the current present-day baseline, due to changes in climate. For this assessment, UK Climate Projections 2018 probabilistic projections have been provided for 30-year periods from 2020 – 2099; and
- In the absence of the Scheme, it is considered there will be no change to the future baseline for climate change. The baseline details (including the energy generated by fossil fuels) are not anticipated to change in the absence of the Scheme.

18.6.55 Vulnerable populations to climate change include those with long-term cardiovascular and respiratory illnesses or disabilities who are at greater risk due to reduced air quality, elderly and very young children who are at greater risk of heatstroke, people living in poor quality housing, and people living in locations susceptible to natural disasters, such as floods and landslips exacerbated by climate change.

Air Quality

18.6.56 The existing baseline conditions relating to air quality are set out in Section 16.6 of **Chapter 16: Air Quality**. A summary of the baseline conditions relevant to human health are set out below. The Study Area for Air Quality is defined in Section 16.4 of **Chapter 16: Air Quality** as up to 250m from, the boundary of the Sites and the Cable Route Search Area and site entrances, and up to 50m of the route(s) used by construction vehicles on the public highway.

- The 2023 Air Quality Annual Status Report produced by North Northamptonshire Council stated that during 2022, none of its 100 diffusion tube monitoring sites exceeded the annual mean Air Quality Strategy (AQS) objective for NO₂ or hourly mean air quality objective for NO₂;
- There are eight Air Quality Management Area (AQMA) in West Northamptonshire all of which were declared for exceedance of the NO₂ annual mean AQS Objective. In 2021, only one of the AQMA contains monitoring sites that exceed the annual mean AQS Objective for NO₂. Northampton AQMA No. 4 is the closest AQMA to the Scheme, located approximately 5.5km from the closest boundary of the Sites and Cable Route Search Area and is situated along the A5095, to the north of the city of Northampton. Monitoring data recorded within Northampton AQMA No. 4 during 2021 showed an exceedance in 2021 at monitoring site 57 with an annual mean NO₂ concentration of 42.3 µg m⁻³ in 2021;
- There is one AQMA within the administrative boundary of Milton Keynes City Council - Olney AQMA. Olney AQMA was declared in 2008 for exceedance of the annual mean AQS Objective for NO₂. The most recent monitoring within the AQMA was below the annual mean AQS Objective in 2022;
- North Northamptonshire Council, West Northamptonshire Council and Milton Keynes City Council collectively have 27 passive monitoring sites within 5km of the Sites and Cable Route Search Area. In the past five years there was one exceedance in the NO₂ annual mean AQS Objective at W1 in 2019. This site is located in the centre of Wellingborough approximately 3.5km east of the closest boundary of the Sites and Cable Route Search Area. 2021 data shows most of the sites are well below the AQS NO₂ annual mean Objective of 40 µg/m³ with the exception of monitoring site 91 (approximately 4km south-west from the closest boundary of the Sites and Cable Route Search Area along the main access road to Crow Lane industrial estate) where the annual mean concentration was 39.8 µg/m³;
- A review of background pollutant concentrations for the Sites has been carried out using Defra predicted annual mean background maps for 2024, which presents the highest predicted background NO₂, PM₁₀ and PM_{2.5} concentrations for each Site within the Scheme. The predicted background concentrations are well below the relevant AQS objectives for each pollutant.

18.6.57 Sub-population groups living in areas with higher background concentrations of air pollutants are of greatest vulnerability to any increased pollution arising as a result of the Scheme. This applies



predominantly to babies and young children, elderly people, and anyone with long-term respiratory illnesses.

Water Quality or Availability

- 18.6.58 The existing baseline conditions relating to water quality or availability are set out in Section 10.6 of **Chapter 10: Hydrology, Flood Risk and Drainage**. A summary of the baseline conditions relevant to human health are set out below. The Study Area for hydrological environment (which is being applied for this section) is the Sites, Cable Route Search Area, and any immediately adjacent watercourses and water bodies as defined in Section 10.4 of **Chapter 10: Hydrology, Flood Risk and Drainage** and shown in **Figures 10.1-10.8**.
- 18.6.59 The baseline assessment of fluvial (river) and pluvial (surface water) flood risk identifies that the majority of the Sites are at low risk of flooding, with the exception of Green Hill F, which is low to moderate risk of fluvial flooding, and Green Hill BESS which is of moderate risk of fluvial flooding.
- 18.6.60 The Cable Route Search Area is predominantly at very low risk of fluvial (river) and pluvial (surface water) flooding, but contains specific location of increased risk. These are between Green Hill E and F and the BESS Site, where it crosses and lies in the vicinity of the River Nene, and in the western extent of the Cable Route Search Area and along parts of the eastern Cable Route Search Area boundary near to existing watercourses.
- 18.6.61 In absence of the Scheme, it is considered there will be no change to the future baseline conditions of the Study Area.
- 18.6.62 With regard to human health, the level of risk of fluvial and pluvial flooding is also conservatively applied to risk to on-site workers and to mobilisation of pollutants from the Sites to watercourses.
- 18.6.63 Parts of the population reliant on groundwater or reservoir water for consumption and bathing are most likely to be vulnerable to reduced water quality as a result of pollutants or runoff from the Scheme.

Land Quality

- 18.6.64 The existing baseline conditions relating to land quality (including ground contamination) are set out in Section 22.6 of **Chapter 22: Ground Conditions and Contamination**. The Study Area for ground conditions is defined as the Sites and Cable Route Search Area. A summary of the baseline conditions relevant to human health are set out below.
- There are no licensed groundwater abstractions for potable water within 500m of any of the Sites, or along the Cable Route Search Area. Non-potable water groundwater abstractions have been identified in proximity to all Sites except Green Hill D for agricultural and domestic use.
 - Mining activity for sand and gravel extraction has been recorded at, or in close proximity to Green Hill A, C, E, F, BESS, and on the Cable Route Search Area.
 - Risk of unexploded ordnance (UXO) is recorded as low except for at Green Hill G, where this risk is up to medium.
 - In absence of the Scheme, it is considered there will be no change to the future baseline conditions of the Study Area.

Noise and Vibration

- 18.6.65 The existing baseline conditions relating to noise and vibrations are set out in Section 14.6 of **Chapter 14: Noise and Vibration**. A summary of the baseline conditions relevant to human health are set out below. The Study Area for noise and vibration is defined as the area within, and within a 500m offset from the Sites and the Cable Route Search Area.
- 18.6.66 The baseline noise environment has been established following noise surveys undertaken at a total of 25 monitoring stations across Green Hill A-G and Green Hill BESS.
- 18.6.67 A number of subsections of the population may be more vulnerable to noise and vibration, principally those living closest to noise sources, those where the contrast between existing baseline and projected noise and vibrations is greatest, but additionally those with sensory



sensitivities and impairments to whom additional noise impacts would have a disproportionate effect on amenity.

Radiation (Electromagnetic Fields)

18.6.68 The existing baseline conditions relating to radiation – specifically EMF are set out in Section 21.6 of **Chapter 21: Electromagnetic Fields**. The Study Area for EMF is defined as the Cable Route Search Area and its immediate vicinity. A summary of the baseline conditions relevant to human health are set out below.

- There are existing cable routes and electrical infrastructure within the Sites and surrounding areas. These will have associated electromagnetic fields. The Scheme does not use any existing electrical infrastructure, up to its Point of Connection at the National Grid substation at Grendon.
- In absence of the Scheme, it is considered there will be no change to the future baseline conditions of the Study Area.

18.6.69 The greatest risk to human health from EMF is as a result of prolonged exposure, and concerns regarding exposure from major electrical infrastructure. Vulnerable sub-populations therefore include those living, working, and studying in close proximity to electrical infrastructure.

Institutional and Built Environment

Health and Social Care Services

18.6.70 The ZOI contains two General Practice (GP) healthcare facilities, which provide the primary level of healthcare to the general population. These are located at Mawsley Village Surgery, and Earls Barton Medical Centre. Both Mawsley and Earls Barton also have dental clinics. A number of other GP surgeries can be found in larger settlements near the ZOI such as Onley, Denton, and in the urban areas for Northampton and Wellingborough.

18.6.71 The ZOI also contains at least two specialist care facilities. Grangefield in Earls Barton provides residential care for elderly and disabled residents. Oakfield in Easton Maudit provides specialist residential care for adults with learning disabilities who require full time care.

18.6.72 A small number of hospitals with specialist services can be found in major settlements in the Wider Baseline Study Area, such as Kettering, Northampton, Wellingborough, Bedford and Milton Keynes. Accident and Emergency Departments can be accessed at the Northampton General Hospital, Kettering General Hospital, Bedford Hospital, and Milton Keynes University Hospital.

Future Baseline

18.6.73 This section considers changes to the baseline conditions, described above, that might occur in the absence of the Scheme and during the time period over which the Scheme would be in place. The future baseline scenarios are set out in **Chapter 2: EIA Process and Methodology**.

18.6.74 In absence of the Scheme, it is considered that with projected population increase, there is likely to be a demographic shift towards an aging population, which is anticipated to bring forward human health impacts as a result of increased age-related illnesses, greater health and social care requirements, and a proportional reduction in working-age people to support and maintain societal infrastructure. These factors are likely to result in a future population baseline in the assessment timeframe for the Scheme's decommissioning phase that is of greater sensitivity to changes to human health conditions. Therefore, the future baseline will be considered in assessing the sensitivity of future human health receptors conditions during the Scheme's operational and decommissioning phases.

18.7 Embedded Mitigation and Enhancement Measures

18.7.1 The way that potential environmental impacts have been or will be prevented, avoided or mitigated to reduce impacts to a minimum through design and/or management of the Scheme is outlined in this section and will be considered as part of the assessment of the likely significant effects. Proposed environmental enhancements are also described where relevant.



18.7.2 The following embedded mitigation and enhancement measures for construction, operation, and decommissioning have been incorporated into the Scheme design, with detailed proposals and locations to be submitted with the DCO application. Additional mitigation measures identified in other chapters within the PEIR are included here, so that residual effects are captured in the assessment of likely human health effects. These measures are proposed to be secured through the following documents, for which outline versions will be submitted with the DCO submission:

- Outline Construction Environmental Management Plan (OCEMP);
- Outline Construction Traffic Management Plan (OCTMP);
- Outline Public Rights of Way Management Plan (OPRoWMP);
- Outline Landscape and Ecological Management Plan (OLEMP);
- Outline Operational Environmental Management Plan (OOEMP);
- Outline Skills, Supply Chain and Employment Plan (OSSCEP); and
- Outline Decommissioning Environmental Management Plan (ODEMP).

Embedded Construction Mitigation Measures

18.7.3 The preliminary layout and configuration of the Scheme have been designed to include measures to minimise impacts on human health receptors during the Scheme's construction phase.

18.7.4 A description of the extents of the Scheme, and any embedded mitigation measures therein are set out in detail in each of the topic chapters as well as presented in the commitments register – which is found at **Chapter 26 Commitments Register**.

18.7.5 Construction is anticipated to take place across an approximately two-year / 24 month period. An all-encompassing mitigation measure is for the construction schedule for the Scheme to retain appropriate flexibility to be phased and staggered across the Sites and Cable Corridor to reduce impacts on environmental receptors. With specific regard to human health receptors, the embedded flexibility in the construction timescale of the Scheme could be utilised to reduce the intensity of peak construction activities on the Scheme, and redistribute where activities are taking place to minimise peak human health impacts in any single location.

18.7.6 The embedded visual mitigation includes designing the preliminary layout of the Sites to provide suitable buffers from roads, PRoWs, and neighbouring buildings. These measures seek to reduce the impacts on the desirability of these receptors for leisure and play, and local perceptions of community identity.

18.7.7 During construction, the OCEMP commits to providing a Community Liaison Manager, to whom any comments, concerns or complaints about the development of the Scheme can be raised, either directly by members of the public, or via elected representatives on parish or town councils, councillors, and Members of Parliament. This role should be used to continue open channels of communication between the community and the operators of the Scheme as set up during the application and DCO process, and through the discharge of requirements process. In doing so, this should mitigate impacts on community identity and influence by allowing the community to continue to be involved in the development of their local environment as the Scheme is constructed.

18.7.8 The Scheme also includes a number of topic specific embedded mitigation measures as set out in other chapters of the PEIR, and will be secured through the OCEMP at the point of DCO submission:

- Section 7.7 of **Chapter 7: Climate Change**:
 - Utilise the waste hierarchy to avoid, reduce, reuse and recycle waste to minimise embodied carbon during construction;
 - Adopt good industry practices to reduce greenhouse gas emissions;
 - Reduce vehicular emission through encouraging lower carbon transport options and reducing worker trips to the Scheme; and



- Implementation of flood risk management to ensure climate change resilience.
- Section 8.7 of **Chapter 8: Landscape and Visual Impact:**
 - Inclusion of standard offsets from landscape features and visual receptors to reduce impact on perception of the landscape; and
 - Further mitigation measures to be determined in the ES based on the final Scheme design for DCO submission.
- Section 10.7 of **Chapter 10: Hydrology, Flood Risk and Drainage:**
 - Implementation of flood risk management to ensure climate change resilience;
 - Implementation of permeable surfaces for site accesses; and
 - Embedded offsets from watercourses and monitoring of quantum of water discharge and resultant water quality during construction.
- Section 13.9 of **Chapter 13: Transport and Access:**
 - The selection of the most appropriate and unconstrained routes for construction traffic and HGV access to the Scheme;
 - Management of construction vehicle movements to be secured through a Construction Traffic Management Plan (CTMP);
 - Abnormal loads movements to be determined and addressed in the ES;
 - Additional construction traffic measures including staggered work programmes and working hours, signage to enforce preferred routes, banksmen to control movements at sensitive point (such as PRow crossings); and
 - Provision of a Worker Travel Plan to encourage car-sharing and use of minibuses.
- Section 14.7 of **Chapter 14: Noise and Vibration:**
 - Screening and noise volume control near sensitive receptors, including adopting best practice measures;
 - Adherence to time limits for noisy works, and ensure planning conditions for night works where required are agreed in advance; and
 - Adoption of best practice methods to reduce vibration impacts.
- Section 16.7 of **Chapter 16: Air Quality:**
 - Sensitive siting of temporary works;
 - Incorporation of construction dust management and monitoring;
 - Adoption of good practice tools and sensitive siting of machinery and dust generating activities;
 - Siting of Green Hill BESS away from residents to reduce air quality impacts in the potential case of fire; and
 - Any other measures as required to reduce air quality and dust impacts as determined upon completion of the full assessment in the ES, and to be set out in the OCEMP.
- Section 17.7 of **Chapter 17: Socio-economics, Tourism and Recreation:**
 - Use of flexibility within the construction schedule to phase the construction programme to reduce peak impacts on temporary accommodation demand;
 - Embedded design offsets to provide suitable buffers from roads, PRowS, neighbouring buildings, and other tourism destinations and other recreational features to reduce the visual impacts on the desirability of these receptors for tourism and recreational use;



- Mitigate visual impacts from construction operations, lighting, and the location of construction equipment to reduce the level of impact on the desirability of the ZOI;
- Implementation of transport-related mitigation measures to reduce impacts on recreational use of PRoWs and other recreational routes including local highways; and
- Implementation of enhancement measures to improve the level of local education and skills uplifting, skills and qualification attainment, and increase local recruitment, procurement and employment, including additional potential targeted measures for agricultural workers to be supported in moving to diversified agricultural practices, to be set out through the OSSCEP.
- Section 22.7 of **Chapter 22: Ground Conditions and Contamination:**
 - Implementation of standard good working practices including adherence to health, safety and environmental precautions for workers, dust suppression and management, and appropriate storage of topsoil;
 - A 'Discovery Strategy' protocol shall be included to ensure that contamination identified during construction is assessed by a specialist in land contamination;
 - Horizontal directional drilling (HDD) is to be employed for the construction and placement of the cable route beneath the River Nene;
 - Bulk fuels or chemicals used onsite during the construction phases should be stored appropriately, within an impervious bund of 110% of the volume of the container, with an appropriate spill response plan implemented;
 - All equipment and vehicles will be regularly maintained and inspected to prevent leaks;
 - Any part of the Scheme in areas of elevated radon potential will be subject to radon protective measures where any temporary buildings (such as in construction compounds) are proposed;
 - A Detailed UXO Risk Assessment include the establishment of a UXO Risk Management Plan should be implemented prior to construction and pre-construction intrusive ground surveys in areas of elevated UXO risk; and
 - Areas of alluvium and made ground that may be unstable should not have conventional shallow foundations for infrastructure or temporary buildings.

Embedded Operation Mitigation Measures

- 18.7.9 Due to the proposed operational lifetime of the Scheme being up to 60 years, it is important that the preliminary layout and configuration of the Scheme have been designed to include measures to minimise impacts on human health receptors during the Scheme's operation.
- 18.7.10 As during construction, the embedded visual mitigation includes designing the preliminary layout of the Sites to include suitable buffers from roads, PRoWs, and neighbouring buildings. Furthermore, proposed landscaping planting is likely to mature over the lifetime of the Scheme, which will go some way to enhance the enjoyment of the landscape for residents and visitors to the area. These measures seek to reduce the impacts on the desirability of these receptors for leisure and play, and local perceptions of community identity.
- 18.7.11 Furthermore, the provision of a Community Liaison Manager shall be implemented through the OOEMP to provide a dedicated community contact to the Scheme's operators during peak operational and maintenance activities such as BESS and PV infrastructure replacements. An acting community liaison contact who is part of the Scheme's operational team should also be in position during the lifetime of the Scheme to ensure community concerns are heard, responded to and suitably addressed. This should therefore go some way to reduce the magnitude of impact on human health in the communities most affected by the Scheme.



- 18.7.12 The Scheme also includes a number of topic specific embedded mitigation measures as set out in other chapters of the PEIR, and will be secured through the OOEMP at the point of DCO submission:
- Section 7.7 of **Chapter 7: Climate Change**:
 - Continuation of good practice measures from construction where applicable; and
 - Conduct regular planned maintenance during operation to optimise the efficiency of onsite infrastructure.
 - Section 8.7 of **Chapter 8: Landscape and Visual Impact**:
 - Inclusion of standard offsets from landscape features and visual receptors to reduce impact on perception of the landscape; and
 - Further mitigation measures to be determined in the ES based on the final Scheme design for DCO submission.
 - Section 10.7 of **Chapter 10: Hydrology, Flood Risk and Drainage**:
 - Implementation of flood risk management to ensure climate change resilience;
 - Implementation of permeable surfaces for site accesses;
 - Adoption of diffuse pollution management for runoff water and water used for firefighting; and
 - Locating critical infrastructure outside areas of modelled flood risk, including potential additional risks associated with climate change.
 - Section 13.9 of **Chapter 13: Transport and Access**:
 - Phasing of Scheme infrastructure replacement works to ensure traffic impacts are minimised, are not combined from multiple Sites, and do not interrupt the supply of generated power to the National Grid from the Scheme.
 - Section 14.7 of **Chapter 14: Noise and Vibration**:
 - Continuation of best practice measures for noise and vibration during operation and maintenance activities, as implemented for construction works.
 - Section 16.7 of **Chapter 16: Air Quality**:
 - Sensitive siting of permanent onsite infrastructure works;
 - Adoption of good practice tools;
 - Siting of Green Hill BESS away from residents to reduce air quality impacts in the potential case of fire;
 - Measures to limit human exposure to air pollution in the event of a fire through notification of potentially affected residents, cancellation of outdoor events and potentially moving affected residents to a cleaner air location, to be secured through OBFSMP; and
 - Any other measures as required to reduce air quality and dust impacts as determined upon completion of the full assessment in the ES, and to be set out in the OOEMP.
 - Section 17.7 of **Chapter 17: Socio-economics, Tourism and Recreation**:
 - Continuation of income to agricultural workers displaced by the Scheme;
 - Embedded design offsets to provide suitable buffers from roads, PRoWs, neighbouring buildings, and other tourism destinations and other recreational features to reduce the visual impacts on the desirability of these receptors for tourism and recreational use;



- Implementation of mitigation and best practice measures during peak operation and maintenance activities, including transport-specific measures to reduce impacts on recreational route users, as implemented for construction works; and
- Implementation of long-term enhancement measures to improve the level of local education and skills uplifting, skills and qualification attainment, and increase local recruitment, procurement and employment, including continuing measures for agricultural workers to be supported in moving to diversified agricultural practices, to be set out through the OSSCEP.
- Section 21.7 of **Chapter 21: Electromagnetic Fields:**
 - Design of cable routes to be a minimum setback from sensitive receptors (residences, workplaces, schools) so that ICNIRP reference levels are not exceeded in these locations; and
 - Programme of maintenance for electrical equipment and infrastructure to maintain operational guidelines.
- Section 22.7 of **Chapter 22: Ground Conditions and Contamination:**
 - Implementation of standard good working practices including adherence to health, safety and environmental precautions for workers;
 - Real-time monitoring of solar and Green Hill BESS infrastructure to identify any signs of potential leakage, wear, or faults;
 - Management of fire suppressants to prioritise environmentally safer foams or fire waters, and suitable containment for contaminated fire water in the event of a BESS fire;
 - Implementation and monitoring of high-quality, durable sheathing and insulation materials for underground cabling to prevent leaks and protect cables from physical damage, moisture, and corrosion;
 - Bulk fuels or chemicals used onsite during infrastructure maintenance and replacement activities should be stored appropriately, within an impervious bund of 110% of the volume of the container, with an appropriate spill response plan implemented; and
 - All equipment and vehicles will be regularly maintained and inspected to prevent leaks; and
 - Areas of alluvium and made ground that may be unstable should not have conventional shallow foundations for onsite infrastructure or permanent buildings.

Embedded Decommissioning Mitigation Measures

- 18.7.13 The decommissioning of the Scheme is likely to impact upon human health receptors in a similar manner to during construction, and so embedded mitigation measures set out for construction are also applicable to decommissioning.
- 18.7.14 As during construction, the implementation of a dedicated Community Liaison Officer should be secured through the ODEMP to provide a community contact to address and respond to concerns, anxieties, or complaints by the community.
- 18.7.15 The Scheme also includes a number of topic specific embedded mitigation measures as set out in other chapters of the PEIR, and will be secured through the ODEMP at the point of DCO submission:
- Section 7.7 of **Chapter 7: Climate Change:**
 - Utilise the waste hierarchy to avoid, reduce, reuse and recycle waste to minimise embodied carbon during construction;
 - Adopt good industry practices to reduce greenhouse gas emissions;



- Reduce vehicular emission through encouraging lower carbon transport options and reducing worker trips to the Scheme;
- Implementation of flood risk management to ensure climate change resilience as suitable and required at the point of decommissioning.
- Section 10.7 of **Chapter 10: Hydrology, Flood Risk and Drainage:**
 - Implementation of good industry practices as during decommissioning.
- Section 14.7 of **Chapter 14: Noise and Vibration:**
 - Continuation of best practice measures for noise and vibration during decommissioning, as implemented for construction works.
- Section 16.7 of **Chapter 16: Air Quality:**
 - Implementation of best practice measures for air quality during decommissioning, including transport-specific measures to reduce impacts on recreational route users, as implemented for construction works; and
 - Any other measures as required to reduce air quality and dust impacts as determined upon completion of the full assessment in the ES, and to be set out in the ODEMP.
- Section 17.7 of **Chapter 17: Socio-economics, Tourism and Recreation:**
 - Use of flexibility within the decommissioning schedule to reduce peak impacts on temporary accommodation demand;
 - Implementation of mitigation and best practice measures during decommissioning works, as implemented for construction works; and
 - Optionality for cable infrastructure to be left in situ to minimise future impacts on agriculture and PRowS.
- Section 22.7 of **Chapter 22: Ground Conditions and Contamination:**
 - Implementation of standard good working practices during decommissioning, as during construction.

18.8 Assessment of Likely Significant Effects

18.8.1 Taking into account the embedded mitigation measures as detailed in Section 18.7, the potential for the Scheme to have likely significant effects on human health was assessed using the methodology as detailed in Section 18.4 of this Chapter. In the sections below, effects during the construction, operation and decommissioning phases of the Scheme are discussed.

Construction

18.8.2 The construction of the Scheme is estimated for the purpose of EIA to be undertaken over an approximately two-year / 24 month period. Subject to when the DCO is approved, the earliest construction may start is quarter 2 2027 and will run to quarter 2 2029. The Scheme retains flexibility for construction across the Sites and Cable Corridor to be undertaken in parallel or as a phased development. To ensure the robustness of this assessment in evaluating the worst-case scenario, the construction of all Sites and Cable Corridor in parallel has been assessed.

Social Environment

Housing

18.8.3 Effects of the Scheme on access to housing during construction have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**. Paragraphs 17.8.17-18 therein identify up to a medium-term minor adverse effect to access to permanent housing as a result of accommodating inbound construction workers, and up to a potential short- to medium-term temporary minor adverse effect on access to temporary



accommodation (largely private rental properties) to accommodate the peak inbound construction workforce requiring accommodation in the Wider Baseline Study Area.

18.8.4 Access to appropriate housing is a determinant of health across both physical health, and mental health and wellbeing. Physical health may be affected by having suitable quality housing, potential overcrowding, and lack of access to suitable outdoor space. These then also impact upon mental health and the ability for people to maintain a suitable quality of life. Access to affordable housing is also a key determinant as this is a key pathway for people to improve their quality of life by being able to afford suitable accommodation. As a result, those most vulnerable to changes to the availability of housing are those currently in unsuitable (such as overcrowding or unsafe) housing, and those in or at risk of homelessness. Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation** identifies that the overall population is of medium sensitivity to changes in access to housing as a result of existing barriers to accessing housing but measured by the current greater than 5 years supply of housing land demonstrated by the authority in the Wider Baseline Study Area.

18.8.5 Resultantly, the effect on human health with regard to access to housing is therefore anticipated to be a temporary medium-term **minor adverse effect**.

Open Space, Leisure and Play

18.8.6 Likely effects on open space, leisure and play during construction have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**. Tables 17.16 and 17.17 therein identify up to moderate-minor adverse effects on the recreational use of PRoWs and permissive recreational routes, and up to moderate adverse effects on the recreational use of some high sensitivity long-distance recreational routes. Effects identified on recreational use of water bodies range from neutral to moderate-minor adverse effects, based on visual impacts on their recreational use and enjoyment. Preliminary assessment of the impacts on formal recreation and leisure facilities identify up to temporary medium-term minor adverse effects on recreational use, while moderate-minor adverse effect on the accessibility of recreational facilities for children and youth groups as a result of impacts on access and enjoyment of play spaces and youth sports facilities.

18.8.7 Impacts on open space, leisure and play as determinants of health are driven by reduced activity affecting physical health, while reduced enjoyment of recreational facilities (as a result of visual impact, or disruption to use) can reduce the mental health benefits associated with leisure and play. The influence of the Scheme may generate in-combination impacts, particularly where multiple leisure and play receptors are affected in a similar area. Overall, the magnitude of impact to open space, leisure and play is considered to be low, and adverse.

18.8.8 Children, and adults with limited activity are most vulnerable to changes to open space, leisure and play and therefore are of a **high** sensitivity. Existing baseline conditions demonstrate the 2km ZOI population contains a similar proportion of children to the Wider Baseline Study Area (para. 18.6.3), children (at Year 6) are less likely to be obese (an indicator of poor activity) than in the Wider Baseline Study Area (para. 18.6.26), and self-assessment of disability (as defined by the Equality Act 2010) is comparable with the Wider Baseline Study Area (para.18.6.9). Therefore, whilst these vulnerable groups are more sensitive to change, the overall population is not considered to be disproportionately more sensitive than the Wider Baseline Study Area or national expectation. As such, the sensitivity of the overall population to changes to open space, leisure and play is **low**.

18.8.9 Resultantly, the impact on human health with regard to open space, leisure and play is therefore anticipated to be a temporary medium-term **minor adverse effect**.

Transport Modes, Access and Connections

18.8.10 The ability for people to access public transport, and move around the Study Area is related to health and wellbeing primarily through ability to access healthcare, services and employment, and to ensure social connections and isolation are not adversely affected.

18.8.11 The preliminary transport assessment set out in **Chapter 13: Transport and Access** demonstrated that the only access road likely to experience substantial impacts from construction traffic is Highfield Road, Mears Ashby. The functional use of all other local access roads and



PRoWs are not anticipated to be severely impacted, and as such there are not anticipated to be significant effects to human health as a result of reduced levels of access to transport and connections arising from the Scheme.

- 18.8.12 On Highfield Road, combined construction traffic from both Green Hill Sites D and E is likely to contribute to a substantial increase in HGV traffic, also due to the low existing levels of HGV movements. Highfield Road, whilst having a number of properties along it does not provide access to any notable destinations for visitors, nor does it provide a unique link from Mears Ashby to any nearby destination or settlement. Therefore, impacts to human health are likely to be extremely limited to those who reside on Highfield Road. As the road does not have any footpath or cycle track associated with it, non-vehicular users are of a medium sensitivity to changes. The greatest magnitude effects to non-vehicular users are no greater than medium-term minor impacts to amenity, road user or pedestrian safety, or as a result of fear and intimidation on and by road users. This may therefore contribute towards perceptions of threat to physical safety, and an increased perception of isolation from the nearest settlement, Mears Ashby. As a result, residents and therefore users of Highfield Road are likely to experience up to a minor adverse effect on human health.
- 18.8.13 Highfield Road is not a public transport route, nor does increased traffic on Highfield Road prejudice against users of public transport or access to public transport links. As such, there is no further anticipated effect on human health as a result of changes to access to public transport.
- Community Identity, Culture, Resilience and Influence
- 18.8.14 Sense of community is a multi-faceted wider determinant of human health and is influenced by a number of factors that primarily impact upon mental health and wellbeing.
- 18.8.15 Community identity and culture with respect to people, and sense of place is likely to be particularly sensitive to change due to the character of the settlements and surroundings as set out in paragraphs 18.6.43-18.6.44. As such, the sensitivity of these communities to changes in the character of their surroundings is overall low across the ZOI, with a specific medium sensitivity applied to Mears Ashby, Earls Barton, Grendon, Easton Maudit, and Bozeat due to the expanse of the Scheme's construction works visible from these villages.
- 18.8.16 The level of sensitivity in the community's resilience and influence is governed by the scope of consultation to be held with communities pre-application, and the availability for further influence and engagement through the DCO process. When also consolidated with the limited exposure of the communities to NSIPs and large scale infrastructure projects, this will mean the sensitivity of the population to changes in resilience and influence is no less than medium.
- 18.8.17 The construction of the Scheme is anticipated to bring no greater than a short-term temporary negligible magnitude impact on resident population, and an anticipated neutral effect to resident age and health demographics across the Wider Baseline Study Area. The respective level of effect to community identity with respect to localised net migration during construction is therefore considered to be temporary, short-term, and negligible in any of the affected communities.
- 18.8.18 Based on the likely landscape and visual impacts set out in **Chapter 8: Landscape and Visual Impact**, the impact of the Scheme on community identity and culture and thus on the mental wellbeing of the population is likely to be negative and low in magnitude.
- 18.8.19 With respect of resilience and influence, the community is likely to have been engaged with the DCO process and so will be familiar with the construction programme, and likely impacts from construction works. With the embedded mitigation of a Community Liaison Officer available for community dialogue throughout the construction process, the community will continue to have opportunity to influence their surroundings if construction activities are not undertaken suitably or in accordance with the DCO or its certified documents (such as the OCEMP). Whilst community anxieties about the project may still be present, these are likely to be no more than of a low magnitude impact to community resilience and influence and thus on population mental health and wellbeing.
- 18.8.20 As a result of the medium sensitivity of this receptor, the likely human health effect as a result of changes to community identity, culture, resilience and influence is no greater than a medium-term temporary minor adverse effect.



Economic Environment

Education and Training

- 18.8.21 Likely effects on education and training during construction have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation** with residual effects subject to potential additional mitigation and enhancement measures set out in Section 17.9 therein. Paragraph 17.9.13 therein identifies that enhancement measures can lead to a medium-term temporary moderate-minor beneficial effect on skills and qualification attainment in the Wider Baseline Study Area.
- 18.8.22 Education and training are considered as determinants of health due to the beneficial impact on both physical and mental health and wellbeing as a result of direct ability to find and sustain work, and indirectly to improved socio-economic status and quality of life associated with access to better income as a result of suitable education and training. Overall, the magnitude of impact to education and training resulting from the Scheme is considered to be low, and positive.
- 18.8.23 People with existing limitations in access to suitable education and training are of a high sensitivity to changes in access to education and training. Existing baseline conditions demonstrate that geographically, this is most pertinent in the urban areas of Corby, Wellingborough and Northampton (para. 18.6.49). Across the population in the Wider Baseline Study Area, are less likely to have no qualifications (para. 18.6.47), but also less likely to have NVQ Level 4 or higher qualifications (para. 18.6.48) than the national proportion. As such, the sensitivity of the overall population to changes in access to education and training is medium.
- 18.8.24 Resultantly, the impact on human health with regard to education and training during construction is anticipated to be a temporary medium-term **minor beneficial effect**.

Employment and Income

- 18.8.25 Likely effects on employment and income during construction have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**. Paragraphs 17.8.26-17.8.27 therein identify a medium-term temporary minor beneficial effect on the labour force, and resultantly on economic prosperity and income in the Wider Baseline Study Area.
- 18.8.26 Employment and income are considered as determinants of health due to the beneficial impact on both physical and mental health and wellbeing as a result of sustain and improved socio-economic status and quality of life associated with suitable access to employment and income. Overall, the magnitude of the impact of the Scheme on employment and income is considered to be negligible, and positive.
- 18.8.27 People with existing limitations in access to suitable employment and income are of a medium sensitivity to changes to these determinants. Existing baseline conditions demonstrate that in the Wider Baseline Study Area, the levels of economic activity and unemployment are favourable compared to national trends, albeit income is slightly lower than national levels. Although there are geographic pockets within the Wider Baseline Study Area in which there are greater inequalities in access to employment and income, and therefore these populations may be more vulnerable, the sensitivity of the overall population is low.
- 18.8.28 Resultantly, the impact on human health with regard to employment and income during construction is anticipated to be a no greater than a temporary medium-term **minor beneficial effect**.

Bio-physical Environment

Climate Change Mitigation and Adaptation

- 18.8.29 The Scheme is not anticipated to induce significant adverse effects on human health during construction in respect of climate change mitigation and resilience. This will be ensured through protection of onsite construction workers through embedded flood risk management and climate change resilience mitigation (such as to protect workers from extreme temperature), and protection of wider human health through minimisation of construction greenhouse gas emissions and minimisation of waste.



Air Quality

- 18.8.30 Section 16.8 of **Chapter 16: Air Quality** sets out preliminary conclusions on the likely effects on air quality as a result of the construction of the Scheme, and identifies that effects of construction dust, construction vehicle emissions, and emissions from on-site plant are not anticipated to be significant. A full assessment of likely significant effects will be included in the ES.
- 18.8.31 Effects on air quality are most likely to impact children, and adults with preexisting cardiovascular diseases or long-term disabilities impacting breathing (such as asthma). Furthermore, those nearest the Sites and Cable Corridor, construction access points, and construction routes are most likely to experience effects. Table 18.9 above demonstrates that deaths due to respiratory illnesses are lower in the ZOI than the national average, although there are some wards within the ZOI of higher rates. This indicates that due to the presence of substantial inequalities, the health profile of the ZOI is at least of medium sensitivity to air quality impacts.
- 18.8.32 A full assessment of the impact on human health with regard to air quality will be undertaken in the ES. The preliminary conclusion, made on the basis that the preliminary assessment of effects on air quality during construction concludes that these effects are likely not significant, is that the human health effects related to changes in air quality are also unlikely to be significant.

Water Quality or Availability

- 18.8.33 Section 10.8 of **Chapter 10: Hydrology, Flood Risk and Drainage** sets out the likely impacts on the hydrological environment as a result of the Scheme subject to implementation of embedded design and additional flood risk and hydrology specific mitigation measures. For construction, the most likely impacts relevant to human health relate to a temporary increase in impermeable area, silt-laden runoff, and spillage and leaks of pollutants from construction activities. These impacts have the potential to impact on-site workers, people living downstream of the Sites next to affected watercourses, and people using affected water bodies for recreation and bathing (such as Sywell Reservoir). Risks from these sources are considered to be low as a result of on-site mitigation measures and as such the overall anticipated effect on human health as a result of changes to water quality is a medium-term temporary **negligible adverse effect**.

Land Quality

- 18.8.34 Section 22.8 of **Chapter 22: Ground Conditions and Contamination** identifies that construction workers are likely only to experience negligible adverse effects from contamination during construction activities on the Scheme, adjacent users and residents may be exposed to up to a moderate/minor adverse effect, while the risk to controlled waters is also a moderate/minor adverse effect. Subject to implementation of mitigation, Section 22.10 of **Chapter 22: Ground Conditions and Contamination** states residual effects are no greater than negligible for all receptors.
- 18.8.35 With regard to human health, the key risks associated with contamination are dermal contact, ingestion and inhalation risks to physical health to onsite workers and those immediately adjacent to the Sites and Cable Corridor, while contamination of controlled waters is a substantial risk for nearby residents. Residents reliant on groundwater abstraction for potable water are most at risk of contamination of controlled waters. However, as no such groundwater abstractions for potable water are present within 500m of the Sites or within the Cable Route Search Area, the sensitivity of the overall population to human health risks from contamination is considered medium. As the risk of contamination to both onsite workers and nearby residents is considered to be of a negligible magnitude, the potential effects to human health from changes to ground conditions and contamination during construction are considered to be a medium-term minor/negligible adverse effect.

Noise and Vibration

- 18.8.36 Noise and vibration impacts associated with the Scheme are likely to be localised to point noise sources and near receptors to these sources. Across the Study Area, there is therefore unlikely to be more than a negligible adverse effect to human health as a result of noise and vibration from the Scheme's construction. That notwithstanding, Section 14.8 of **Chapter 14: Noise and Vibration** sets out that individual receptors may experience up to moderate levels of construction noise. Individual receptors – notably residential dwellings - are identified to be of high sensitivity



to noise and vibration, with vulnerable people such as those with sensory impairments, mental disabilities, and those less able to move around or leave their properties being of high sensitivity to these impacts resulting in distress, anxiety, and longer-term impacts on wellbeing. As a result, those at highest risk may experience up to a short- to medium-term moderate/minor adverse effect on their health and wellbeing. This therefore is a significant effect. This will however be assessed in greater detail in the ES.

Radiation (Electromagnetic Fields)

- 18.8.37 High-level electromagnetic fields along the grid connection cable route are not anticipated to be generated from the Scheme during construction as no generation, import or exportation of electricity to or from the National Grid is to occur prior to completion of the Scheme's commissioning. The physical impact to human health is therefore neutral during this time, although the mental health impact as a result of anticipation of the Scheme may have an overall, medium-term temporary **negligible adverse effect** on the population living closest to Scheme.

Institutional and Built Environment

Health and Social Care Services

- 18.8.38 As set out previously in regard to community identity, the construction of the Scheme is anticipated to bring no greater than a short-term temporary negligible magnitude impact on resident population, and an anticipated neutral effect to resident age demographics across the Wider Baseline Study Area. This is likely therefore to bring a respective negligible magnitude impact as a result of increased demand for healthcare services across the Wider Baseline Study Area. This impact is likely to be dispersed across the Wider Baseline Study Area based on where workers are living (either permanently or in temporary accommodation and requiring registration with local GP practices), however there may be some level of concentration of effect on primary and emergency care services nearest the Scheme as a result of increased of workplace illness and injury. Applying a conservative approach, the greatest level of impact within the ZOI may be up to a low magnitude impact on primary and emergency care access.
- 18.8.39 Members of the population most reliant on healthcare services due to long-term illnesses, disabilities, and age-related illnesses are of a high sensitivity to changes to availability of access to healthcare services as a result of increased demand. Table 18.9 above identifies that for most health determinants, the ZOI and the Wider Baseline Study Area perform better than or at the same level as national expectations. This indicates that the general population across the ZOI and Wider Baseline Study Area are likely to be no greater than medium sensitivity to changes to healthcare access, subject to full assessment of existing availability of primary and emergency care services, which will be undertaken in the ES to ensure the most up-to-date information is used.
- 18.8.40 As a worst case scenario, the greatest level of induced impact on healthcare services is likely to have a **minor adverse effect** on human health as a result of increased demand on healthcare services and subsequent decrease in accessibility to existing service users.
- 18.8.41 As set out in paragraph 18.6.71, the ZOI contains two identified specialist care facilities, providing on site residential care for elderly and disabled residents. Residents at these locations are therefore going to be of high sensitivity to changes in provision of care and increased need for residential social care services. As the Scheme is unlikely to increase the number of people requiring residential social care, there is no further effect to this receptor. The existing residents of social care homes are however likely to be of heightened sensitivity to their surrounding environment, and as such these members of the population will be of medium sensitivity to changes to their community identity, culture, resilience and influence (see paragraphs 18.8.14-18.8.20) .

Wider Societal Infrastructure and Resources

- 18.8.42 The Scheme is not anticipated to provide any substantial wider societal infrastructure or resources during its construction phase, save for those related to employment and economic development as identified in paragraphs 18.8.21 to 18.8.28. As such, there are no anticipated human health effects identified on, or as a result of the provision of, wider societal infrastructure and resources.



Operation

Social Environment

Housing

- 18.8.43 The operational workforce will comprise a very small number of permanent staff, most of whom are anticipated to already live in the Wider Baseline Study Area, limiting the potential for any likely displacement of residents, or excessive competition for permanent accommodation during the operational lifetime of the Scheme, or temporary accommodation during infrastructure replacement periods. As a result, no significant effects to human health regarding housing are anticipated during the Scheme's operational lifetime.

Open Space, Leisure and Play

- 18.8.44 Likely effects on open space, leisure and play during the operation of the Scheme have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**. As during construction, tables 17.21 and 17.22 therein identify up to moderate-minor adverse effects on the recreational use of PRowS and permissive recreational routes, and up to moderate adverse effects on the recreational use of some high sensitivity long-distance recreational routes due to the long-term nature of these effects. Effects identified on recreational use of water bodies, recreational facilities, and youth play and sports facilities range from negligible to minor long-term adverse effects, based on visual impacts on their recreational use and enjoyment.
- 18.8.45 Impacts on open space, leisure and play as determinants of health are driven by reduced activity affecting physical health, while reduced enjoyment of recreational facilities (as a result of visual impact, or disruption to use) can reduce the mental health benefits associated with leisure and play. The influence of the Scheme may generate collective impacts, particularly where multiple leisure and play receptors are affected in a similar area. Overall, the magnitude of impact to open space, leisure and play is considered to be low and adverse, with this impact being long-term.
- 18.8.46 Children, and adults with limited activity are most vulnerable to changes to the benefits of open space, leisure and play and therefore are of a high sensitivity. Existing baseline conditions, as summarised in para. 18.8.8, demonstrate the overall population is not considered to be disproportionately more sensitive than the Wider Baseline Study Area or national expectation. As such, the sensitivity of the overall population to changes is low.
- 18.8.47 Resultantly, the impact on human health with regard to open space, leisure and play is therefore anticipated to be a long-term **minor adverse effect**.

Transport Modes, Access and Connections

- 18.8.48 As the Scheme is designed to ensure PRowS and permissive recreational routes across the Sites are kept open during the operational lifetime of the Scheme, there is no more than a negligible impact on the functional connectivity of the off-road access network. Similarly, the Scheme is anticipated to generate far lower traffic during its operational phase than its construction phase, and during day-to-day maintenance is likely to be comparable to existing agricultural traffic. Peak operational impacts as a result of PV or BESS replacement regimes are not anticipated to be as extensive as during construction. As such the level of impact on amenity, road user or pedestrian safety, as a result of fear and intimidation on and by road users, or functional connectivity and access on the local road network is also likely to be a negligible impact, as is the level of impact on public transport access and use. As a result, there is anticipated to be no greater than a long-term negligible adverse effect to human health in the Study Area (for Transport and Access) with no more than a peak minor adverse effect to human health during replacement activity.

Community Identity, Culture, Resilience and Influence

- 18.8.49 As stated for construction, the sensitivity of these communities to changes in the character of their surroundings and impacts on their sense of community is overall low across the ZOI, with a specific medium sensitivity applied to Mears Ashby, Earls Barton, Grendon, Easton Maudit, and Bozeat due to the expanse of the Scheme's infrastructure (and replacement works) visible from these villages. The level of sensitivity in the community's resilience and influence is governed by



the availability for further influence and engagement through operational lifetime of the Scheme and is therefore no less than medium.

- 18.8.50 The operation of the Scheme is anticipated to bring no greater than a negligible impact magnitude in any of the affected communities as a result of localised net migration in the communities affected.
- 18.8.51 Based on the likely landscape and visual impacts set out in **Chapter 8: Landscape and Visual Impact**, the Scheme is likely to generate up to a low negative magnitude of impact on community identity and culture, including in respect of feelings of the attractiveness of the area and community pride in its place, and thus on the mental wellbeing of the population. This may ebb towards negligible during the lifetime of the Scheme as mitigation planting matures, but in areas most prominently affected by the Scheme this may stay as a long-term low negative magnitude of impact due to the longevity of the Scheme's operational lifetime.
- 18.8.52 During the Scheme's operational lifetime, opportunities to influence parts of the Scheme are likely to be reduced, however as set out in paragraph 18.7.11, the continued availability of a community contact (and during peak activities a dedicated Community Liaison Officer) will minimise community anxieties by providing a continued dialogue between communities and the Scheme's operators. As a result, impact on community resilience and influence over the lifetime of the Scheme are likely to be an overall long-term low magnitude impact.
- 18.8.53 Overall, the impact on human health as a result of the Scheme's operation is likely to generate a long-term minor adverse effect on human health due to the longevity of the Scheme, including during peak operational activity relating to infrastructure replacement. This is, however, not a significant effect.

Economic Environment

Education and Training

- 18.8.54 Likely effects on education and training during operation have been considered in a preliminary assessment in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**. Paragraph 17.8.58 therein identifies no more than a long-term minor beneficial effect on skills and qualification attainment in the Wider Baseline Study Area, with additional enhancement measures (as set out in paragraph 17.9.17) likely to improve this but not change the significance of this effect long-term, but produce a peak long-term moderate-minor beneficial effect during peak operational and maintenance activities.
- 18.8.55 Overall, the magnitude of impact to education and training is considered to be negligible, and positive, with this impact being long-term. People with existing limitations in access to suitable education and training are of a high sensitivity. Existing baseline conditions, as summarised in para. 18.8.23 demonstrate that the sensitivity of the overall population to changes is medium.
- 18.8.56 Resultantly, the impact on human health with regard to education and training during operation is anticipated to be a long-term **minor/negligible beneficial effect**.

Employment and Income

- 18.8.57 Likely effects on employment and income during operation have been considered in a preliminary assessment in **Chapter 17: Socio-Economics, Tourism and Recreation**. Paragraphs 17.9.17 therein identifies that with additional enhancement to be set out in the OSSCEP, an overall long-term minor beneficial effect on the labour force, and a resultant long-term minor beneficial effect on economic prosperity and income are anticipated in the Wider Baseline Study Area.
- 18.8.58 As there are likely to be both beneficial and adverse contributing factors towards employment and income in the Wider Baseline Study Area, the overall effect is likely to be **neutral**. That notwithstanding, the worst-case effect will be to those who are likely to experience loss of employment as a result of the Scheme, potentially with reduced access to employment over the lifetime of the Scheme. These people are of a medium sensitivity to change, and as a result may experience a worst case long-term **minor/negligible adverse effect** to human health.

Bio-physical Environment



Climate Change Mitigation and Adaptation

- 18.8.59 **Chapter 7: Climate Change** estimates that over the operational lifetime of the Scheme, the quantum of electricity generated is approximated to be 700,000-800,000MWh per annum. The carbon intensity of the Scheme is estimated to be 12% of a comparable gas-fired Combined Cycle Gas Turbine (CCGT) generating facility. As a result, the Scheme is likely to substantially reduce the quantum of greenhouse gas emissions associated with energy production. The level of significance will be assessed in full in the ES.
- 18.8.60 With regard to human health, the Scheme is likely to benefit human health as a result of decreasing risk from future climate change events, and increasing the national adaptability to climate change going forward. The full extent of this will be assessed in full in the ES.

Air Quality

- 18.8.61 Section 16.8 of **Chapter 16: Air Quality** sets out preliminary conclusions on the likely effects on air quality as a result of the operation of the Scheme, and identifies operation and maintenance vehicle emissions, and emissions from any instances of fire at Green Hill BESS to be the main sources of air quality impacts. A full assessment of effects will be in the ES.
- 18.8.62 A full assessment of the impact on human health with regard to air quality will be undertaken in the ES following completion of a full air quality assessment. While preliminary indications show the Scheme is unlikely to cause significant effects on human health, this is largely to be determined by the location and placement for BESS within the Scheme and the proposed separation distances from residential properties from BESS infrastructure.

Water Quality or Availability

- 18.8.63 Section 10.8 of **Chapter 10: Hydrology, Flood Risk and Drainage** sets out the likely impacts on the hydrological environment as a result of the Scheme's operation subject to implementation of embedded design and additional flood risk and hydrology specific mitigation measures. During operation, the impacts relevant to human health include diffuse pollution resulting from fire, and increased runoff to watercourses from a permanent increase in impermeable areas. Risks from both these sources are considered to be low as a result of on-site mitigation measures and as such the overall anticipated effect on human health as a result of changes to water quality is a long-term **negligible adverse effect**.

Land Quality

- 18.8.64 During the Scheme's operational lifetime, the preliminary assessment in Section 22.8 of **Chapter 22: Ground Conditions and Contamination** identifies that onsite workers are likely only to experience negligible adverse effects from contamination during operation and maintenance activities on the Scheme, including during peak activities related to replacement of infrastructure, with adjacent users and residents exposed to up to a minor adverse effect, while the risk to controlled waters is also a minor adverse effect.
- 18.8.65 During the operational lifetime of the Scheme, the key risks associated with contamination are as a result of contamination of controlled waters due to potential spillages or leakages of temporary fuels and chemicals stored on site, or as a result of contaminated firewater from controlling potential BESS fires. Overall, the sensitivity of the population to human health risks from contamination is considered medium. As the risk of contamination to both onsite workers and nearby residents is considered to be of a negligible magnitude, the potential effects to human health during operation are considered to be a long-term minor/negligible adverse effect.

Noise and Vibration

- 18.8.66 Section 14.8 of **Chapter 14: Noise and Vibration** sets out that individual receptors may experience up to moderate-minor levels of noise during the operational lifetime of the Scheme as a result of noise from electrical infrastructure onsite. Where individual receptors are exposed to noise and vibrations at this level, these are likely only to cause health and wellbeing impacts where residents or affected dwellings are most vulnerable to changes in their sensory environment. As such, those at highest risk may experience up to a long-term minor/negligible adverse effect on their health and wellbeing. Whilst this is not considered to be a significant effect, the time duration of exposure may lead to the level of significance being perceived as increased



nuisance over the lifetime of the Scheme or the occupational lifetime of the residents of affected dwellings. This will however be assessed in greater detail in the ES.

Radiation (Electromagnetic Fields)

- 18.8.67 The primary source of radiation from the Scheme is electromagnetic fields generated along the cable routes between the Sites, and the grid connection cable. Those operating at more than 132kV are to be assessed for their potential maximum electromagnetic field strength. Section 21.8 of **Chapter 21: Electromagnetic Fields** identifies that a single 400kV cable buried at 0.9m is likely to generate a peak EMF of 96.17 μ T, which is below the ICNIRP reference level of 100 μ T.
- 18.8.68 The electrical design is considering the possibility of up to four high-voltage cables within a single trench along sections of the cable route. As such, there is potential for the ICNIRP reference level to be exceeded along the cable route, warranting further assessment, which will be provided in the ES.
- 18.8.69 EMF has potential to impact upon human health where the EMF is very strong, or where exposure to EMF is experienced over significant periods of time. The ICNIRP reference level is set for long-term exposure at locations such as dwellings, schools, or employment locations where these levels would be experienced for months or years. Human health impacts from transient movements, such as walking on roads, PRoWs, or working in fields with cables buried beneath are not likely to induce human health effects as the exposure times are short.
- 18.8.70 Applying the embedded mitigation in the design of the Scheme, the cable routes are to be set back by a conservative amount to ensure maximum levels of electromagnetic radiation received at existing receptor sites from the proposed cable routes during operation will be below ICNIRP reference levels. As such, it can be assumed that human health impacts from EMF are not anticipated to be significant, and this will be confirmed in the ES.

Institutional and Built Environment

Health and Social Care Services

- 18.8.71 The operation of the Scheme is anticipated to bring no greater than a long-term temporary negligible magnitude impact on resident population, and an anticipated neutral effect to resident age demographics across the Wider Baseline Study Area as during operation. The level of impact within the ZOI is therefore considered not to be greater than a negligible magnitude impact on primary and emergency care access.
- 18.8.72 While members of the population most reliant on healthcare services due to long-term illnesses, disabilities, and age-related illnesses are of a high sensitivity to changes to availability of access to healthcare services as a result of increased demand, the general population across the ZOI and Wider Baseline Study Area are likely to be of medium sensitivity to changes to healthcare access.
- 18.8.73 Therefore, the impact on healthcare services is likely to have a **minor/negligible adverse effect** on human health as a result of increased demand on healthcare services and subsequent decrease in accessibility to existing service users.
- 18.8.74 The operation of the Scheme is not anticipated to generate any direct impacts on provision of social and residential care. However, those already in social and residential care, such as those in the two identified specialist care facilities in paragraph 18.6.71 will be sensitive to changes in their sense of place and community identity, culture, resilience and influence. Therefore, refer to paragraphs 18.8.49-18.8.53.

Wider Societal Infrastructure and Resources

- 18.8.75 The Scheme in its operational lifetime is to perform the function of net zero energy infrastructure, valuable both for national energy security, but also to help supply electricity for the benefit of people's lives and livelihoods while improving the country's climate change resilience. The ability for the Scheme to contribute towards these goals is likely to lead to a long-term **minor beneficial effect** on human health within the Wider Baseline Study Area. This is as a result of the Scheme contributing to the electricity demands of continued and improved way of life, and helping to



reduce community anxieties about climate change through demonstrating the Study Area's contribution to meeting the national net zero carbon emission goals.

Decommissioning

Social Environment

Housing

- 18.8.76 As set out in paragraphs 18.8.3 to 18.8.5 above, effects of the Scheme on access to housing during construction have been considered in a preliminary assessment and classed as a temporary medium-term **minor adverse effect**. As identified in Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation**, the decommissioning of the Scheme is likely to generate an estimated 75-80% of the level of employment of the construction phase, and thus a proportional requirement for accommodating decommissioning workers. Whilst the availability of housing at the point of decommissioning cannot be determined at this point, the level of effect on human health as a result of reduced access to housing is likely to be similar to that during construction. Therefore, it can be assumed that there will be a temporary medium-term **minor adverse effect** on human health resulting from impacts on housing as a result of the decommissioning of the Scheme.

Open Space, Leisure and Play

- 18.8.77 Likely effects on open space, leisure and play during decommissioning are likely to be similar to those experienced during construction, subject to changes to the future baseline as a result of the passage of time and early projections of population demographics.
- 18.8.78 Overall, the magnitude of impact to open space, leisure and play is considered to be low, and adverse, as anticipated during construction.
- 18.8.79 Children, and adults with limited activity are most vulnerable to changes to open space, leisure and play and therefore are of a high sensitivity. Future baseline conditions in the ZOI are not known due to 60-year interim, however it can be assumed that the population of over-65 year olds, and thus proportionally, the rate of people with limited activity may be higher than the existing baseline. As a result, the preliminary sensitivity of the overall population to changes is considered to be up to medium.
- 18.8.80 Resultantly, the impact on human health with regard to open space, leisure and play during decommissioning is anticipated to be a temporary medium-term **minor adverse effect**.

Transport Modes, Access and Connections

- 18.8.81 Impacts upon the ability for members of the public to access public transport, access and receive services on the local highway network, and functionally use the local highway and PRoW network as non-vehicular users are likely to be no greater than those experienced during construction. As such, the effect on human health and wellbeing is anticipated to be no more than a temporary medium-term minor adverse effect.

Community Identity, Culture, Resilience and Influence

- 18.8.82 Towards the point of decommissioning, the sensitivity of these communities to changes in the character of their surroundings and impacts on their sense of community is likely to be overall low across the ZOI, but without specifically higher sensitivity in areas nearer the Scheme, because, at the point of decommissioning, the Scheme may be up to 60 years old and have been present at its location for the majority of most people's lives.
- 18.8.83 As during construction, the decommissioning of the Scheme is anticipated to bring no greater than a negligible negative impact magnitude in any of the affected communities as a result of localised net migration in the communities affected.
- 18.8.84 With respect to sense of place, the decommissioning of the Scheme is likely to have up to a low magnitude positive impact on community identity and culture, as a result of the land being returned to agricultural use.
- 18.8.85 That notwithstanding, the Scheme is proposed to reestablish the role of a Community Liaison Officer prior to and during decommissioning activities onsite to retain community resilience and



influence on the outcomes of the Scheme's decommissioning. Whilst community anxieties about decommissioning activities may still be present, these are likely to be no more than of a low magnitude impact to community resilience and influence and thus on population mental health and wellbeing.

- 18.8.86 Overall, the impact on community identity, culture, resilience and influence as a result of the Scheme's decommissioning is likely to generate a temporary short-term minor adverse effect during the commencement of decommissioning works, which may then trend towards a medium-term **minor/negligible beneficial effect** on human health as the decommissioning and restoration works progress and agricultural use of the Sites recommences.

Economic Environment

Education and Training

- 18.8.87 Likely effects on education and training during decommissioning are likely to be similar to those experienced during construction, albeit due to uncertainty are not likely to be as great in significance, and therefore with enhancement is likely to have a medium-term temporary minor beneficial effect.
- 18.8.88 People with limitations in access to suitable education and training are of a high sensitivity. The current level of sensitivity of the overall population to changes in access to education and training is medium. Future baseline conditions in relation to education and training are not able to be forecasted with any reasonable accuracy, therefore the sensitivity of the overall population to changes is considered to be medium.
- 18.8.89 Resultantly, the impact on human health with regard to education and training during decommissioning is anticipated to be a temporary medium-term **minor/negligible beneficial effect**.

Employment and Income

- 18.8.90 Section 17.8 of **Chapter 17: Socio-Economics, Tourism and Recreation** demonstrates at paragraphs 17.8.86-17.8.96 that the effects on employment and income as a result of the Scheme's decommissioning will be similar to those experienced during construction. While the sensitivity of the population is not able to be assessed with great certainty, the likely socio-demographic shift towards an aging population may reduce the proportion of the population at working-age, thus creating greater competition in labour markets, and increasing importance on suitable income to maintain good quality of life. As a result, the wider population is likely to be of at least medium sensitivity to change during the Scheme's decommissioning.
- 18.8.91 Resultantly, a negligible magnitude increase to both employment and income is likely to induce a temporary medium-term **minor beneficial effect** on human health with regard to employment and income during decommissioning.

Bio-physical Environment

Climate Change Mitigation and Adaptation

- 18.8.92 The Scheme is not anticipated to induce significant adverse effects on human health during decommissioning in respect of climate change mitigation and resilience. This will be ensured through protection of onsite workers through embedded flood risk management and climate change resilience mitigation (such as to protect workers from extreme temperature), and protection of wider human health through minimisation of construction greenhouse gas emissions and minimisation of waste.

Air Quality

- 18.8.93 There is the potential for fugitive dust emissions, vehicle emissions and NRMM emissions during the decommissioning phase. Details regarding the decommissioning phase activities are limited, however the potential effects are likely to be similar to those identified during the construction phase.



Water Quality or Availability

- 18.8.94 Section 10.8 of **Chapter 10: Hydrology, Flood Risk and Drainage** sets out the likely impacts on the hydrological environment as a result of the Scheme subject to implementation of embedded design and additional flood risk and hydrology specific mitigation measures. For decommissioning, the most likely impacts relevant to human health are similar to those during construction, and thus relate to temporary increase in impermeable area, silt-laden runoff, and spillage and leaks of pollutants from decommissioning activities. Risks from these sources are considered to be low as a result of on-site mitigation measures and as such the overall anticipated effect on human health as a result of changes to water quality is a medium-term temporary **negligible adverse effect**.

Land Quality

- 18.8.95 Section 22.8 of **Chapter 22: Ground Conditions and Contamination** identifies that during decommissioning, risks of contamination from onsite works are likely to be similar to those experienced during construction.
- 18.8.96 As such, the sensitivity of the overall population to human health risks from contamination is considered medium, while the risk of contamination to both onsite workers and nearby residents is considered to be of a negligible magnitude, following implementation of mitigation. Resultantly, the potential effects to human health during decommissioning are considered to be a medium-term minor/negligible adverse effect.

Noise and Vibration

- 18.8.97 As during construction, noise and vibration impacts associated with the Scheme's decommissioning are likely to be localised to point noise sources and near receptors to these sources. Across the Study Area, there is therefore unlikely to be more than a negligible adverse effect to human health as a result of noise and vibration from the Scheme's construction. That notwithstanding, individual receptors – notably residential dwellings, are identified to be of high sensitivity to noise and vibration, with the most vulnerable people at highest risk may experience up to a short- to medium-term moderate/minor adverse effect on their health and wellbeing. This therefore is a significant effect. This will however be assessed in greater detail in the ES.

Radiation (Electromagnetic Fields)

- 18.8.98 High-level electromagnetic fields along the grid connection cable route are not anticipated to be generated from the Scheme during the Scheme's decommissioning as no generation, import or exportation of electricity to or from the National Grid is to occur following the termination of the Scheme's operational lifetime. The resultant effect is therefore a **neutral effect** to human health.

Institutional and Built Environment

Health and Social Care Services

- 18.8.99 The decommissioning of the Scheme is anticipated to bring no greater than a short-term temporary negligible magnitude impact on resident population, and an anticipated neutral effect to resident age demographics across the Wider Baseline Study Area as during construction. Applying a conservative approach, the greatest level of impact where concentrated within the ZOI may be up to a low magnitude impact on primary and emergency care access.
- 18.8.100 Members of the population most reliant on healthcare services due to long-term illnesses, disabilities, and age-related illnesses are of a high sensitivity to changes to availability of access to healthcare services as a result of increased demand. Future baseline conditions cannot be accurately predicted, however age-related illnesses are likely to be of greater concern in future. This indicates that the general population across the ZOI and Wider Baseline Study Area are likely to be of medium sensitivity to changes to healthcare access.
- 18.8.101 As a worst case scenario, the greatest level of induced impact on healthcare services is likely to have a **minor adverse effect** on human health as a result of increased demand on healthcare services and subsequent decrease in accessibility to existing service users.
- 18.8.102 Whether or not the two identified specialist care facilities in paragraph 18.6.71 will still be in use during the Scheme's decommissioning cannot be predicted. That notwithstanding, it can be



assumed that any social care or residential care facilities in the ZOI at the future baseline stage are going to be of high sensitivity to changes to their surrounding environment. As the Scheme's decommissioning is unlikely to increase the number of people requiring residential social care, there is no further effect to this receptor. Applying a conservative approach to the existing users of these facilities, these receptors are likely to experience the same impacts as during construction. As a population group of medium sensitivity to changes to their community identity, culture, resilience and influence, these receptors will experience up to medium-term temporary minor adverse effects. (refer to paragraph 18.8.86.

Wider Societal Infrastructure and Resources

- 18.8.103 The Scheme is not anticipated to provide any substantial wider societal infrastructure or resources during its decommissioning phase, save for those related to employment and economic development. As such, there are no anticipated human health effects considered apart from those identified in paragraphs 18.8.87-18.8.91.

18.9 Additional Mitigation and Enhancement Measures

- 18.9.1 This section provides information of additional mitigation that may be applied in circumstances where the preliminary assessment in section 18.8 concludes that the Scheme will have a likely significant adverse effect on a human health receptor that requires further mitigation to manage the effect to an appropriate level.

- 18.9.2 The mitigation measures set out in this section would allow the design, construction, operation, and management of the Scheme to be adapted where feasible to minimise adverse effects of the Scheme on the relevant receptors are minimised. These mitigation measures furthermore aim to reduce the impacts of the Scheme when considered cumulatively with other developments being built out over a similar timeframe in the same area.

- 18.9.3 Similarly, where beneficial effects are anticipated, a series of enhancement measures can be introduced where feasible to ensure the greatest beneficial effects can be generated and secured.

Construction

- 18.9.4 Construction is anticipated to take place across an approximately two-year / 24 month period. For the purpose of assessment, it is assumed that all parts of the Scheme will be constructed in parallel to determine the worst-case environmental effects.

Noise and Vibration

- 18.9.5 Preliminary localised and temporary significant effects have been identified as a result of the potential for construction noise impacts to be experienced by vulnerable people in the population. As such, additional mitigation is likely to be required to reduce noise and vibration impacts, such as additional noise screening during construction, and limits to construction activities nearest to the most sensitive receptors. These will be integrated into the Scheme design for DCO submission, and are to be reassessed upon completion of the full assessment in the ES.

Radiation (EMF)

- 18.9.6 Health effects during construction as a result of EMF are most likely to be felt as a result of anxiety towards EMF effects over the operational lifetime of the Scheme. The provision of suitable levels of information regarding EMF during consultation, the DCO application process, and then upon request by any person during the construction period should help to alleviate much of this anxiety. The residual human health effect as a result is expected to remain as a **negligible adverse effect** and is anticipated to affect fewer people.

Health and Social Care Services

- 18.9.7 To reduce the level of impact on primary healthcare services within the ZOI, the OCEMP will contain specific mitigation by way of support to construction workers to find and register with GPs across the Wider Baseline Study Area in reasonable proximity to their temporary or permanent accommodation and where such GP surgeries have reasonable capacity to take on additional patients. This should help to reduce the concentration of effect in any given area, and as such reduce the magnitude of impact to negligible in the ZOI. The resultant level of induced impact on healthcare services is likely to have a **minor/negligible adverse effect** on human health as a



result of increased demand on healthcare services and subsequent decrease in accessibility to existing service users.

- 18.9.8 Section 18.8 above identifies users of residential care homes to be of increased sensitivity to changes in their environment. Oakfield in Easton Maudit is highlighted specifically due to its proximity to the Scheme and vulnerability of its residents to changes in human health determinants. To mitigate these measures beyond those embedded measures defined in the Scheme design, the OCEMP will include location specific measures to reduce construction impacts. These will include keeping in direct contact with the operators of the care home during construction, and subject to agreement, minimising working hours within 100m of the Sites and Cable Corridor, avoiding using any part of the Sites and Cable Corridor within 100m of the residential home for storage of materials, and implementing landscape works within 50m of the residential home as early as possible in the construction programme. With these additional measures in place, the magnitude of impacts on residents at Oakfield can be reduced to low – equivalent to other vulnerable groups in the ZOI for community identity, culture, resilience and influence. The resultant human health effect to residents is **minor adverse effect**. This is therefore not significant.

Operation

- 18.9.9 The operational lifetime of the Scheme is estimated to be 60 years from the completion of the construction phase. For the purpose of assessment, it has been assumed that the Scheme will commence operation from Q2 2029, with decommissioning estimated to be no later than 2089. Key mitigation and enhancement measures for the Scheme's operation and maintenance are set out in the OOEMP.

Open Space, Leisure and Play

- 18.9.10 The Scheme also features opportunities for a number of enhancements to existing PRoWs and the provision of a new non-vehicular permissive routes where it can be shown that there is a local need or appetite for such a route to be included as part of the Scheme. The opportunity for members of the public to comment on potential connections they wish to see added or improved will be made available through the statutory consultation process and will be integrated where feasible into the Scheme design for DCO submission. Any implemented measures will create the potential for enhance connectivity in the local area and may help to improve recreation in the immediate vicinity, secondarily benefitting local population health and wellbeing in the long-term.

Health and Social Care Services

- 18.9.11 During peak operational activities associated with the replacement of PV and BESS infrastructure, additional mitigation measures with respect of identifying healthcare facilities with the greatest capacity for inbound workers, and restrictive working conditions in proximity to locations of highest sensitivity (such as Oakfield residential home) should be implemented as proposed for construction, and secured as required in the OOEMP.

Decommissioning

- 18.9.12 Decommissioning will see the return of impacts to human health receptors in a similar magnitude to those experienced during construction, largely from the Scheme, with likely comparatively reduced effects in the Cable Route Search Area. Whilst a detailed assessment on the anticipated effects cannot be reliably made due to uncertainty of future baseline conditions, mitigatory measures can still be implemented as set out in the ODEMP.

Transport Modes, Access and Connections

- 18.9.13 Additional transport measures including a staggered decommissioning programme, and worker travel plan for decommissioning can be utilised and secured through the ODEMP to reduce the impact on public transport, local highway and PRoW users, as set out during construction. As such, the likely peak level of effect is likely to remain a **medium-term temporary minor adverse effect**.

Noise and Vibration

- 18.9.14 As for construction, preliminary localised and temporary significant effects have been identified as a result of the potential for decommissioning noise impacts to be experienced by vulnerable



people in the population. As such, additional mitigation is likely to be required to reduce noise and vibration impacts, such as additional noise screening during decommissioning works, and limits to decommissioning activities nearest to the most sensitive receptors. These will be integrated into the Scheme design for DCO submission, and are to be reassessed upon completion of the full assessment in the ES.

- 18.9.15 As set out for construction, impacts on primary healthcare services within the ZOI will be reduced through the ODEMP, which will support construction and decommissioning workers to find and register with GPs across the Wider Baseline Study Area in reasonable proximity to their temporary or permanent accommodation and where such GP surgeries have reasonable capacity to take on additional patients. The resultant level of induced impact on healthcare services is likely to have a **minor/negligible adverse effect** on human health as a result of increased demand on healthcare services and subsequent decrease in accessibility to existing service users, subject to future baseline conditions being comparable to existing conditions.
- 18.9.16 The ODEMP will also include requirement for location-specific mitigation to be provided at the point of drafting and implementation of the final DEMP, ahead of Scheme decommissioning. This should include a requirement to identify residential care homes and institutions that may be of specific vulnerability to impacts from decommissioning activities, and provide targeted mitigation measures in response. Subject to these additional mitigation measures being implemented, the human health impacts on vulnerable populations in residential care should be no greater than **minor/negligible adverse effects** across the ZOI.

18.10 Residual Effects

- 18.10.1 This section summarises the residual significant effects of the Scheme following the implementation of additional mitigation as outlined in Section 18.9 of this chapter.
- 18.10.2 Following the implementation of the appropriate site-specific mitigation measures identified during the construction, operation and decommissioning phases, the residual effects on socio-economic, tourism and recreation receptors are determined as set out in **Table 18.10** below.



Table 18.10 Residual Effects on Human Health Receptors

*Significant Effects are highlighted in orange.

Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
CONSTRUCTION				
Housing	Changes to quality of life due to access to suitable permanent housing and temporary accommodation	Wider Baseline Study Area	Use of flexibility within the construction schedule to reduce peak impacts on temporary accommodation demand	Medium-term temporary minor adverse
Open space, leisure and play	Change to levels of physical activity, levels of mental benefit from activity, and levels of enjoyment of leisure and play	2km ZOI	Embedded design offsets from PRoWs and any other recreational features to limit impacts on leisure and play use	Medium-term temporary minor adverse
Transport modes, access and connections	Changes to access to public transport, ease of access to and from services, and connectivity of receptors to other receptors, contributing to perceptions of road safety and isolation	Study Area for transport	The selection of the most appropriate and unconstrained routes for construction traffic and HGV access to the Scheme Provide staggered work programmes and working hours to reduce peak or combined effects on the highway network, and provision of a Worker Travel Plan to encourage car-sharing and use of minibuses to reduce construction worker movements	Medium-term temporary minor adverse
Community identity, culture, resilience and influence	Change to sense of community identity, culture, and sense of place, and impacts upon sense of control or feeling of inclusion in controlling of environment and surroundings	2km ZOI	Inclusion of standard offsets from landscape features and visual receptors to reduce impact on perception of the landscape Use targeted consultation upon request for members of the public who are most directly affected by the Scheme, and maintaining an open line of contact to the Applicant team during the application process and post-consent; provide a Community Liaison Manager during construction	Medium-term temporary minor adverse
Education and training	Changes to availability, quality, and relevance of education and training, and secondary changes to quality of life as a result of level of education	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Medium-term temporary moderate-minor beneficial
Employment and income	Changes to availability of employment and income, and secondary changes to quality of life as a result of level of income	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Medium-term temporary minor beneficial



Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
Air quality	Changes to air quality, and associated risks of increased respiratory diseases	Study Area for air quality	Sensitive siting of temporary works; incorporation of construction dust management and monitoring; and siting of BESS away from residents to reduce air quality impacts in the potential case of fire.	<i>To be assessed in ES once confirmed</i>
Water quality or availability	Changes to flood risk, and changes to water quality for drinking and bathing	Study Area for hydrology	Implementation of flood risk management to ensure climate change resilience; and embedded offsets from watercourses and monitoring of quantum of water discharge and resultant water quality during construction	Medium-term temporary negligible adverse
Land quality	Risks of direct contact, ingestion, or inhalation of contaminants, and changes to safety of groundwater for potable use	Study Area for ground conditions	Implementation of standard good working practices including adherence to health, safety and environmental precautions for workers; implementation of a Discovery Strategy, and HDD under the River Nene; monitoring of equipment and containment of potential contaminants.	Medium-term temporary minor adverse
Noise and vibration	Changes to sensory environment due to noise and vibration, and associate decrease in amenity and mental wellbeing	Study Area for noise and vibration	Screening and noise volume control near sensitive receptors, including adopting best practice measures, adherence to time limits for noisy works, and ensure planning conditions for night works where required are agreed in advance, adoption of best practice methods to reduce vibration impacts	Localised medium-term temporary moderate/minor adverse
Radiation (electromagnetic fields)	Bio-physical impacts of EMF on the body, and changes to perception of risk of EMF	Study Area for EMF	Design of cable routes to be a conservative minimum setback from sensitive receptors (residences, workplaces, schools); and prioritisation of buried cabling to reduce electric field strength	Medium-term temporary negligible adverse
Health and social care services	Changes to the level of access to primary, emergency healthcare and social care services for existing service users, and secondary impacts on the quality of care provided	2km ZOI	Direct construction workers to find and register with GPs across the Wider Baseline Study Area in reasonable proximity to their temporary or permanent accommodation and where such GP surgeries have reasonable capacity to take on additional patients. Directly engaging with social care providers to minimise impacts on residents in full-time care.	Medium-term temporary minor/negligible adverse
OPERATION				
Open space, leisure and play	Change to levels of physical activity, levels of mental benefit from activity, and levels of enjoyment of leisure and play	2km ZOI	Embedded design offsets from PRowS and any other recreational features to limit impacts on leisure and play use	Long-term minor adverse



Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
Transport modes, access and connections	Changes to access to public transport, ease of access to and from services, and connectivity of receptors to other receptors, contributing to perceptions of road safety and isolation	Study Area for transport	Phasing of Scheme infrastructure replacement works to ensure traffic impacts are minimised, are not combined from multiple Sites, and do not interrupt the supply of generated power to the National Grid from the Scheme.	Long-term negligible adverse Peak medium-term minor adverse
Community identity, culture, resilience and influence	Change to sense of community identity, culture, and sense of place, and impacts upon sense of control or feeling of inclusion in controlling of environment and surroundings	2km ZOI	Inclusion of standard offsets from landscape features and visual receptors to reduce impact on perception of the landscape Use targeted consultation upon request for members of the public who are most directly affected by the Scheme, and maintaining an open line of contact to the Applicant team during the application process and post-consent; maintain a Community Liaison Manager during operational lifetime of Scheme	Long-term minor adverse
Education and training	Changes to availability, quality, and relevance of education and training, and secondary changes to quality of life as a result of level of education	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Long-term minor beneficial
Employment and income	Changes to availability of employment and income, and secondary changes to quality of life as a result of level of income	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Long-term neutral
				Subpopulation long-term minor/negligible adverse
Climate change mitigation and adaptation	Exposure to flood risk and dangerous weather as a result of climate change, and secondary impacts such as drought and natural disasters	Study Area for climate change	Utilise the waste hierarchy to avoid, reduce, reuse and recycle waste to minimise embodied carbon during all phases of the Scheme; adopt good industry practices to reduce greenhouse gas emissions; reduce vehicular emission through encouraging lower carbon transport options and reducing worker trips to the Scheme; implementation of flood risk management to ensure climate change resilience as suitable and required at the point of decommissioning	<i>Likely long-term beneficial</i> <i>To be assessed in ES once confirmed</i>
Air quality	Changes to air quality, and associated risks of increased respiratory diseases	Study Area for air quality	Sensitive siting of permanent onsite infrastructure works; and siting of BESS away from residents to reduce air quality impacts in the potential case of fire	<i>To be assessed in ES once confirmed</i>



Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
Water quality or availability	Changes to flood risk, and changes to water quality for drinking and bathing	Study Area for hydrology	Implementation of flood risk management to ensure climate change resilience; and locating critical infrastructure outside areas of modelled flood risk, including potential additional risks associated with climate change	Long-term negligible adverse
Land quality	Risks of direct contact, ingestion, or inhalation of contaminants, and changes to safety of groundwater for potable use	Study Area for ground conditions	Continuation of best practice measures for contamination as implemented for construction works; and real-time monitoring of solar and BESS infrastructure to identify any signs of potential leakage, wear, or faults	Long-term minor/negligible adverse
Noise and vibration	Changes to sensory environment due to noise and vibration, and associate decrease in amenity and mental wellbeing	Study Area for noise and vibration	Continuation of best practice measures for noise and vibration as implemented for construction works	Long-term minor/negligible adverse
Radiation (electromagnetic fields)	Bio-physical impacts of EMF on the body, and changes to perception of risk of EMF	Study Area for EMF	Design of cable routes to be a conservative minimum setback from sensitive receptors (residences, workplaces, schools); and prioritisation of buried cabling to reduce electric field strength	<i>To be assessed in ES once confirmed</i>
Health and social care services	Changes to the level of access to primary and emergency healthcare for existing service users, and secondary impacts on the quality of care provided	2km ZOI	Embedded mitigation to minimise impacts on existing service users during peak operational activities.	Long-term minor/negligible adverse
Wider societal infrastructure and resources	Changes to level of energy available for continued and improved quality of life and to perceptions of local and national contributions to fighting climate change	Wider Baseline Study Area	None required	Long-term minor beneficial
DECOMMISSIONING				
Housing	Changes to quality of life due to access to suitable permanent housing and temporary accommodation	Wider Baseline Study Area	Use of flexibility within the construction schedule to reduce peak impacts on temporary accommodation demand	Medium-term temporary minor adverse
Open space, leisure and play	Change to levels of physical activity, levels of mental benefit from activity,	2km ZOI	Embedded design offsets from PRowS and any other recreational features to limit impacts on leisure and play use	Medium-term temporary minor adverse



Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
	and levels of enjoyment of leisure and play			
Transport modes, access and connections	Changes to access to public transport, ease of access to and from services, and connectivity of receptors to other receptors, contributing to perceptions of road safety and isolation	Study Area for transport	Staggered decommissioning programme, and worker travel plan for decommissioning can be utilised to reduce the impact on public transport, local highway and PRoW users	Medium-term temporary minor adverse
Community identity, culture, resilience and influence	Change to sense of community identity, culture, and sense of place, and impacts upon sense of control or feeling of inclusion in controlling of environment and surroundings	2km ZOI	Provision of a Community Liaison Officer prior to and during decommissioning activities.	Short-term temporary minor adverse (early decommissioning)
				Medium-term temporary minor/negligible beneficial (late decommissioning)
Education and training	Changes to availability, quality, and relevance of education and training, and secondary changes to quality of life as a result of level of education	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Medium-term temporary minor beneficial
Employment and income	Changes to availability of employment and income, and secondary changes to quality of life as a result of level of income	Wider Baseline Study Area	Provide enhanced local education and skills uplifting, and local recruitment and procurement are set out through the OSSCEP.	Medium-term temporary minor beneficial
Air quality	Changes to air quality, and associated risks of increased respiratory diseases	Study Area for air quality	Implementation of good industry practices as during construction	<i>To be assessed in ES once confirmed</i>
Water quality or availability	Changes to flood risk, and changes to water quality for drinking and bathing	Study Area for hydrology	Implementation of good industry practices as during decommissioning	Medium-term temporary negligible adverse
Land quality	Risks of direct contact, ingestion, or inhalation of contaminants, and changes to safety of groundwater for potable use	Study Area for ground conditions	Implementation of standard good working practices as during construction	Medium-term temporary minor adverse



Receptor	Description of Effect	Area of Effect	Embedded and Additional Mitigation and Enhancement Measures	Residual Significance of Effect
Noise and vibration	Changes to sensory environment due to noise and vibration, and associate decrease in amenity and mental wellbeing	Study Area for noise and vibration	Continuation of best practice measures for noise and vibration as implemented for construction works	Localised medium-term temporary moderate/minor adverse
Radiation (electromagnetic fields)	Bio-physical impacts of EMF on the body, and changes to perception of risk of EMF	Study Area for EMF	None required	Neutral
Health and social care services	Changes to the level of access to primary, emergency healthcare and social care services for existing service users, and secondary impacts on the quality of care provided	2km ZOI	<p>Direct construction workers to find and register with GPs across the Wider Baseline Study Area in reasonable proximity to their temporary or permanent accommodation and where such GP surgeries have reasonable capacity to take on additional patients.</p> <p>Directly engaging with social care providers to minimise impacts on residents in full-time care.</p>	Medium-term temporary minor/negligible adverse



18.11 Cumulative and In-Combination Effects

Cumulative effects

- 18.11.1 The ES will give consideration to potential cumulative effects of the Scheme and other relevant projects within the vicinity of the Scheme on a single receptor/resource.
- 18.11.2 A list of cumulative projects can be found in **Volume 3, Appendix 2.2** of the PEIR, the list will be reviewed and refined in preparation of the DCO application submission through further consultation and will be presented and assessed in the ES. Cumulative effects will be listed within **Chapter 25: Cumulative Effects** of the ES.
- 18.11.3 For human health effects, cumulative effects within the 2km ZOI will be assessed. Those developments considered relevant in the assessment of cumulative effects are anticipated to be any other NSIPs in the Wider Baseline Study Area, any other TCPA solar developments, large scale major housing developments (>100 dwellings), and any other strategic built developments or allocations that are likely to increase exposure of members of the public and workers to increased human health impacts.
- 18.11.4 Those cumulative developments identified and considered relevant to are set out in **Table 18.11** below.

Table 18.11: Cumulative Developments Relevant to Human Health

Development Name / Reference	Description	Quantum of Development
Planning Inspectorate (NSIPs)		
Not Applicable		
North Northamptonshire		
Niort Way, Wellingborough	Urban extension – mixed use	3,000 dwellings >26,000m ² business and employment space
Niort Way Phase 2, Wellingborough	Residential development	250 dwellings
Prologis Park	Business and employment development	200,000m ² business and employment space
Grendon Lake BESS	BESS development	~50MWh BESS
Grendon Lake Solar	Solar PV development	-----
West Northamptonshire		
Overstone Leys	Urban extension – mixed use	2,000 dwellings 8,000m ² business and employment space
North Overstone	Urban extension – mixed use	1,600 dwellings 8,000m ² business and employment space
Milton Keynes		
Not Applicable		
Bedford		
Not Applicable		

- 18.11.5 During construction, there is potential for cumulative effects on human health as a result of localised pockets where multiple developments overlap in terms of construction works, visual



impacts, and on sense of place and identity of existing communities. Key areas of focus for further assessment in the ES will be in the Moulton, Overstone, and Sywell area; Mears Ashby; Hardwick and Queensway, Wellingborough; and Grendon. Topic areas and receptors likely to experience significant cumulative effects, and therefore subject to further assessment are:

- For localised cumulative effects:
 - Air quality;
 - Community identity, culture, resilience and influence;
 - Land quality;
 - Noise and vibration;
 - Open space, leisure and play; and
 - Transport modes, access and connections.
- For wider cumulative effects:
 - Community identity, culture, resilience and influence;
 - Employment and income;
 - Health and social care services (primary and emergency healthcare);
 - Housing;
 - Open space, leisure and play;
 - Transport modes, access and connections; and
 - Wider societal infrastructure and resources.

18.11.6 Cumulative effects are not anticipated with respect of climate change mitigation and adaptation, education and training, health and social care services (residential care services), radiation (electromagnetic fields), and water quality and availability.

18.11.7 A full assessment of cumulative effects is to be presented in the ES and will be based on the most up-to-date publicly available information about the cumulative developments assessed.

18.11.8 Cumulative effects during operation are less likely to be significant due to the reduced level of activity associated with the Scheme, and the movement from construction activity to operational or occupational activity on any other assessed developments. That notwithstanding, the long-term nature of cumulative effects will also be taken into account in respect of their significance. This is particularly apparent to areas in which multiple developments are taking place in a visually localised area. As such, there is a high chance of significant effects in relation to community identity, culture, resilience and influence.

18.11.9 Cumulative effects at the point of decommissioning are likely to be substantially fewer than those experienced during construction, as there is minimal anticipated overlap in project decommissioning timeframes for assessed projects and developments. Residential and employment developments are not anticipated to be decommissioned and are assessed as being permanent. The likelihood of significant cumulative effects is reduced as most built developments such as those for residential and employment use are treated as being permanent in nature with no prospective decommissioning timeframe.

In-combination effects

18.11.10 The Scheme has potential to incur combined effects with regard to human health with other topics assessed within this ES. In compliance with paragraph 5(2)(a) to (d) of the EIA Regulations (Ref.1), the following interactions are considered:

- The combination of individual effects, for example, the combined effects of noise, dust and visual effects on a particular receptor;



- The combination of individual topics, for example, the combined effects of climate change on ground conditions;
- The combination of different works of the Scheme on a particular receptor for example, the in-combination effects of the construction of the Cable Route Corridor and the energy storage at the same time; and
- The combined effects of the three generating stations.

18.11.11 By virtue of the numerous interdependent factors assessed within this human health assessment, in-combination effects are intrinsic to the understanding of the relationship between the Scheme's impacts as assessed across the PEIR. Those identified in this chapter demonstrate in-combination effects of climate change, landscape, flooding, ground contamination, noise and vibration, air quality, electromagnetic fields, and socio-economics, tourism and recreation.

18.11.12 The conclusions of this preliminary assessment should be read in conjunction with those in **Chapter 23: Major Accidents and Disasters**, which draws parallels to the assessment of human health impacts, albeit focussing on acute and high magnitude impacts to physical health and the risk of injury and death. As such, it is likely that there will be in-combination effects with Major Accidents and Disasters, however as preliminary residual effects (Section 23.9 of **Chapter 23: Major Accidents and Disasters**) are not anticipated to be significant, it is unlikely that in-combination effects with human health are likely to be significant. The level of significance of these will be determined in full in the ES following completion of the Scheme design for DCO submission.

18.11.13 The in-combination effects of human health generated from the Scheme will be fully assessed in the ES and likely to consist of in-combination effects from multiple topic areas, and multiple parts of the Scheme on individual human health receptors to a greater degree than on overall populations and sub-populations. As the assessment of human health effects assesses the impact of the Scheme on the general population and specific vulnerable sub-populations relevant to each type of human health impact, it is not anticipated that there are any additional significant effects as a result of the combination of effects from the Scheme.

18.12 Summary

18.12.1 This chapter of the PEIR has identified the existing environment in relation to human health and wellbeing and the assessment work that has been undertaken to date to identify preliminary environmental effects as a result of the Scheme.

18.12.2 Preliminary mitigation measures including the securing of good practice measures, the promotion of local employment and skills uplifting, and opportunities to improve community engagement and influence are being explored and have been described with potential residual effects outlined. However, it is to be noted that it is not possible to identify all significant likely environmental effects of the Scheme at this stage.

18.12.3 To complete the ES for DCO submission, the assessment of human health effects will require the following additional work:

- Baseline conditions will be re-assessed incrementally as new information, such as updated GP and DWP data, and updated OHID health profiles are published;
- As the design of the Scheme is updated, the construction and operational programmes upon which the assessments throughout the ES are based will need to be updated, as will the results of the assessment thereof;
- As the finalised layout (for DCO) and associated mitigation of the Scheme are integrated into the Scheme design, the assessment of effects across all assessment receptors will be updated;
- Updated assessments will feed into the drafting of outline mitigation documents to be secured through the DCO. The level of mitigation that can be secured will then be used to assess the post-mitigation residual effects of the Scheme, and any cumulative effects from other developments in the relevant Zone of Influence.



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